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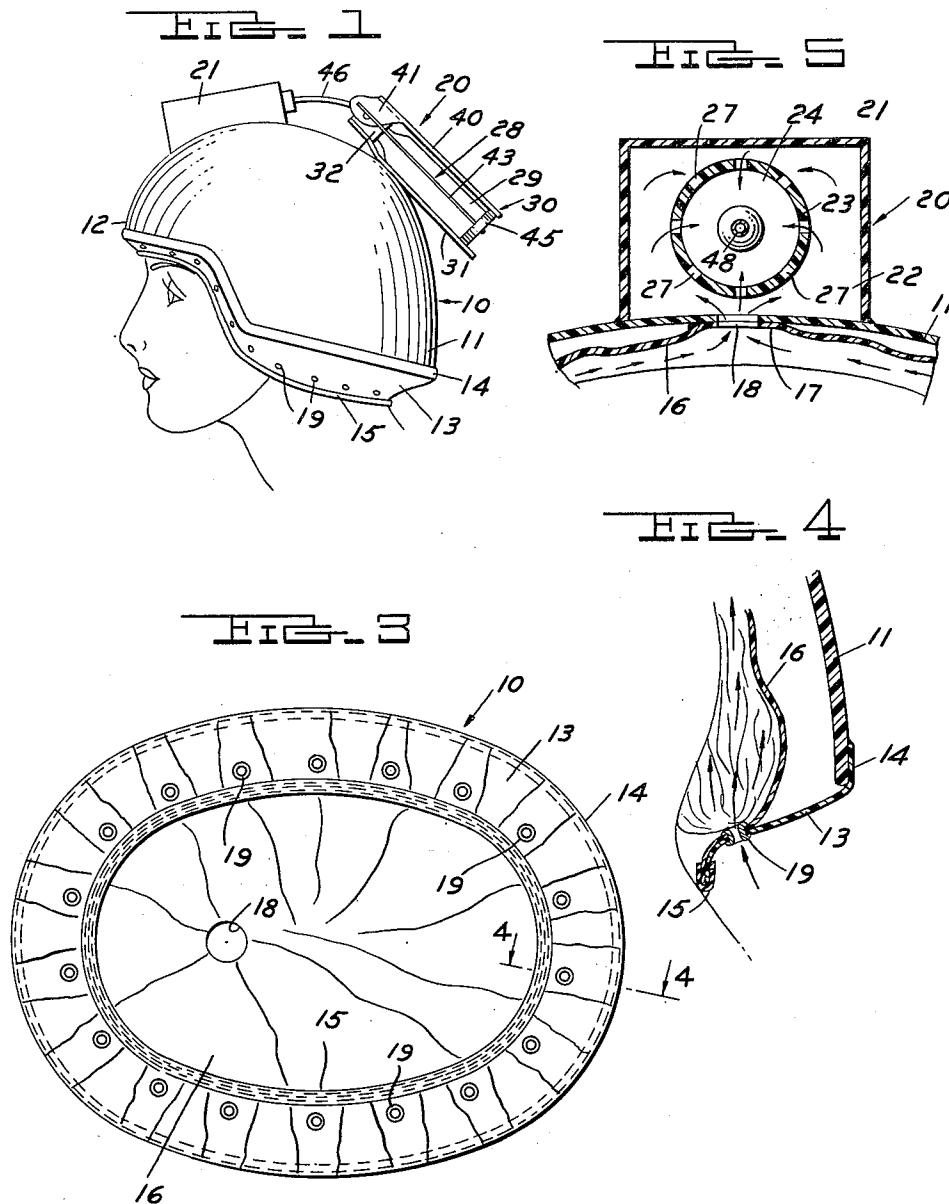
A. L. BUNTING

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HAIR DRIER

Filed Feb. 12, 1951

2 SHEETS—SHEET 1



INVENTOR.

ALBERT L. BUNTING

BY

Whitham & Haller & Bell
ATTORNEYS

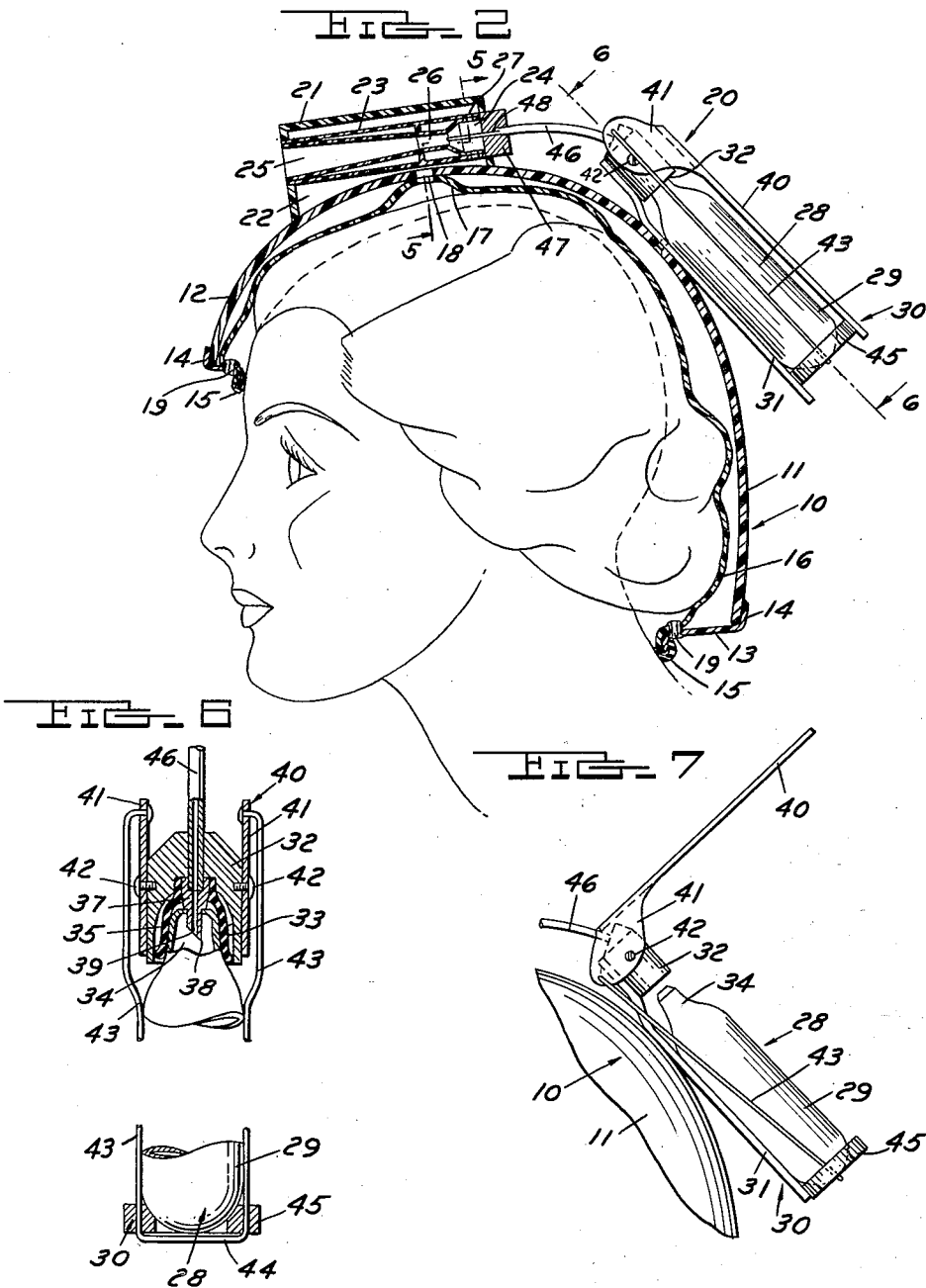
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2 SHEETS—SHEET 2



INVENTOR.
ALBERT L. BUNTING
BY

William H. Huber & Bellman
ATTORNEYS

UNITED STATES PATENT OFFICE

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HAIR DRIER

Albert L. Bunting, Dearborn, Mich., assignor to
Speedryer, Inc., Detroit, Mich., a corporation
of Michigan

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12 Claims. (Cl. 34—99)

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This invention relates to hair drying apparatus and refers more particularly to improvements in hair driers of the cap type.

It is an object of this invention to force dry hair with a cap characterized in that the several parts thereof, including the power means, are self-contained; or in other words, form a unit requiring no connection whatsoever with an outside or separate power source. Thus movement of the user during the drying operation is not restricted in any way, and the cap may be used effectively in practically any locality regardless of the availability of utilities.

In accordance with this invention air is forcibly drawn through the cap by flowing fluid under pressure through a jet-type passage having a reduced pressure chamber communicating with the space between the cap and hair of the user. The fluid under pressure is supplied by a replaceable cartridge removably supported on the cap by a holder having provision for piercing the cartridge as the latter is installed on the holder.

With the above in view it is another object of this invention to provide the cap with a flexible membrane adapted to cover the hair to be dried, and being sufficiently flexible to collapse toward the hair in response to the reduction in pressure caused by flow of fluid under pressure through the jet tube. With such an arrangement the major volume of the air drawn through the cap is restricted to passage in close proximity to the scalp. Thus for a given volume of air drawn through the cap a greater amount passes through the interstices naturally present in the mass of hair and a lesser amount of air passes over the top of the mass of hair. Consequently the hair drying time is reduced to a minimum.

It is a further object of this invention to provide a hair drying cap of the above type which is extremely light in weight, and is composed of a relatively few simple parts capable of being inexpensively manufactured on a production basis.

The foregoing as well as other objects will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawings, wherein:

Figure 1 is a side elevational view of a hair drying cap embodying the features of this invention and showing the same applied to the head of a user;

Figure 2 is a sectional view through the cap shown in Figure 1;

Figure 3 is a bottom plan view of the cap;

Figure 4 is a sectional view taken on the line 4—4 of Figure 3;

Figure 5 is a cross sectional view taken on the line 5—5 of Figure 2;

Figure 6 is a sectional view taken on the line 6—6 of Figure 2; and

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Figure 7 is a fragmentary elevational view of a part of the construction shown in Figure 1.

Referring now more in detail to the drawing, it will be noted that the numeral 10 designates a hair drying cap having a rigid part 11 shaped to fit over the head of a user and preferably formed of an inexpensive, light weight, rigid material such for example, as moldable plastic, rubber, synthetic rubber, aluminum, magnesium and other equivalent materials.

Regardless of the material used in fabricating the body part 11 of the cap, this material is molded or otherwise fashioned to conform generally in shape to the human head. The bottom of the body part 11 is open to freely receive the head of a user, and the front portion 12 is cut away to extend over the forehead above the eyes of the user.

The bottom edge of the body part 11 has a flexible ring-like strip 13 secured thereto, and this strip extends inwardly from the bottom edge of the body part 11. The strip 13 may be formed from a wide variety of flexible materials, but particularly satisfactory results have been obtained by forming the strip 13 from a thin highly flexible plastic sheet. By following this procedure, the outer peripheral edge portion 14 of the strip may be heat sealed, cemented or otherwise secured throughout its extent to the bottom edge portion of the body part 11. A suitable elastic ring 15 is preferably secured to the inner edge of the ring-like strip 13, and enables fitting the cap to a wide range of head sizes.

The cap or body part 11 is lined with a flexible membrane 16 shaped to correspond generally to the body part and having the bottom edge suitably fastened to the inner edge of the strip 13. The top of the membrane 16 has a localized portion 17 heat sealed, cemented or otherwise secured to the adjacent wall of the body part 11. The portion 17 of the membrane and the adjacent portion of the rigid body part 11 having registering openings therethrough which cooperate to form an air outlet 18 at the top of the cap.

Air is admitted from the atmosphere into the interior of the cap or membrane 16 through an inlet comprising a plurality of openings 19 formed in the ring-like strip 13 and spaced from each other around the strip. In practice it has been found that highly satisfactory results are obtained by proportioning the area of the outlet 18 and the combined area of the inlet openings 19 so that the latter area does not exceed five times the area of the outlet 18.

It has been found by exhaustive experiments that hair may be more thoroughly dried in a shorter length of time by flowing the air through the interstices inherently present in the mass of hair confined by the cap. In other words it is important to confine the flow of air in the cap

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so that the majority of the air is compelled to flow through the hair, and is restrained from passing over the top of the mass of hair. By confining or channelling flow of air in close proximity to the scalp, the temperature of the air is raised to some extent by heat flowing from the scalp, and the ability of the air to carry moisture is increased. In the present instance the flow of air through the cap is confined by designedly forming the membrane 16, so that it possesses sufficient flexibility to collapse toward the hair or scalp of the user in response to drawing air through the outlet 18 from the interior of the cap.

In accordance with the present invention, air is forcibly drawn through the cap by a self-contained device 20. This device is shown in Figures 2 and 5 of the drawings as having a casing 21 secured to the top of the rigid body part 11 over the outlet 18 and cooperating with the body part to form a chamber 22 which is sealed from the atmosphere. If desired the casing 21 may be formed of a plastic material compatible with the plastic used in forming the body 11, in order to permit fusing the casing 21 to the body part 11.

The casing 21 forms a housing for a convergent-divergent nozzle or jet tube 23 which may also be formed of molded plastic, if desired; and extends axially through the front and rear walls of the casing. The jet tube or nozzle has a suction chamber 24 at the rear and an outwardly tapering expansion chamber 25 at the front end. The two chambers are connected by a restricted throat 26 extending axially of the tube. Referring now to Figure 5 of the drawings, it will be noted that the suction chamber 24 in the jet tube 23 communicates with the chamber 22 and outlet 18 through the medium of a plurality of openings 27 formed in the wall of the suction chamber 24. The arrangement is such that fluid or gas flowing at high velocity through the restricted throat 26 produces a suction in the chamber 24 sufficient to draw air from the cap through the outlet 18. The expansion chamber 25 at the front or discharge end of the throat 26 communicates with the atmosphere so that the air drawn from the cap is discharged into the atmosphere.

Fluid or gas under substantial pressure is discharged into the rear end of the jet tube 23 from a source of supply 28 comprising a cartridge containing a supply of the selected fluid under pressure. Numerous different types of fluid or gas under pressure may be employed. In general it is preferred to use a gas of low molecular weight that may be liquefied at relatively low pressures, and which is non-toxic, practically odorless, inexpensive and noninflammable. Examples of suitable gases are halogenated hydrocarbons. Gases produced commercially under the trade names "Freons" and "Genetrons" have been used with considerable success.

Regardless of the gas employed, a replaceable cartridge 29 is provided for storing the gas under substantial pressure. For the purpose of illustration the cartridge 29 is mounted on the rigid body part 11 by a holder 30 having a support in the form of a bar 31 suitably secured to the body part 11 in rear of the casing 21 and having a socket 32 secured to the front end thereof. As shown in Figure 6 of the drawings, the socket 32 has a rearwardly opening recess 33 into which the neck portion 34 of the cartridge is adapted to project. A nipple 35 of resilient

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material, such for example as rubber, is secured within the recess; and is of a nature to snugly fit around the neck portion 34 of the cartridge to form an effective seal.

It will further be noted from Figure 6 that a tubular pin 37 is suitably secured to the base of the socket 32 and projects centrally into the recess 33 through the nipple 35. The rear end of the pin 37 is chamfered to provide a knife edge 38 and a passage 39 extends axially through the pin. The knife edge 38 at the rear end of a pin is of a nature to puncture the sealed end of the neck portion 34 on the cartridge 29, and thereby release the gas under pressure through the passage 39.

The cartridge 29 is held in place on the support 31, and is moved into the socket to accomplish the piercing operation by a lever 40. The lever 40 has ears 41 at opposite edges adjacent the front end thereof which straddle the socket 32 and are pivoted to the latter by pins 42. The ears 41 are also respectively pivotally connected to the front ends of a pair of rods 43 at points spaced laterally from the pins 42, so that when the lever 40 is swung downwardly from the position shown in Figure 7 of the drawings to the position shown in Figure 2 adjacent the cartridge 29, the rods are pulled forwardly. Referring again to Figure 6 of the drawings, it will be noted that the rear ends of the rods are connected by a transverse part 44 and provide a support for a socket 45. The socket 45 is slidably mounted on the support 30 and is engaged by the rear end of the cartridge 29. The construction is such that forward displacement of the rods 43 by the lever 40 shifts the cartridge 29 into the socket 32 where the pin 37 punctures the neck portion 34 of the cartridge.

The released gas under pressure flowing through the passage 39 in the pin 37 is conducted to the suction chamber 24 of the jet tube 23 by a conduit 46 having the rear end anchored in the socket 32 in communication with the passage 39. The front end of the conduit 46 is secured to a fitting 47 on the rear wall of the casing 21, and communicates with the rear end of a substantially reduced conduit 48. The rear end portion of the conduit 48 is anchored in the fitting 47, and the front end extends through the suction chamber 24 to a position adjacent the entrant end of the throat 26. Thus gas under substantial pressure from the cartridge 29 is discharged at high velocity into the throat 26 of the jet tube 23. The rapid flow of the gas through the throat 26 to the atmosphere creates a reduced pressure in the chamber 24 which is sufficient to forcibly draw air into the cap through the openings 19 and to also draw air from the interior of the cap into the suction chamber 24, through the outlet 18 and openings 27. The air drawn into the chamber 24 is moved at high velocity by the gas through the throat 26 and expansion chamber 25 to the atmosphere.

As stated above the air drawn through the cap by the flow of gas under pressure through the jet tube 23 collapses the membrane 16 against the hair of the user. This membrane conforms itself to the irregular contour of the mass of hair, and confines the flow of air to a restricted space adjacent the scalp of the user. As a result the air actually passes through the interstices naturally formed in the mass of hair, and the latter is thoroughly dried in a minimum length of time.

Actually the hair is usually thoroughly dried before the supply of gas in the cartridge 29 is

exhausted, so that it is not necessary to replace this cartridge during the hair drying operation. The cartridge however may be readily replaced by merely swinging the lever 40 to the position shown in Figure 7 of the drawings. This procedure releases the clamping action on the cartridge, and enables quickly removing the cartridge from the holder 30.

What I claim as my invention is:

1. Apparatus for drying hair comprising a cap having a part adapted to be placed on the head of a user over the hair to be dried, an air outlet in the upper portion of the cap communicating with the space between said part and scalp of the user, an air inlet in the cap positioned to communicate with the space between said part and scalp of the user at a point spaced from the air outlet, means carried by the cap for forcibly drawing air into said space through the inlet and for expelling the air through the outlet, said means including a passage having a restricted throat and having a suction chamber at the entrant end of the throat communicating with the air outlet in the cap, a source of gas under pressure carried by the cap, and means for directing gas from the source through the suction chamber and into the entrant end of said throat.

2. The apparatus defined in claim 1 having a membrane supported by the cap in a position to extend over the hair to be dried and being sufficiently flexible to collapse toward the hair in response to a reduction in pressure in the region of the outlet created by the jet of gas flowing through the throat in said passage.

3. The apparatus defined in claim 1 wherein the outlet is positioned adjacent the top of the cap and wherein the inlet comprises a plurality of openings through the cap adjacent the bottom of the latter.

4. The apparatus defined in claim 1 having a suction chamber in the passage at the entrant end of the throat and communicating with the outlet, an expansion chamber in the passage at the discharge end of the throat communicating with the atmosphere, and a passage connecting the source of gas under pressure to the expansion chamber and having a restricted discharge end positioned to direct gas under pressure into the entrant end of the throat.

5. The apparatus defined in claim 1 wherein the source of gas under pressure comprises a replaceable sealed cartridge, a holder for the cartridge supported on the cap and having a socket for receiving one end of the cartridge, means responsive to inserting said one end of the cartridge into the socket for piercing the cartridge and releasing the gas, and a passage connecting the socket in said part to the entrant end of the throat.

6. The apparatus defined in claim 5 wherein the cartridge piercing means comprises a pin extending into the socket from the base of the latter and having a passage therethrough, and a conduit connecting the passage in said pin to the entrant end of said throat.

7. The apparatus defined in claim 6 wherein the holder has means for selectively moving the cartridge in a direction to project the said one end of the same into the socket and into engagement with the piercing pin.

8. Apparatus for drying hair comprising a cap having a part adapted to be placed on the head of a user over the hair to be dried, an air outlet in the upper portion of the cap communicating with the space between said part and scalp of

the user, an air inlet in the cap positioned to communicate with the space between said part and scalp of the user at a point spaced from the air outlet, means carried by the cap for forcibly drawing air into said space through the inlet and for expelling the air through the outlet, said means including a member secured to the cap part and cooperating with said part to form a closed chamber communicating with the outlet, a jet tube extending through opposite walls of the chamber and having an expansion chamber at the discharge end communicating with the atmosphere, a suction chamber at the intake end of the tube communicating with said outlet, a restricted throat in the tube connecting the expansion and suction chambers, a source of fluid under pressure carried by the cap, and a supply passage extending from the source to the suction chamber and having a restricted outlet positioned to discharge into the entrant end of the throat.

9. The apparatus defined in claim 8 wherein the source of fluid under pressure comprises a replaceable cartridge and wherein means is provided at the inlet end of the supply passage for piercing said cartridge to release the fluid under pressure.

10. The apparatus defined in claim 8 having a flexible membrane supported by the cap in a position to extend over the hair to be dried and being sufficiently flexible to collapse toward the hair in response to the suction produced in the chamber by the flow of fluid under pressure through the throat of the jet tube.

11. Apparatus for drying hair comprising a cap having a rigid part shaped to receive the head of a user, a flexible membrane within said part and adapted to cover the hair to be dried, the flexible membrane having a portion at the top fixed to the adjacent portion of the rigid part and said portions being apertured to provide an outlet, the flexible membrane also having the portion at the bottom fixed to the part adjacent the lower edge of the latter and having an air inlet in said bottom portion, the remaining portions of the membrane being free from connection with said part and said membrane being sufficiently flexible to collapse against the hair in response to drawing air through the space between the membrane and hair from the inlet to the outlet, and means carried by the cap for forcibly drawing air from the inlet and through said outlet.

12. The apparatus defined in claim 11 wherein the means for forcibly drawing air through the cap includes a passage having a restricted throat, and having a suction chamber at the entrant end of the throat communicating with the air outlet, a source of gas under pressure carried by the cap and means for directing gas from the source through the suction chamber and into said throat.

ALBERT L. BUNTING.

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