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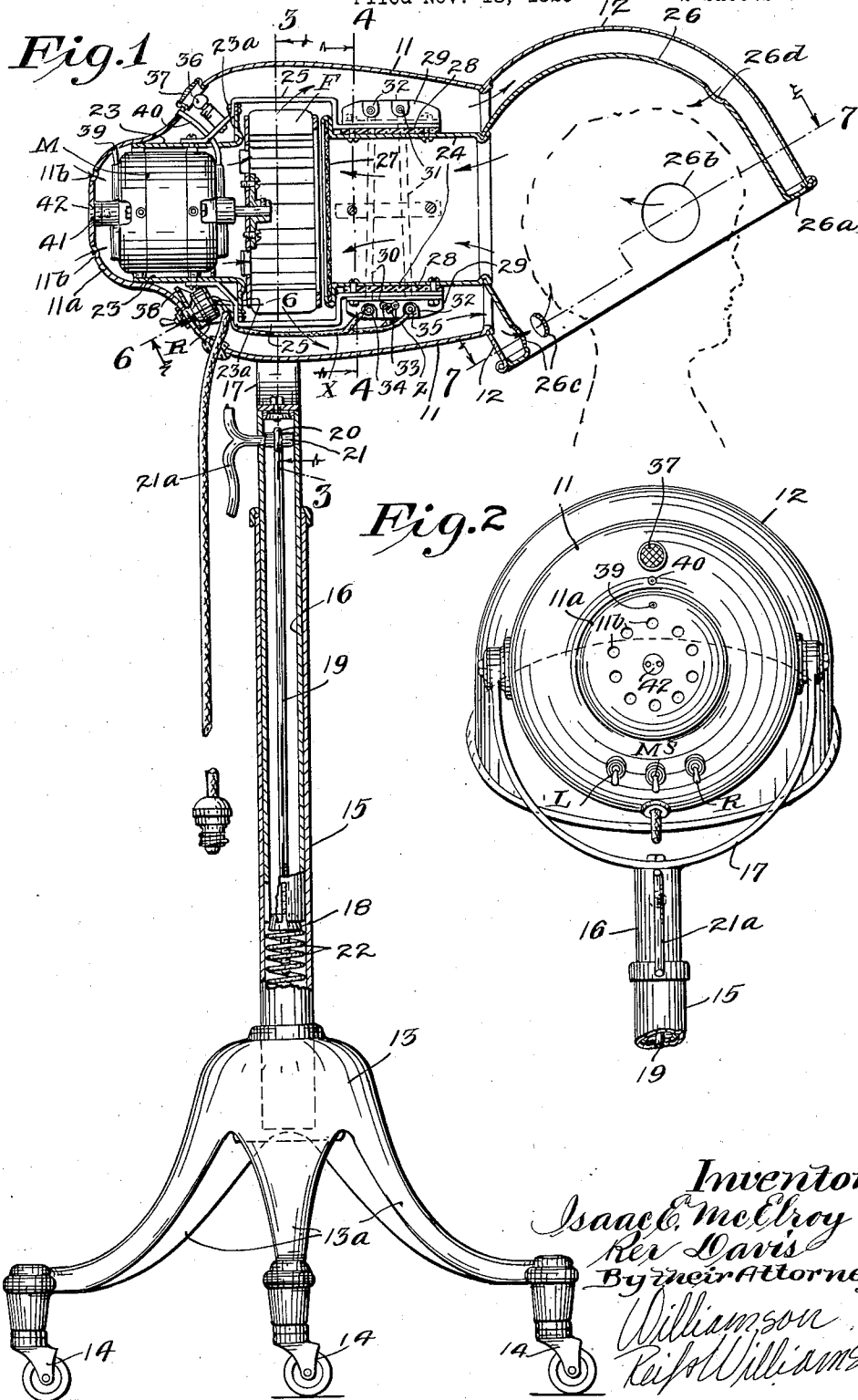
I. E. McELROY ET AL

2,012,473

HAIR DRIER

Filed Nov. 18, 1929

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 3

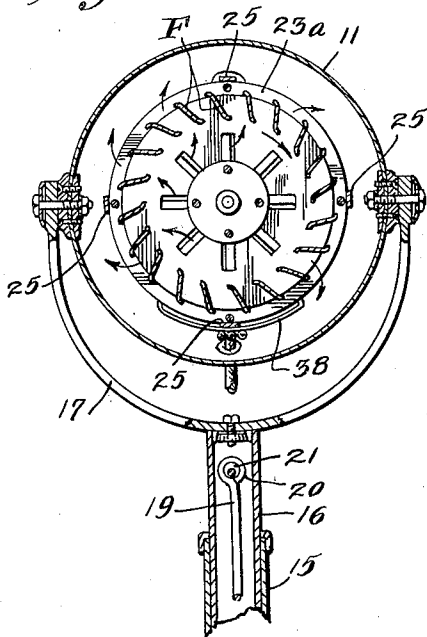


Fig. 4

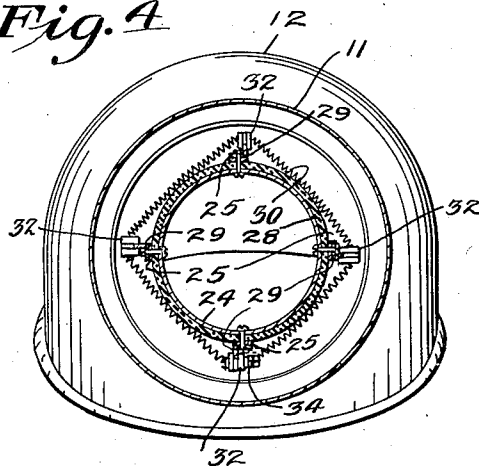


Fig. 7

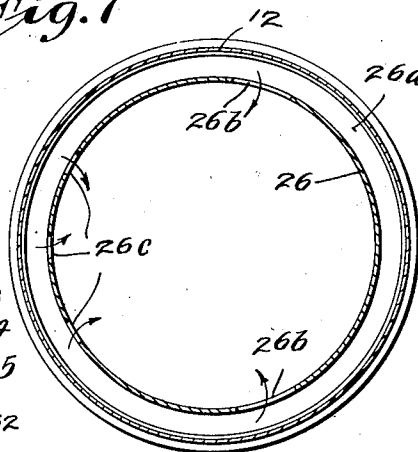


Fig. 6

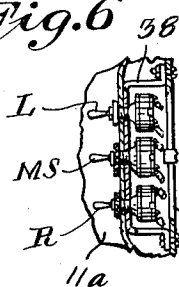


Fig. 5

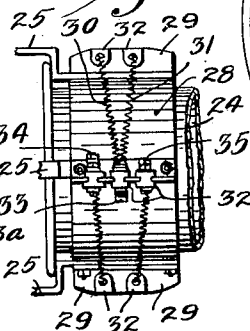
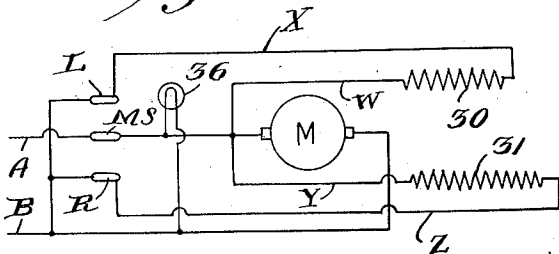


Fig. 8



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UNITED STATES PATENT OFFICE

2,012,473

HAIR DRIER

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Application November 18, 1929, Serial No. 407,893

7 Claims. (Cl. 34—26)

This invention relates to a process for drying hair and to hair driers of the type wherein a stream of air is projected upon the scalp by means of a fan or impeller.

5 With most commercial hair driers used at this time it is difficult to dry the entire head of hair uniformly, the hair at the sides of the head and at the rear usually being the last to dry and the neck, ears, face and person of the subject are often unpleasantly heated, due to the fact that
10 all of the heated air projected against the scalp escapes outwardly and downwardly about those parts.

Furthermore, most commercial hair driers include electrically operated fans and are objectionably noisy and also require a considerable amount of time to adequately dry the hair. The initial drying of the hair is carried out by subjecting a heated blast of air against the head, the
15 air passing over electrical heating elements in its passage through a blower casing. Cold air is taken from without the casing. Consequently, powerful heating elements are required which consume a substantial amount of electrical current.
20 Even with such a heating device, and with a comparatively high speed fan, few commercial driers manufactured at this time can dry an average head of treated hair in less than forty-five minutes.

25 It is an object of our present invention to provide a new and improved hair drier which will lessen the requisite amount of time for drying a head of hair, which may be operated more economically, utilizing less electrical current and which will dry a head of hair substantially uniformly.

It is a further object of our invention to provide a hair drier wherein the parts may be easily constructed and readily assembled at low cost, the motor fan, heating elements, electrical controlling switches and an inner casing being assembled in a single unit which is conveniently mounted within the ornamental drier casing.

30 A further object is to provide a hair drier which will be practically noiseless in operation and which will afford maximum comfort to the persons treated, eliminating the objectionable discharge of hot air about the neck and sides of the face of the subject.
35

It is a further object to provide an improved hair drier wherein air is distributed under some pressure at the most advantageous portions of the hair or scalp to insure a uniform drying of the hair, said air being discharged from a sub-

stantially annular confining chamber which is adapted to surround the head.

It is a further object to provide a hair drier wherein a stream of heated air is projected against the scalp and a substantial portion of said heated air then returned to or circulated through the drier casing and the heating elements, thereby facilitating the maintenance of the projected air at a predetermined temperature and effecting a substantial economy in current consumption.
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Another object of our invention is to provide a new and improved process for more quickly and thoroughly drying the hair.

These and other objects and advantages of the invention will be apparent from the following description made in connection with the accompanying drawings wherein like reference characters refer to similar parts throughout the several views and in which,
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Fig. 1 is a vertical section taken longitudinally through a preferred embodiment of our invention, the base of the standard being shown in side elevation.
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Fig. 2 is a rear elevation of the device with the lower portion of the standard broken away;

Fig. 3 is a cross section taken on the line 3—3 of Fig. 1;

Fig. 4 is a cross section taken on the line 4—4 of Fig. 1;

Fig. 5 is a fragmentary side elevation showing the mounting of the heating elements and the manner in which the air intake casing is secured to the fan motor;
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Fig. 6 is a section taken on the line 6—6 of Fig. 1, showing the manner in which the circuit controlling switches are secured to the inner unit and of their handles or tumblers conveniently disposed for manipulation from without the outer casing of the device;

Fig. 7 is a cross section showing the construction of the dome or air distributing casing and taken on the line 7—7 of Fig. 1; and

Fig. 8 is an electrical diagram showing the circuits through the motor, electrical heating elements and pilot light.

The embodiment of the invention illustrated in the drawings, includes an outer shell or casing 11 having a diminished or bossed rear end 11a which is provided with a series of relatively small circumferentially arranged air intake ports 11b. Casing 11, as shown, tapers slightly toward the front end thereof which end is open and secured to a dome-shaped hood 12. As shown, hood 12 is provided with a large eccentrically disposed circular aperture leaving a circular flange there-
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about of proper diameter to snugly surround the forward end of casing 11. The forward edge of casing 11 is pressed outwardly about and against the inner surface of said circular flange, said pressing also bending the stock of casing 11 inwardly on the outer side of the circular flange of the hood. The connection between casing 11 and hood 12 may thus be made rigid without the use of fastening means, welding or soldering. Hood 12 is open at its lower end and is preferably provided with a reinforced or beaded edge, said edge determining a plane which intersects the longitudinal center line of casing 11 at an acute angle.

Casing 11 is supported from a suitable upright standard, which is of an improved type and which will be subject matter of another application for U. S. Letters Patent. As shown, said standard comprises a pedestal or base 13, having diverging legs 13a, which may be supported by castors 14, if desired. An upright tube 15 is rigidly secured at its lower end to base 13 and has telescoped in the upper portion thereof a tubular post 16. Post 16 has rigidly secured to the upper end thereof a yoke 17, the oppositely disposed extremities of which are frictionally and swivelly secured to casing 11 to permit said casing to be swingably adjusted on a horizontal axis. Details of the frictional means for swingably mounting casing 11 will be described in said other patent application which will be filed for the adjustable standard. As illustrated, tubular post 16 is adjustably connected with supporting tube 15 by means of an improved mechanism which may be briefly described as follows:—

The lower end of tube 16 is provided with vertical slots to render the same expansible and a wedge member 18 is disposed concentrically of said lower end and is adapted to be forced upwardly within said lower end to expand the same and rigidly clamp post 16 to tube 15. Wedge member 18 is secured to the lower end of a vertical rod 19 which is disposed longitudinally within post 16 and the upper end of said rod is provided with an eye 20 which surrounds an eccentric 21 journaled transversely in the upper end of post 16. A handle 21a is connected with eccentric 21 and is disposed on the outer side of post 16 for convenient manipulation and when turned will move rod 19 longitudinally and thus operate the wedge 18. A coiled spring 22 may be disposed within the lower end of tube 15 engaging at its upper end wedge member 18 and if desired, the end of post 16, said spring receiving the weight of the drier proper and post 16, when wedge 18 is released and serving to partially support its weight and cause said parts to maintain a floating relation to facilitate vertical adjustment of the drier.

All of the other parts of our improved drier not previously described, including the motor, fan, inner casing, control switches, heating elements and pilot light are assembled in a compact unit which is mounted within casing 11 and hood 12 and secured thereto by very simple means. The frame for the unit includes a rear open ended cylindrical sleeve 23 having an out-turned annular flange 23a at its forward end. An electric fan motor M is secured concentrically in the rear portion of sleeve 23, its armature shaft projecting forwardly and concentrically of casing 11. A fan F of the cage type having a plurality of inclined circumferentially arranged blades and adapted to draw a stream of air inwardly and expel the same circumferentially thereof is fixed to the forward end of the armature shaft of motor M. An open ended cylindrical air intake

casing 24 is disposed forwardly of fan F and is secured to sleeve 23 by means of a series of elongated U-shaped spanning strips 25. Casing 24 terminates at its forward end substantially in a plane intersecting the forward end of outer casing 11 and a dome-shaped inner hood 26 of similar shape but of smaller dimensions than the outer hood 12 is secured rigidly to the forward end of casing 24 in a similar manner to the connection between outer casing 11 and hood 12. The forward and lower edge of inner hood 26 is turned outwardly to form an annular spacing flange 26a adapted to engage and be telescoped within the lower edge of outer hood 12. An air strainer 27 which may be constructed of suitable netting is secured across the rearward end of casing 24 disposed directly in front of fan F. An insulated ring 28 of suitable dielectric material surrounds the intermediate portion of casing 24 and a series of radially projecting lugs 29 are circumferentially arranged about ring 28 and secured thereto, as shown, four of said lugs being utilized. The lugs 29 may be struck up from the forward attachment ends of spanning strips 25 if desired.

The heating elements 30 and 31 surround the lugs 29 and are held in rectangular position spaced at most parts from insulated ring 28 thereby. As a convenient means for attaching the heating elements 30 and 31 we provide for each of the lugs 29 a pair of insulated eyelets 32 each having spaced flanges and said eyelets are slidably inserted in notched portions in the outer horizontal edges of lugs 29. The heating elements are inserted through their respective eyelets, and surround the ring 28 and are secured to terminal eyelets, as shown in Fig. 5. In the lug 29 in which the terminal eyelets are mounted, an extra central eyelet is provided carrying a suitable electric terminal 33 to which the input ends of heating elements 30 and 31 are secured. The output ends of said heating elements are secured to electric terminals 34 and 35 respectively which are connected with service wires, as shown in Fig. 1.

A pilot light 36 is mounted above the upper and forward portion of motor M and the socket therefor may be conveniently attached to an inclined portion of the upper spanning member 25, as clearly shown in Fig. 1, the pilot lamp being adapted to be aligned with a suitable lens 37 provided in an apertured portion of outer casing 11 just forwardly of the bossed rear end 11a.

Electrical control switches, as shown being three in number, and indicated as entireties by the letters L, MS, and R are mounted in a U-shaped strap 38, which may have turned attachment ends secured to the annular flange 23a of sleeve 23. The switches as shown, are of the tumbler type and the tumblers or handles extend through apertured portions of the outer casing 11 which are disposed in the lower and rearward portion of the casing below the boss 11a.

To facilitate oiling of the bearings of motor M, upwardly extending oiling tubes 39 and 40 may be provided communicating with the lubrication ports of the motor and terminating outwardly in apertured portions at the upper rear of the casing 11.

It will be seen that the several parts described above in the several preceding paragraphs are assembled in a compact unit which may be telescoped within the outer casing 11 in the manner illustrated in Fig. 1. The rear edge of sleeve 23 surrounding the motor is nested in the bossed portion of casing 11 and the rear end of the

motor is provided with an axially disposed internally threaded bushing 41 which when the unit is telescoped with the outer casing 11 will be axially aligned with a central countersunk aperture in boss 11a. A heavy screw or bolt 42 is passed through said aperture engaging bushing 41 and securing the entire unit within the outer casing 11.

The annular flange 26a of inner hood 26 is snugly telescoped within the lower edge of outer hood 12 serving to assist in holding the assembled unit axially of the outer casing and closing the annular chamber formed between the forward portion of said unit and the forward portion of casing 11 with its hood 12. It will be noticed that hoods 12 and 26 in cooperation form a relatively restricted annular chamber wherein air will be forced by fan F and compressed to some extent. Inner hood 26 is provided with several discharge ports of such size and disposed at points whereby uniform drying of the hair may be effected and as illustrated, two oppositely disposed ports 26b are formed in the portions of the inner hood which are adjacent the sides of the head of a person treated, while three relatively small ports 26c are positioned in the rear of hood 26 adjacent the lower edge, directing air, as indicated by the arrows, upwardly against the back of the head and then inwardly through the intake casing 24. Two more discharge ports 26d are formed in the forward intermediate portions of hood 26 adapted to discharge air upon the forward portion of the scalp, said air, for the most part, moving rearwardly in the direction of the arrows indicated. The total area of the several discharge ports 26b, 26c and 26d is substantially less than the area of the fan intake casing 24 so that pressure will be placed upon the air within the annular chamber between hoods 12 and 26.

In Fig. 8 a diagram of the electrical circuits is illustrated the letters A and B indicating the line. The main circuit is through a master switch MS, motor M and back to the line, the pilot lamp 36 being by-passed in said circuit. A second circuit is made through the line A in multiple through a conductor numbered w, through heating element 30, through conductor x, through switch L and back to line B. A third circuit is made through line A, through conductor y connected in multiple with motor M and conductor w to line A, through heating element 31, through conductor z, through switch R and back to line B. It will be seen that motor switch MS operates as a master switch for all circuits while switch L closes the circuit through the smaller heating element 30 when the motor switch is closed and switch R closes the circuit through the larger heating element 31 when the motor switch is closed. Pilot lamp 36 is illuminated when the motor switch is closed.

Operation

The operation of our improved drier may be briefly described as follows:—

When the circuits through motor M and one or more of the heating elements are closed, air will be drawn rearwardly by cage fan F through intake casing 24 axially of the fan. Small amounts of air will simultaneously be drawn through the small ports 11b in the rear boss of casing 11, said air passing through and cooling motor M and entering fan F axially and from the rearward side. Air will be displaced by fan F and expelled circumferentially of the fan into the space be-

tween casing 11 and intake casing 24 and will be moved forwardly through the restricted annular passage between hoods 12 and 26. This air will be discharged upon the scalp of a person treated through ports 26b, 26c and 26d in the inner dome or hood 26. A substantial proportion of the discharged air will impinge against the adjacent portions of the hair and scalp in the directions indicated by the arrows, while some of the discharged air will escape downwardly and out the open end of the double hood. Simultaneously, small amounts of fresh air will be drawn inwardly through inner hood 26 and be mixed or diffused with the surrounding air which passes through casing 24 in the direction indicated by the arrows. In this manner, a large per cent of the air displaced by the fan F is recirculated between the inner and outer casing over and about the scalp of the person treated and back into the fan. In actual practice a substantial proportion of the diffused air or mixed air which is recirculated is drawn into the intake passage (shell 24) for the fan through the space between the back of the head of the person treated and the interior back portion of the hood, while a relatively large amount of the air discharged through the ports 26b and 26d leaves the drier through the space between the upper and forward portion of the head of the person being treated and the forward portion of the hood. Diffusion occurs throughout the entire annular space between the head of the person treated and the interior of the hood, some currents of air going out and some entering, and a substantial proportion of the mixed air being recirculated through the drier. The recirculated air will retain most of its heat and will be more easily raised to the desired temperature by the heating elements 30 and 31 than if cold air were drawn in from the outside. Consequently, heating elements of relatively small value may be successfully utilized thereby economizing considerably upon the current needed for adequately heating the air discharged against the scalp. Because of our construction including the proximity and arrangement of the air directing ports 26b, 26c and 26d to the scalp, a high speed motor is not required in our drier. Accordingly, we have obtained excellent results with the use of a motor of less than twelve hundred R. P. M. The speed of most motors and fans utilized in hair driers causes a large amount of objectionable noise, while with the slow motor and cage-type fan, of the form illustrated, our drier is practically noiseless. In fact, it is necessary to provide the drier with a pilot light 26 to indicate to the operator that the motor is in operation.

The recirculation of a substantial portion of the discharged air, in addition to accelerating the heating of said air and economizing on the current consumption, prevents the objectionable downward hot discharge of air about the neck, body and sides of the face of the person treated. The combination of our circuits, construction and arrangement of the pilot light and switches is of considerable importance, since it permits either of the heating elements 30 and 31 to be utilized separately or both to be utilized thereby giving three different heats. Further, the circuits through the heating elements can never be closed when the motor is idle and this removes much of the attendant danger now found in most commercial driers on the market.

The construction of the telescoped unit containing the several working parts is of im-

portance, since it provides very simple compact construction which may be readily removed for repair or replacement of parts and which is connected and secured within casing 11 by the single bolt or screw 42. The labor of attaching and mounting parts within the cylindrical casing or shell of a drier is thus obviated and the several parts may be quickly assembled to form our unit.

By discharging air at the sides, front and rear of the scalp, air is caused to circulate about all portions of the hair and scalp and a uniform drying is obtained.

It will be seen that in addition to providing a more efficient and improved hair drier we have invented a novel and improved process for drying hair. This process or method consists in recirculating air about the scalp and through a heating element, drawing a stream of air rearwardly over the scalp and projecting that stream of air circumferentially and annularly about the scalp and discharging the same at points disposed circumferentially of the scalp, thereby preventing a substantial portion of the air from being discharged about the sensitive portions of the face, body and shoulders and effecting an economy in the heating of said air and a more uniform drying of the hair. From the foregoing description it will be apparent that our method further consists in loosely surrounding the scalp portion of a human head with an open bottomed hood and simultaneously projecting from spaced points, streams of heated air against the head in the hood; continuously discharging a portion of the projected air into the atmosphere while simultaneously diffusing another portion of the warm projected air with some relatively dry atmospheric air and recirculating the air made up by said diffusion and heating the diffused air in the recirculation.

The economy of current consumption with our drier is very substantial. We have previously made driers of well known type where the heated air is projected against the scalp and dissipated without re-circulation, and the heating elements in such driers required a current consumption of from fourteen to twenty amperes to produce reasonably successful results. With our improved drier construction, which discharges a substantially increased volume of air upon the scalp, the current consumption is less than five and one-half amperes and we are able to entirely dry a scalp which has been treated with liquid within less than eighteen minutes.

What is claimed is:

1. In a hair drier, an outer casing having an open forward end, an inner casing mounted within the forward portion of said outer casing and spaced therefrom to form between said casings a discharge passage, a fan in the rear portion of said outer casing adapted to project air through said discharge passage, the interior of said inner casing constituting an intake passage for said fan, and a hollow confining member adapted to surround a portion of the scalp and secured to the forward end of said outer casing, and communicating with said discharge passage, said confining member having a plurality of spaced air discharge ports adapted to direct air against the scalp.

2. In a hair drier, an outer casing having an open forward end, an inner casing mounted within the forward portion of said outer casing and spaced therefrom, to form in cooperation with said outer casing, an annular discharge passage,

a fan in the rear portion of said outer casing adapted to project air through said discharge passage, the interior of said inner casing constituting an air intake passage for said fan, an outer confining hood secured to the forward edge of said outer casing, an inner confining hood secured to the forward edge of said inner casing and spaced from said outer confining hood to form in cooperation therewith a continuation of said annular discharge passage, and closure means between said inner and outer hoods adjacent their forward edges, said inner hood having a plurality of spaced outlet ports for directing air against the scalp.

3. In a hair drier, an outer substantially cylindrical casing, means for directing air against a scalp from the forward end of said casing, a unit mounted within said casing, said unit comprising a motor adapted to be seated within the rear portion of said casing, a fan secured to the armature shaft of said motor and disposed forwardly thereof, a relatively short tubular casing disposed concentrically of and forwardly of said fan, means spanning said fan and secured to said motor and to said tubular casing for attaching said motor and casing together, and means for holding said tubular casing in spaced relation to said outer casing, and a heating element surrounding said tubular casing and supported in spaced relation therefrom.

4. In a hair drier, an outer casing of substantially circular cross section and having an open forward end, a hood connected with the forward end of said casing, a unit detachably mounted within said casing, said unit comprising a motor adapted to be seated within the rear portion of said casing, a fan secured to the armature shaft of said motor and disposed forwardly thereof, a relatively short tubular casing disposed concentrically of and forwardly of said fan, connecting means spanning said fan and secured to said motor and to said tubular casing, an inner hood of smaller dimensions than said first mentioned hood secured to the forward end of said tubular casing, said last mentioned hood being spaced from said outer hood when said unit is mounted in said casing, a switch box secured to the rear portion of said motor, switches in said box having control elements which project through the rear of said casing when said unit is mounted and a heating element surrounding said tubular casing and attached thereto.

5. In a hair drier, an outer casing of substantially circular cross section, air distributing means connected with the open end of said casing, a unit detachably mounted within said casing, said unit comprising a motor adapted to be seated within the rear portion of said casing, a fan secured to the armature shaft of said motor and disposed forwardly thereof, a tubular casing disposed forwardly and axially of said fan and spaced from said casing to define a central intake passage for said fan and an annular discharge passage for said fan, and means spanning said fan for connecting said tubular casing with the casing of said motor, and a heating element disposed in said annular discharge passage.

6. In a hair drier, a casing having a hood constructed to loosely surround the scalp portion of a human head, air heating means mounted within said casing, air circulating means also mounted in said casing and having an air intake and an air discharge, said air intake communicating with the space confined by said hood,

said hood including air directing means connected with the discharge of said air circulating means and having a series of spaced air discharge ports adapted to direct air against the scalp, the aggregate area of said discharge ports being less than the total effective flow area of the intake for said air circulating mechanism whereby streams of air will be discharged at relatively high velocity against the scalp.

7. A hair drier comprising a substantially continuous hood adapted to encompass the head in close proximity to the scalp and the hair to be treated, said hood consisting of an outer imperforate wall and an inner perforated wall suitably spaced from said wall so as to form a

chamber for the circulation of a drying medium therethrough, said chamber being closed at all of its edges, a casing secured to said hood and in communication with said chamber, a conduit in said casing in communication with said hood but out of communication with said chamber for introducing drying medium into the back of the casing, and means for drawing the drying medium introduced into said conduit into said casing and then projecting it forwardly toward said chamber to be discharged at the desired points of application.

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