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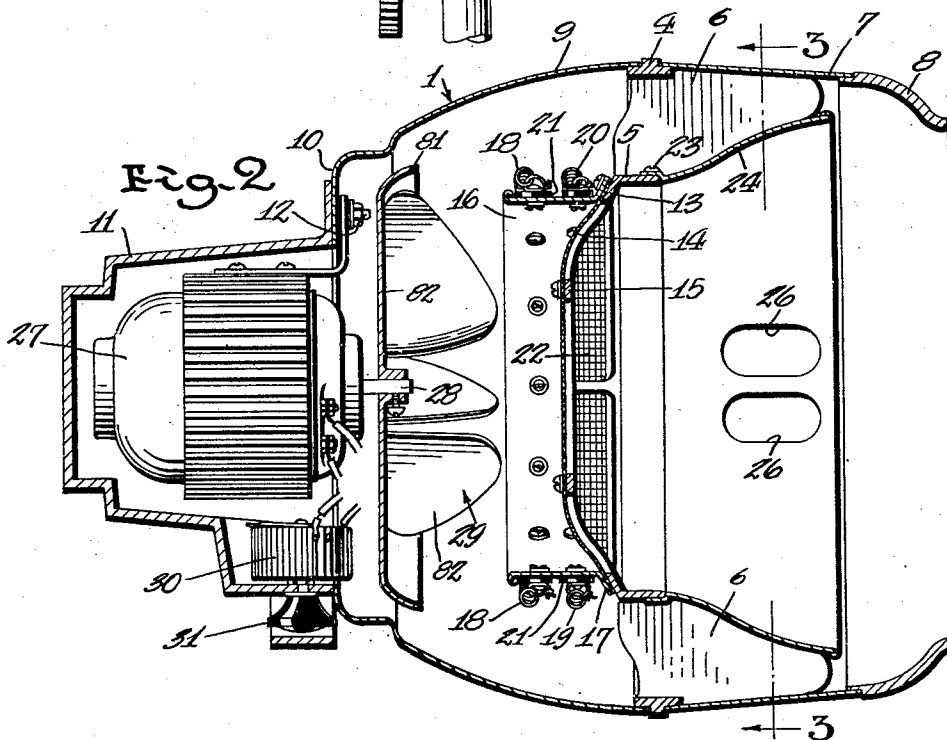
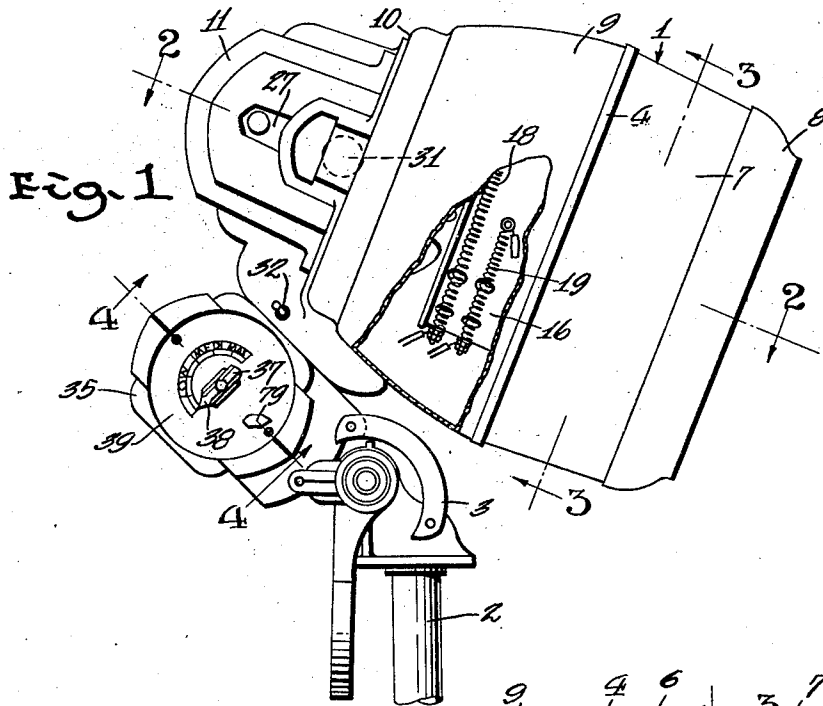
W. L. MARTIN

2,016,096

DRIER

Filed April 4, 1932

3 Sheets-Sheet 1



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INVENTOR
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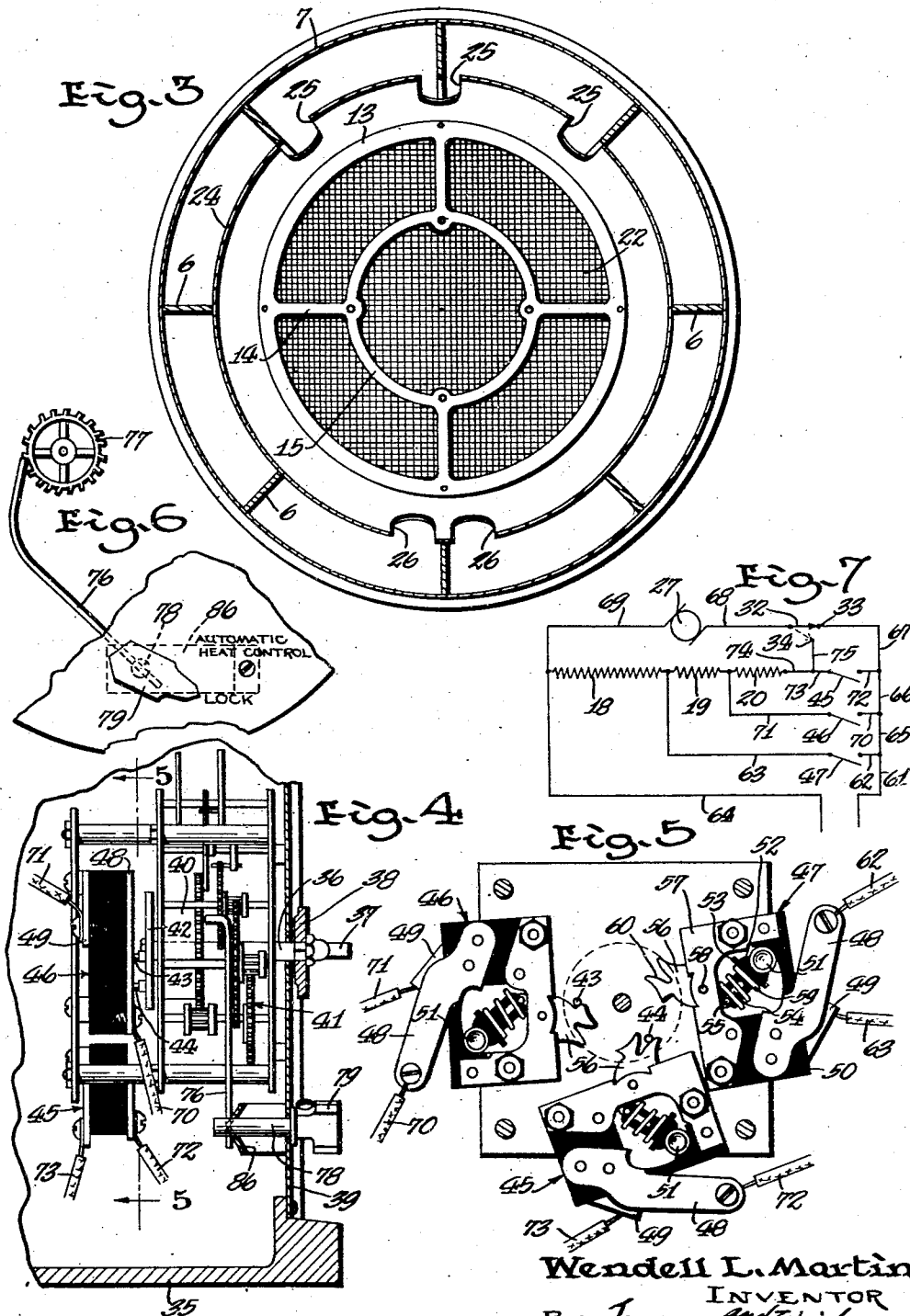
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DRIER

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3 Sheets-Sheet 2



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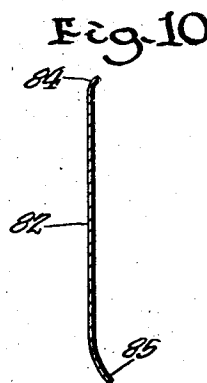
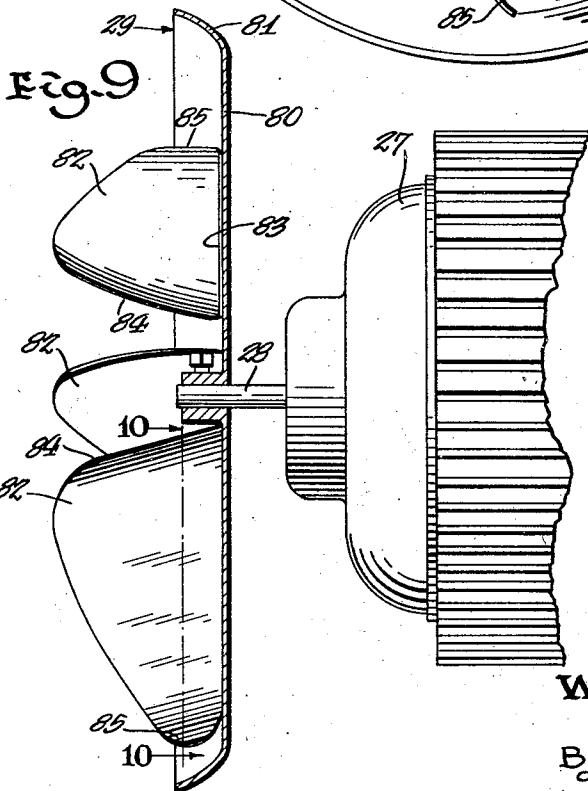
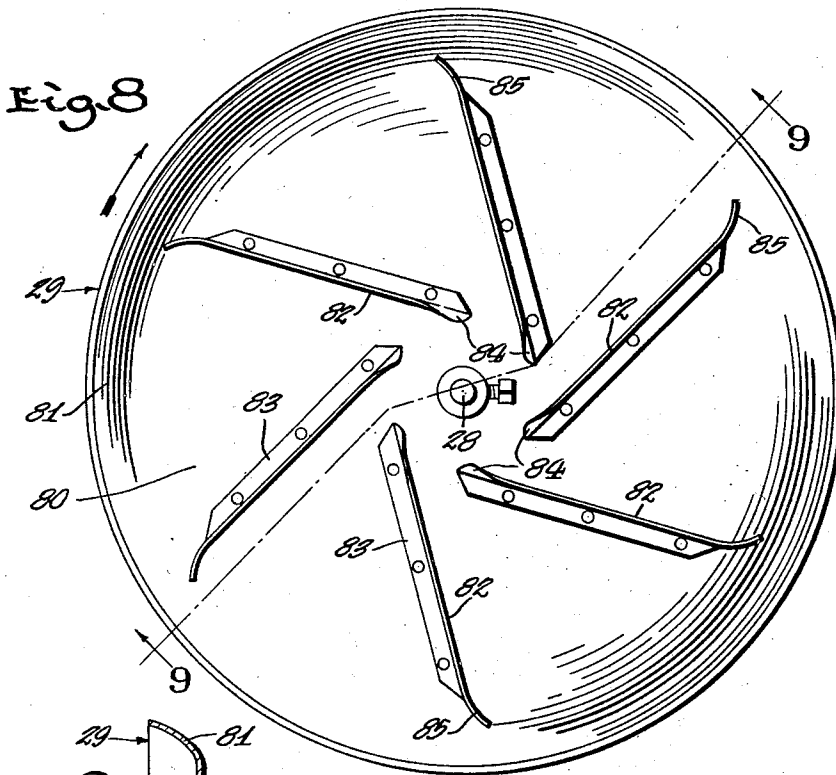
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,016,096

DRIER

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Application April 4, 1932, Serial No. 603,023

11 Claims. (Cl. 219—39)

My invention relates to driers, and has particular reference to driers for use in drying hair, or the hands, or the like, and the principal object of my invention is to provide a new and improved drier of this type.

In the drawings accompanying this specification and forming a part of this application, I have shown, for the purpose of illustration, one form which my invention may assume, and in these drawings:

Figure 1 is a side elevational view of a drier constructed in accordance with my invention, with parts broken away, to illustrate the location of the heating and resistance elements,

Figure 2 is an enlarged longitudinal sectional view taken on line 2—2 of Figure 1,

Figure 3 is a transverse sectional view taken on line 3—3 of Figure 1,

Figure 4 is an enlarged fragmentary sectional view through the timing mechanism, taken on line 4—4 of Figure 1,

Figure 5 is a vertical sectional view taken on line 5—5 of Figure 4,

Figure 6 is a fragmentary elevational view of the stop mechanism,

Figure 7 is a wiring diagram illustrating the electric circuits employed and the relative position of the contact elements and the heating and resistance elements controlled thereby,

Figure 8 is an enlarged front elevational view of the fan,

Figure 9 is a transverse sectional view taken on line 9—9 of Figure 8, while

Figure 10 is a transverse sectional view through one of the fan blades, taken on line 10—10 of Figure 9.

With reference to the drawings, a drier constructed in accordance with my invention is shown as comprising a substantially cylindrical hood, indicated as an entirety at 1, which is adapted to be directed toward the head and hair of the person whose hair is being dried and which may, if desired, at least partially embrace the same. The hood 1 is carried by a vertical tubular support 2 through the medium of interposed linkage mechanism 3.

The hood 1 preferably comprises an outer ring 4 and an inner ring 5, which are connected at intervals by radially extending fins or baffle elements 6 formed integrally therewith. The outer ring 4 carries a forwardly extending substantially cylindrical casing member 7 to the forward edge of which is secured a ring member 8 having inwardly inclined walls adapted to intercept the air issuing from the drier and to deflect it radially

inward against the head and hair. The ring 4 also carries a rearwardly extending substantially bell-shaped casing member 9 provided with an annular flange 10 adjacent to its rear end, to which a motor casing 11 is secured by means of bolts 12.

The inner ring 5 is formed with a rearwardly and inwardly extending flange 13 having a plurality of radially extending arms 14 formed integrally therewith which are integrally connected at their inner ends to a centrally disposed ring member 15. A substantially cylindrical member 16 is disposed within the casing member 9 in spaced relation thereto and is provided with a flange 17 which is secured to the flange 13 of the ring 5 and carries a circumferentially arranged heating element 18 and a plurality of resistance elements 19 and 20 which are insulated from the member 16 by spacing members 21 of insulating material. The resistance elements 19 and 20 are arranged around the lower half of the member 16 so that any heat radiating therefrom will heat the lower portion of the air stream flowing through the drier, which impinges in the vicinity of the nape of the neck and the lower portion of the hair. A screen 22 is secured to the flange 13 and ring 15 of the ring 5 so as to prevent any possibility of the hair being drawn into the drier by the inwardly flowing air stream. Secured to the forward edge of the ring 5, by means of screws 23, is a forwardly and outwardly flared substantially bell-shaped inner casing member 24, the forward edge of which terminates in a plane located just to the rear of the ring member 8 and is provided with a plurality of upper apertures 25 and a plurality of lower apertures 26, through which some of the air flowing through the casing, between the cylindrical member 7 and the inner casing 24, may pass inwardly for contact with the hair.

Suitably mounted within the motor casing 11 is an electric motor 27 provided with a forwardly extending shaft 28 to which a centrifugal fan, indicated in its entirety at 29, is fixed. This fan, as will be hereinafter explained, is designed to draw air inwardly into the drier in a centrally disposed stream through the inner casing 24 and to expel the same outwardly in a substantially annular stream surrounding the inflowing stream of air, through the space between the inner casing 24 and the outer casing member 7, and between the baffle members 6. These baffle members intercept the swirling air and direct the same in a forward direction, and also tend to prevent a localization of the air stream, such as

might be caused by an unequal obstruction of the outlet of the drier by the head. The speed of the motor may be controlled at will by means of a rheostat 30 carried by the motor housing 11 and provided with a suitable operating knob or handle 31, and the motor circuit may be opened and closed, in order to start and stop the motor, by means of a switch 32 which is also mounted on the motor housing 11 in a position where it may be readily accessible to the operator, and which cooperates with two fixed contact members 33 and 34.

The motor housing 11 is mounted directly upon a housing 35 which contains the timing mechanism for controlling the temperature of the heating element 18, hereinafter to be described, and which is connected at its lower end to the pedestal 2 by means of the linkage mechanism 3.

The timing mechanism, in the present instance, may be of any suitable commercial type of clock-work mechanism, and therefore need not be described in detail. For the purpose of this description, it is sufficient to state that this mechanism comprises a central shaft 36 provided at its outer end with an operating handle 37, by means of which the mechanism may be set in operation, and which is provided with a pointer 38 for cooperation with a suitable dial 39 provided exteriorly of the housing 35, and which may carry suitable indicia, such as "maximum heat", "medium heat" and "low heat", indicating the temperature of the air passing through the drier. The shaft 36 is driven by means of a spring 40, through the medium of interposed gearing mechanism 41, and is provided at its inner extremity with a disk 42 provided with a pair of substantially diametrically disposed pins 43 and 44.

The pins 43 and 44 successively operate a plurality of electric switches, each indicated as an entirety at 45, 46, and 47, respectively, which control the supply of electric current to the heating element 18 and to the resistance elements 19 and 20. Each of these switches comprises a plurality of fixed contact elements 48 and 49, which are mounted in spaced relation upon an insulating block 50 and which are adapted to be bridged by a movable contact element 51 in order to close the circuit controlled thereby. The contact element 51 is mounted on one end of an insulating member 52 provided with a collar 53 and is formed at its other end with a slot 54 adapted to receive a pin 55 carried by a lever 56 pivoted intermediate its ends on a bracket 57 by means of a pin 58. A spring 59 is interposed between the collar 53 and the pin 55 and urges the contact member 51 either into or out of operative position with respect to the fixed contacts 48 and 49 with a snap action, in the well known manner, when the pin 55 is moved from one side of the center to the other by the movement of the lever 56. The lever 56 is provided with a slot 60 adapted to be engaged by the pins 43 and 44 when the device is operated.

When it is desired to operate the drier, the shaft 36 is rotated in a clockwise direction, thereby winding the spring 40 of the clock-work mechanism. During the first part of this movement of the shaft 36, the pin 44 will first enter the slot 60 of the lever 56 of the switch 45, thereby swinging this lever about its pivot 58 sufficiently to cause the movable contact element 51 to be snapped to an over-the-center position where it will bridge the fixed contact elements 48 and 49 and close the circuit controlled thereby. Continued rotation of the shaft 36 carries the pin 44

out of the slot 60 in the lever 56 of the switch 45 and into the slot 60 of the lever 56 of the switch 46, thereby actuating the contact element 51 of this switch so as to close the circuit through the fixed contact elements 48 and 49. By this time the pin 43 has reached a point where it enters the slot 60 of the lever 56 of the switch 47 and actuates the contact member 51 of this switch so as to close the circuit through the fixed contact elements 48 and 49. After the switches 45, 46 and 47 have all been closed, as above described, the pin 43 engages the side of the lever 60 of the switch 45 and arrests the rotation of the shaft 36. The handle 37 is then released and the clock-work mechanism under the action of the spring 40 rotates the shaft 36 backwardly in a counter-clockwise direction at a predetermined rate.

When the switches are all closed, electric current will traverse a circuit of least resistance, which may be termed the maximum heating circuit, passing from a source of electrical energy through wires 61 and 62, switch 47, wire 63, heating element 18, and wire 64, back to source. A circuit for the motor 27 will also be established passing from the source of electrical energy through wires 61, 65, 66, 67, fixed contact 33, movable contact 32, wire 68, windings of motor 27, wire 69, and wire 64, back to source. Under these conditions, both the heating element 18 and the motor 27 are energized so as to cause a current of heated air to flow through the casing. When a predetermined time interval has elapsed, the pin 43 will actuate the lever 56 of the switch 47 so as to open this switch, thereby opening the maximum heating circuit just traced and compelling the current to traverse a medium heating circuit of increased resistance passing from the source of electrical energy through the wires 61, 65, and 70, switch 46, wire 71, resistance element 19, heating element 18, and wire 64, back to source. By reason of the increased resistance in this circuit, the electric current traversing the heating element 18 is reduced, thereby decreasing the heating effect of the heating element and the temperature of the air flowing through the casing.

After another time interval of predetermined duration has elapsed, the pin 44 rotates to a position where it enters the slot 60 of the lever 56 of the switch 46 and snaps the movable contact member 51 to an over-the-center position, thus opening the medium heating circuit and compelling the current to traverse a low heating circuit of still higher resistance passing from the source of electrical energy through wires 61, 55, 66, 72, switch 45, wires 73 and 74, resistance elements 20 and 19, heating element 18, and wire 64, back to source. By reason of the increased resistance of this circuit, the current traversing the heating element 18 is still further reduced, thereby resulting in a still further reduction in the temperature of the heating element 18 and that of the air passing through the casing.

At the expiration of a still further interval of time of predetermined duration, the pin 44 enters the slot 60 of the lever 56 of the switch 45 and actuates this lever to throw the movable contact element 51 to an over-the-center position, thus opening the low heating circuit and interrupting the supply of current to the heating element 18. However, with the switch 32 in the position shown in Figure 7, motor 27 will remain energized and cause the flow of air through the casing to continue. Under these conditions the air will be unheated and is utilized to cool the scalp follow-

ing the application of the relatively hot drying air. If, however, the switch 32 occupies the position shown in dotted lines in Figure 7, in which it is in engagement with the fixed contact 34, the motor will be energized by current traversing a circuit from the source of supply through wires 61, 65, 66, 72, switch 45, wires 73 and 75, fixed contact 34, movable contact 32, wire 68, windings of the motor 27, and wires 69 and 64, back to source. Under these conditions the motor 27 will be de-energized as soon as the switch 45 is opened, thereby causing the flow of air through the casing to automatically discontinue when the heating ceases. In this case, the application of cold air to the scalp is dispensed with.

As soon as the switch 45 has been opened, the pin 43 engages the side of the lever 56 of the switch 46, thereby arresting the turning movement of the shaft 38 in a counter-clockwise direction under the influence of the spring 40, and the operation of the timing mechanism.

The operation of the timing mechanism may at any time be rendered ineffective by means of a lock mechanism illustrated in Figure 6. This lock mechanism comprises an arm 76 which is adapted to be moved to a position in which the upper end thereof is in locking engagement with the teeth of a gear 77 of the gearing mechanism 41, thus preventing the operation thereof. The arm 76 is carried by a stud shaft 78 which is mounted in the housing 35 of the timing mechanism and is provided with an operating handle 79. An over-the-center cam 86 may be employed to maintain the arm 76 either in its locking or ineffective position.

The fan 29 preferably comprises a disk 80 having a forwardly curved outer periphery 81 and a plurality of fan blades 82 extending at right angles to the plane of the disk 80 and are provided with flanges 83 which are secured to the disk 80, and are arranged in spaced relation substantially tangentially of a circle having a diameter less than that of the disk 80. Each of the blades 82 is provided with a curved inner lip portion 84 and a curved outer lip portion 85. It has been found that by means of this particular construction, the fan operates very quietly, with a minimum of vibration, notwithstanding the speed of rotation thereof, and also that the volume of air displaced remains substantially constant throughout variations of speed, within reasonable limits. The air displaced by the fan flows inwardly toward the fan in a centrally disposed stream and is intercepted by the blade 82 and is forced radially outward thereby with a wiping action, until it reaches the curved periphery 81 of the disk 80, at which point it is deflected in a forward direction and is gradually released from the fan blade by the rearwardly curved lips 85, whereby vibration is materially reduced. The air then flows forwardly in a substantially cylindrical stream surrounding the inwardly flowing air stream.

It will be understood by those skilled in the art that the embodiments herein disclosed accomplish the principal object of the invention, and it will be apparent that the invention embodies uses and advantages other than those herein particularly referred to, and it will be further apparent that various changes and modifications may be made in said embodiments without departing from the spirit of the invention, and accordingly the disclosure herein is illustrative only and the invention is not limited thereto.

I claim:

1. A hair drier, comprising: a tubular casing; means for causing a current of air to flow through said casing; electrical heating means disposed within said casing and extending about the interior thereof and adapted to heat the air passing through said casing, said heating means including an additional resistance element disposed in said air stream; and mechanism for controlling operation of said air current means and said heating means, operable to connect said additional resistance element in circuit with said heating means to reduce the total heating effect thereof, said additional resistance element being positioned at one side portion of said casing and operating to concentrate the greater portion of the reduced heat of said heating means in a selected part of said air stream.

2. A hair drier, comprising: a tubular casing; means for causing a current of air to flow through said casing; electrical heating means disposed within said casing and extending about the interior thereof and adapted to heat the air passing through said casing, said heating means including a plurality of resistance elements disposed in said air stream; and mechanism for controlling operation of said air current means and said heating means, operable to successively connect said resistance elements in circuit with said heating means to progressively reduce the total heating effect thereof at a predetermined rate, said resistance elements being positioned at one side portion of said casing and operating to concentrate the greater portion of the reduced heat of said heating means in a selected part of said air stream.

3. Apparatus for subjecting a person to the action of a stream of gas-like fluid, comprising: a casing; a generator for generating a stream of fluid within said casing; mechanism automatically operable through a predetermined cycle to vary the working characteristics of the stream of fluid and stopping same, including a time measuring means controlling the action of said mechanism to vary said working characteristics as a function of time; means for controlling the generator independent of said time measuring means and means operable at will to interrupt the cycle of operation to prolong the effect at any given movement.

4. Apparatus for subjecting a person to the action of a stream of gas-like fluid, comprising: a casing; a generator for generating a stream of fluid within said casing; mechanism automatically operable through a predetermined cycle to vary the working characteristics of the stream of fluid and stopping same, including a time measuring means controlling the action of said mechanism to vary said working characteristics as a function of time; means for selectively controlling the generator independent of said time measuring means and means operable at will to interrupt the cycle of operation of said automatic mechanism and thus prolong the effect at any given movement, said means also being releasable at will and said automatic mechanism being constructed to resume its operation when released.

5. Apparatus for subjecting a person to the action of a stream of gas-like fluid, comprising: a casing; a motor, a generator driven by said motor for generating a stream of fluid within said casing; switching and heating mechanism automatically operable through a predetermined cycle to vary the working characteristics of the stream of fluid and stopping same, including a

time measuring means controlling the action of said mechanism to vary said working characteristics as a function of time; a switch adapted to connect said motor parallel and/or in series with said switching mechanism and a locking member operable at will to interrupt the cycle of operation of said automatic mechanism and lock the same in stationary condition, and thus prolong the effect at any given movement, said locking member also being releasable at will to permit resumption of said cyclic operation.

6. Apparatus for subjecting a person to the action of a stream of gas-like fluid, comprising: a casing; an electric motor; a generator driven by said motor for generating a stream of fluid within said casing; heating means, comprising a plurality of resistance elements arranged in parallel circuits to each other and said motor; mechanism automatically operable to vary the heating effect of said resistance elements upon the stream of fluid, including a snap switch for the circuit of each of said resistance elements, and a moving member successively engageable with each of said snap switches to control said resistance elements; and a time measuring means controlling the action of said moving member, and a switch adapted to connect said motor with one of said snap switches for joint control of said motor and the heating circuit controlled by said snap switch.

7. A hair drier, comprising: a casing; an electric motor, means driven by said motor for causing a current of air to flow through said casing; electrical heating means disposed within said casing and extending about the interior thereof and adapted to heat the air passing through said casing, said heating means including an additional resistance element disposed in said air stream; and mechanism, including a time measuring means, automatically operable to control said heating means as a function of time, and having means for connecting said additional resistance element in circuit with said heating means to reduce the total heating effect thereof, and switching means, adapted to connect said motor parallel and/or in series with said connecting means for joint and individual control of said heating means and said motor, said additional resistance element being positioned at one side portion of said casing and operating to concentrate the greater portion of the reduced heat of said heating means in a selected part of said air stream.

8. Apparatus for subjecting a person to the action of a stream of gas-like fluid, comprising: a casing; an electric motor, a generator driven by said motor for generating a stream of fluid within said casing; heating means, comprising a plurality of resistance elements arranged in parallel circuits to each other and said motor; mechanism automatically operable to progressively diminish the heating effect of said resistance elements upon the stream of fluid, including a snap switch for the circuit of each of said re-

sistance elements, a moving member successively engageable with each of said snap switches successively to cut into circuit additional of said resistance elements; a time measuring means controlling the action of said moving member, and a switch for selectively connecting the motor in series with one of said snap switches.

9. A hair drier, comprising: a casing; an electric motor means driven by said motor for causing a current of air to flow through said casing; electrical heating means arranged in parallel to said motor disposed within said casing and extending about the interior thereof and adapted to heat the air passing through said casing, said heating means including a plurality of resistance elements disposed in said air stream; and mechanism, including a time measuring means, for controlling operation of said heating means, having means operable to successively connect said resistance elements in circuit with said heating means to progressively reduce the total heating effect thereof, and switching means adapted to selectively connect the motor in series with one of the connecting means of said resistance elements, a greater portion of said resistance elements being positioned at one side portion of said casing and operating to concentrate the greater portion of the reduced heat of said heating means in a selected part of said air stream.

10. Apparatus for subjecting a person to the action of a stream of gas-like fluid, comprising: a casing; electrically operated means for generating a stream of fluid within said casing; electrical heating means for heating the fluid of said stream; switching mechanism automatically operable through a predetermined cycle for controlling the operation of both of said means, including a time measuring means controlling the action of said mechanism as a function of time; elements operable at will to interrupt the cycle of operation to prolong the effect at any given movement; and a switching device adapted to connect said electrically operated means in parallel and/or in series with said switching mechanism for selectively controlling the operation of one of said means independently of said mechanism.

11. Apparatus for subjecting a person to the action of a stream of gas-like fluid, comprising: a casing; an electric motor, a generator driven by said motor for causing a stream of fluid to recirculate through said casing; switching and heating mechanism automatically operable through a predetermined cycle to vary the working characteristics of the stream of fluid, including a time measuring means controlling the action of said mechanism to vary said working characteristics as a function of time; switching means adapted to selectively connect said motor in parallel and/or in series with said switching mechanism; and means operable at will to interrupt the cycle of operation to prolong the effect at any given movement.

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