Feb. 19, 1935. W. L. MARTIN 1,991,950

DRIER

Filed April 25, 1931

Fig. 1

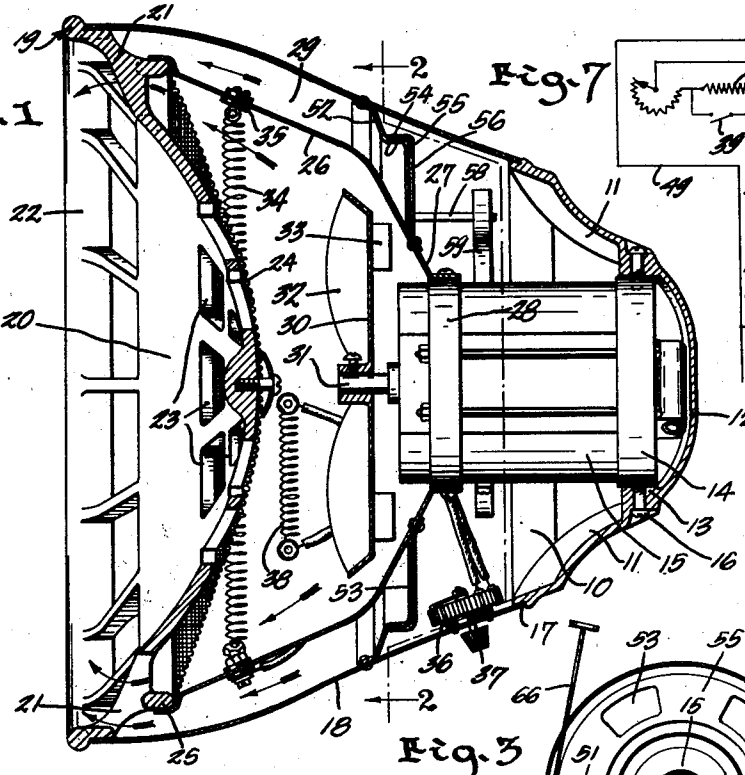


Fig. 7

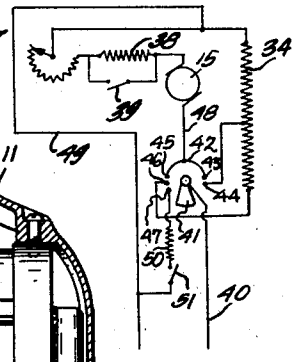


Fig. 3

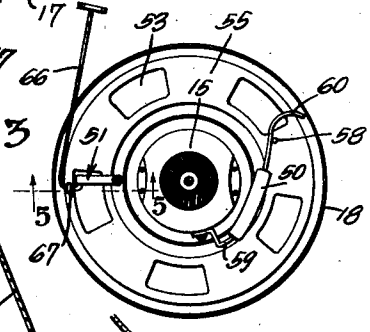


Fig. 2

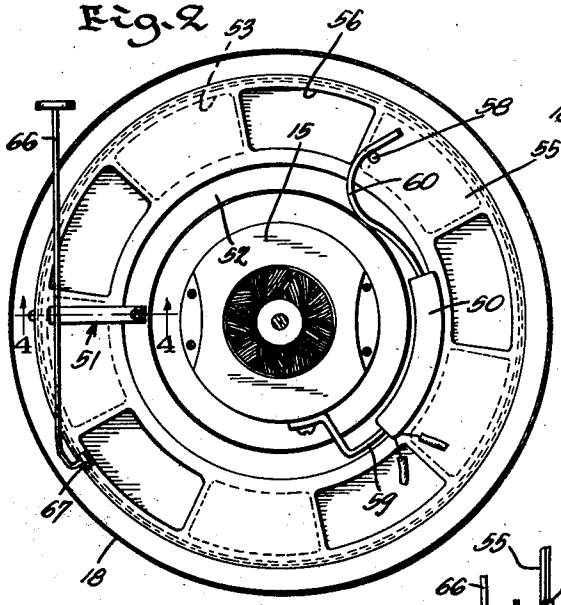


Fig. 4

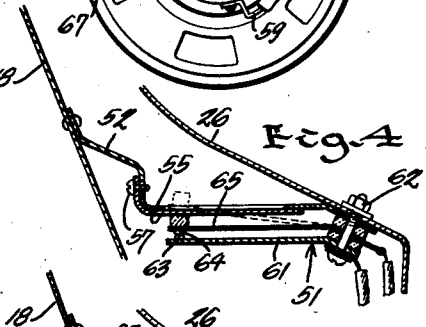


Fig. 5

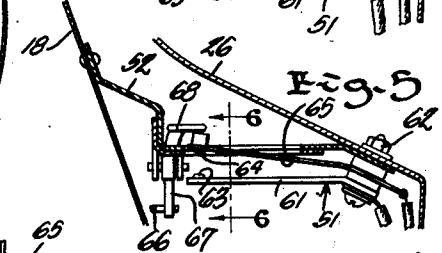
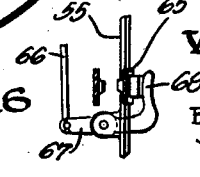


Fig. 6



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Patented Feb. 19, 1935 1,991,950

UNITED STATES PATENT OFFICE

1,991,950

DRIER

Wendell L. Martin, Cleveland, Ohio, assignor to The Martin Brothers Electric Company, Cleveland, Ohio, a corporation of Ohio

Application April 25, 1931, Serial No. 532,815

7 Claims. (Cl. 34—26)

This invention relates to driers, and more particularly to driers for use in drying hair, or the hands, or the like, and the principal object of the invention is to provide a new and improved construction of this type.

In the drawing accompanying this specification and forming a part of this application I have shown, for purposes of illustration, a certain form which my invention may assume, and in this drawing:

Figure 1 is a vertical sectional view through an embodiment of the invention,

Figure 2 is a transverse vertical sectional view corresponding substantially to the line 2—2 of Figure 1, and showing the control means in closed position,

Figure 3 is a reduced transverse vertical sectional view, showing the control means in open position,

Figure 4 is an enlarged fragmentary horizontal sectional view, corresponding to the line 4—4 of Figure 2,

Figure 5 is an enlarged fragmentary horizontal sectional view corresponding to the line 5—5 of Figure 3,

Figure 6 is an enlarged fragmentary sectional view corresponding to the line 6—6 of Figure 5, while

Figure 7, is a diagrammatic layout of the electrical circuits employed in connection with the invention.

The embodiment of the invention herein disclosed comprises a relatively heavy metallic ring 10 adapted to be supported upon a suitable standard (not shown), provided with integral rearwardly converging spaced legs 11 connected to an end piece 12, having an interior seat 13 for the reception of the annular section 14, forming part of the frame of a motor 15, and held in position by screws 16. The forward edge of the ring member 11 is rabbeted, as indicated at 17, for the reception of an outside casing 18, flaring forwardly as shown, and at its forward edge being connected to an annular casting 19. The casting 19 is provided with a dished central section 20 connected by spaced webs 21 with an outer ring 22, and the central section has a plurality of inlet apertures 23 therein covered by a screen 24. Formed integrally with the webs 21, substantially intermediate their ends, and at the inner surfaces thereof, is a ring 25 adapted for the accommodation of the forward portion of an inner casing 26 having a reduced portion 27 secured to the annular section 28 of the frame of the motor 15, the outer casing 18 and the inner casing 26 defining an annular passage 29 adapted to discharge between the webs 21 outwardly of the ring 25.

A fan 30 is secured to the armature shaft 31 of the motor 15 and is disposed within and adjacent the reduced portion 27 of the inner casing 26, and is provided with blades 32 operable to suck air inwardly through the apertures 23 in the central section 20, and with blades 33 operable to suck air past the motor 15 so as to cool the same, and the air thrown off centrifugally by the fan 30 is deflected outwardly due to the shape of the casing 26, discharging through the openings between the webs 21 at the inner side of the ring 25. Discharge of this air sets up a vacuous condition at the outlet of the passage 29, causing air to be drawn through the openings provided by the legs 11, and through the passage 29 and to discharge between the webs 21 at the outer side of the ring 25, as before pointed out, and due to the juxtaposition of the discharge openings at the inner and outer sides of the ring 25, a substantial portion of the discharging air is again sucked inwardly by the fan 30 through the openings 23 in the central section 20, and thus a substantial portion of the air recirculated through the apparatus.

An annularly arranged heating coil 34 is disposed within the inner casing 26 in the path of discharging air, insulated from said casing 26, and supported by said casing through use of fasteners 35. A rheostat 36 is also connected in circuit with the motor 15, mounted on the outer casing 18 with its handle 37 projecting through the casing 18 so as to be readily accessible exteriorly of the casing 18, while the rheostat itself is disposed generally within the casing 18, and in the air current flowing through the passage 29, whereby the heat from the rheostat 36 serves to heat the air flowing through the passage 29 and such air also prevents overheating of the rheostat 36. Another resistance 38 is connected in circuit with the motor 15 but is arranged to be short circuited by a switch 39, and the resistance 38 is of such character that the motor 15 will operate at the same speed on direct current with the resistance 38 in circuit, as on alternating current with the resistance 38 short circuited by the switch 39. The resistance 38 is located adjacent the heating element 34, so that its heat serves to additionally heat the air of the main current and at the same time the main air current serves to prevent overheating of the resistance 38.

Under these circumstances it is convenient to connect the parts as shown in Figure 7, wherein

a first line conductor 40 is connected to the switch arm 41, adapted to engage either the switch terminal 42, the terminals 43 and 44, or the terminals 45, 46, 47; the switch terminal 42 is connected to the motor 15 by a conductor 48, and the motor connected to the line wire 49; the terminal is connected to the terminal 42 and conductor 48 and the terminal 44 connected to an intermediate portion of the heating coil 34; and the terminal 45 is connected to the terminal 42 and conductor 48, the terminal 46 to the end of the heating coil 34, and the terminal 47 to a secondary heating coil 50 having a switch 51 interposed between the coil 50 and the line wire 49, the secondary heating coil being for a purpose presently to be explained.

Mounted in the passage 29 is a partition 52 secured to the outer and inner casings 18 and 26 so as to span the passage 29, provided with a plurality of arcuate openings 53, provided also with an annular offset 54 upon which is rotatably mounted a shutter 55 having arcuate openings 56, which in one position are adapted to register with the openings 53, and in another position adapted to be out of register therewith, and the shutter 55 is oscillatably held upon the offset 54 by a pin and slot connection such as that indicated at 57, and the shutter 55 also has a pin 58 projecting rearwardly therefrom and adapted to be engaged by an actuating device.

The actuating device comprises a thermostatic element in the form of a bimetallic strip 59, one end of which is secured to the casing of the motor 15, and the other end of which is curved as at 60, and engageable with the pin 58, the strip 59 being surrounded by the heating coil 50. The switch 51 for the heating coil comprises a contact arm 61 supported upon and insulated from a post 62, having a contact disk 63 adapted to engage the disk 64 of a resilient contact member 65, which normally rides upon the adjacent surface of the shutter 55, thereby maintaining closed contact between the disks 63 and 64, but which is so positioned as to spring into one of the openings 56 of the shutter 55 when the latter has reached fully opened position, thereby breaking such contact and de-energizing the coil 50. An operating rod 66 extends through the outer casing 18, and is pivotally connected to a bell crank lever 67 carried by the shutter 55 and is provided with an actuating portion 68 engageable with the end of the contact member 65, the shutter 55 having once reached fully opened position then being manually returnable to normally closed position by moving the rod 66 inwardly, this action operating the bell crank lever 67 to force the contact member 65 out of the opening 56 and into its initial position in engagement with the imperforate portion of the shutter 55, thereby re-establishing the circuit through the heating coil 50.

In operation when the switch arm 41 is engaged with the switch terminal 42 the motor 15 operates independently of the heating coil 34, but when the arm 41 is in engagement with the contacts 43 and 44, both the motor 15 and the heating coil 34 are energized. During this period the shutter 55 may be either open or closed depending upon whether it is desired to heat up the air quickly, in which case the shutter 55 will be closed, or to run the apparatus in an ordinary way, in which case the shutter 55 will be open. When only the motor 15 is operating and the shutter 55 open, air is drawn inwardly through the openings 23 in the dished portion 20 by the centrifugal fan 30, and thrown off substantially radially therefrom, being then deflected and discharging forwardly between the webs 21 at the inner side of the ring 25; and at the same time air is drawn inwardly from the rear through the apertures provided by the legs 11 and through the channels between the motor 15 and motor frame, by operation of the blades 33 of the fan 30, this air joining the main discharging stream of air and also passing outwardly between the webs 21 at the inner side of the ring 25. The air discharging from the inner casing 26 induces flow of air through the passage 29, such air entering the passage 29 from the rear through the openings provided by the legs 11. By reason of the arrangement of the streams of discharging air with respect to the inlet for incoming air, a substantial portion of the discharging air is entrained by the incoming air and hence recirculation is set up in the apparatus. When the heating coil 34 is energized by placing the switch arm 41 in engagement with the terminals 43 and 44 the recirculating air is quickly heated and this heat under ordinary conditions is more or less maintained and progressively intensified. This desirable condition may be materially augmented by closing the shutter 55 which cuts off the relatively cool exterior air flowing through the passage 29 from communication with the main recirculating air stream, and the normal position of the shutter 55 may therefore be considered closed. After a certain period of operation at maximum heat it may be desirable to cut down the heat intensity gradually over a predetermined period. When such action is desired the switch arm 41 is turned to engage the terminals 45, 46, and 47 thereby bringing in circuit the secondary heating coil 50, and cutting in a larger portion of the heating coil 34, reducing the heat generated thereby, and with the shutter 55 closed the switch 51 may be closed as heretofore pointed out, and the heating coil 50 acting upon the thermostatic element 59 causes movement thereof, transmitted to the shutter 55 through the pin 58, gradually opening the shutter 55, admitting passage of cooler air through the passage 29, which joining the recirculating air produces a gradually cooling effect thereon over the predetermined period during which the shutter 55 passes from completely closed to completely open position. When the shutter 55 reaches fully opened position the resilient contact member 65 will have sprung into the adjacent opening 56 and operated the switch 51 to break the circuit through the heating coil 50, and the shutter will then remain open until it is manually closed by manipulation of the operating rod 66.

It will be understood by those skilled in the art that the disclosure herein accomplished at least the principal object of my invention, and it will further be understood that the invention has uses and advantages other than those herein particularly referred to, and it will be apparent that various changes and modifications may be made without departing from the spirit of the invention; accordingly it will be appreciated that the disclosure herein is illustrative only and the invention not limited thereto.

I claim:

1. A recirculating drier comprising: a casing having an end portion adapted to be directed toward an object to be treated, and having an inlet through which air is drawn and an outlet through which air is expelled, said inlet and outlet both being arranged in juxtaposed position in

said end portion; means for drawing exterior air and at least some of the air as expelled from said outlet inwardly through said inlet into said casing and redirecting at least some of the same air outwardly and expelling it from said outlet, means for heating said air, thermostatically controlled regulating means operable to effect introduction of additional exterior air to the air normally operated upon by said drier and having a coil for heating the thermostatic element, and means for automatically de-energizing said coil when said regulating means has reached predetermined position.

2. A recirculating drier comprising: a casing having an end portion adapted to be directed toward an object to be treated, and having an inlet through which air is drawn and an outlet through which air is expelled, said inlet and outlet both being arranged in juxtaposed position in said end portion; means for drawing exterior air and at least some of the air as expelled from said outlet inwardly through said inlet into said casing and redirecting at least some of the same air outwardly and expelling it from said outlet, means for heating said air, and regulating means effective to introduce additional exterior air to the air normally operated upon by the drier, having an apertured shutter movable to open said regulating means, a thermostatic element for moving said shutter, a heating coil co-acting with said theremostatic element, and a switch device for maintaining said coil energized, having a contact member normally held engaged by contact with said shutter and adapted to enter an aperture in said shutter to de-energize said heating coil when the shutter has reached predetermined position.

3. A recirculating drier comprising: a casing having an end portion adapted to be directed toward an object to be treated, and having an inlet through which air is drawn and an outlet through which air is expelled, said inlet and outlet both being arranged in juxtaposed position in said end portion; means for drawing exterior air and at least some of the air as expelled from said outlet inwardly through said inlet into said casing and redirecting at least some of the same air outwardly and expelling it from said outlet, means for heating said air, a second casing surrounding said first casing and spaced therefrom to provide an air passage communicating with exterior air and adapted to discharge into the air normally operated upon by said drier to vary the temperature of said normal air, and means positioned in said passage and operable for controllably regulating the air flowing through said passage.

4. A recirculating drier comprising: a casing having an end portion adapted to be directed toward an object to be treated, and having an inlet through which air is drawn and an outlet through which air is expelled, said inlet and outlet both being arranged in juxtaposed position in said end portion; means for drawing exterior air and at least some of the air as expelled from said outlet inwardly through said inlet into said casing and redirecting at least some of the same air outwardly and expelling it from said outlet, means for heating said air, a second casing surrounding said first casing and spaced therefrom to provide an air passage communicating with exterior air and adapted to discharge into the air normally operated upon by said drier to vary the temperature of said normal air, regulating means positioned in said passage and operable to regulate the amount of air flowing through said passage, and thermostatically operable means for actuating and controlling said regulating means.

5. A recirculating drier comprising: a casing having an end portion adapted to be directed toward an object to be treated, and having an inlet through which air is drawn and an outlet through which air is expelled, said inlet and outlet both being arranged in juxtaposed position in said end portion; means for drawing exterior air and at least some of the air as expelled from said outlet inwardly through said inlet into said casing and redirecting at least some of the same air outwardly and expelling it from said outlet, means for heating said air, a second casing surrounding said first casing and spaced therefrom to provide an air passage communicating with exterior air, regulating means positioned in said passage and operable to regulate the air flowing through said passage, a thermostatic element for operating said regulating means, a coil for heating said thermostatic element, and means for automatically de-energizing said coil when said regulating means reach predetermined position.

6. A recirculating drier comprising: a casing having an end portion adapted to be directed toward an object to be treated, and having an inlet through which air is drawn and an outlet through which air is expelled, said inlet and outlet both being arranged in juxtaposed position in said end portion; means for drawing exterior air and at least some of the air as expelled from said outlet inwardly through said inlet into said casing and redirecting at least some of the same air outwardly and expelling it from said outlet, means for heating said air, a second casing surrounding said first casing and spaced therefrom to provide an air passage communicating with exterior air, regulating means positioned in said passage and operable for controllably regulating the air flowing through said passage, thermostatic means for operating said regulating means in one direction, and manually operable means for operating said regulating means in an opposite direction.

7. A recirculating drier comprising: a casing having an end portion adapted to be directed toward an object to be treated, and having an inlet through which air is drawn and an outlet through which air is expelled, said inlet and outlet both being arranged in juxtaposed position in said end portion; means for drawing exterior air and at least some of the air as expelled from said outlet inwardly through said inlet into said casing and redirecting at least some of the same air outwardly and expelling it from said outlet, means for heating said air, a second casing surrounding said first casing and spaced therefrom to provide an annular air passage communicating with exterior air and adapted to discharge into the air normally operated upon by said drier to vary the temperature of said normal air, annular shutter means positioned in said passage and operable for regulating the air flowing through said passage, and thermostatic means for actuating and controlling operation of said annular shutter means.

WENDELL L. MARTIN.