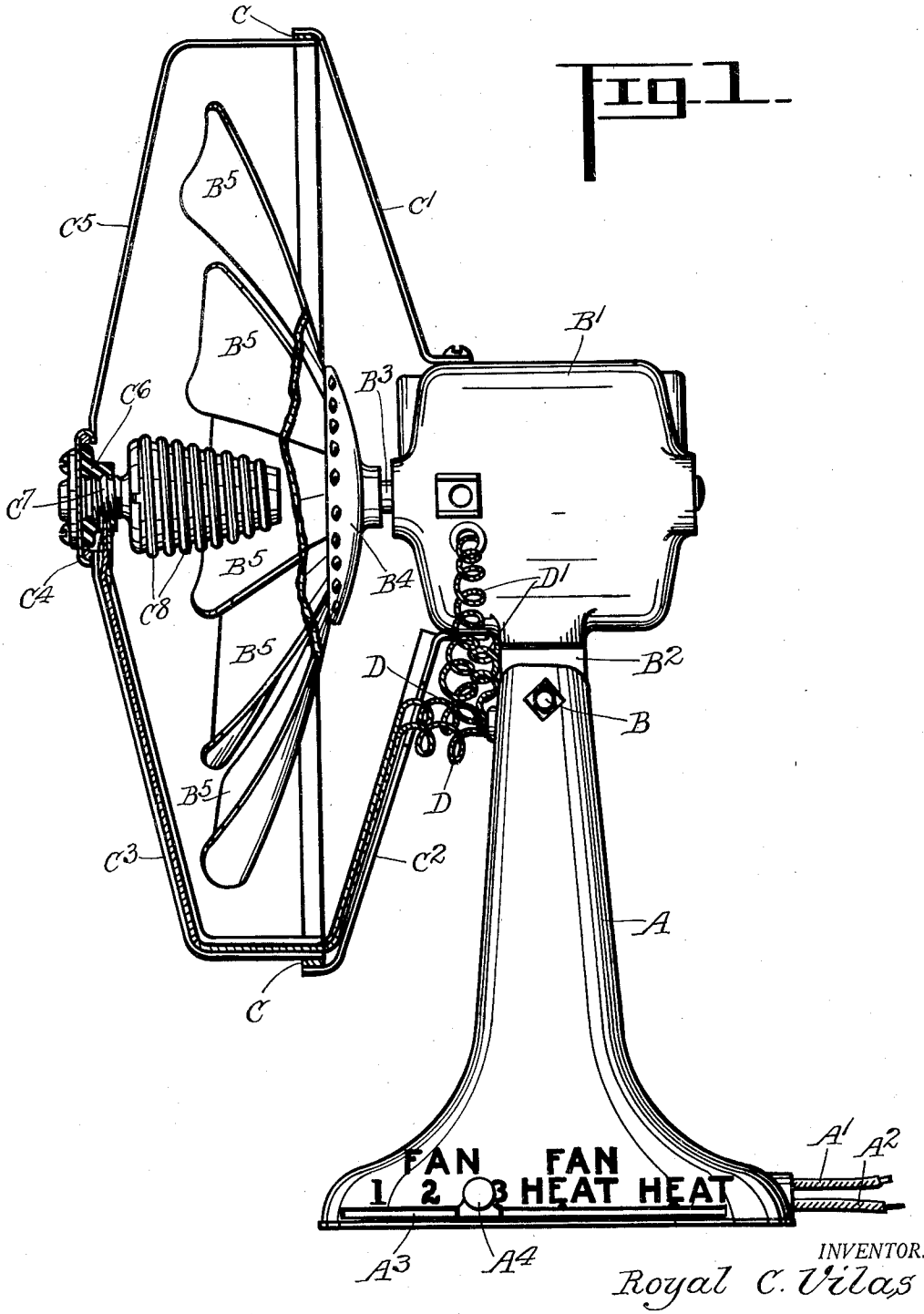
Dec. 23, 1930. R. C. VILAS 1,785,752

COMBINED AIR CIRCULATING FAN AND HEATER

Filed Aug. 16, 1930 4 Sheets-Sheet 1

Fig 1.



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COMBINED AIR CIRCULATING FAN AND HEATER

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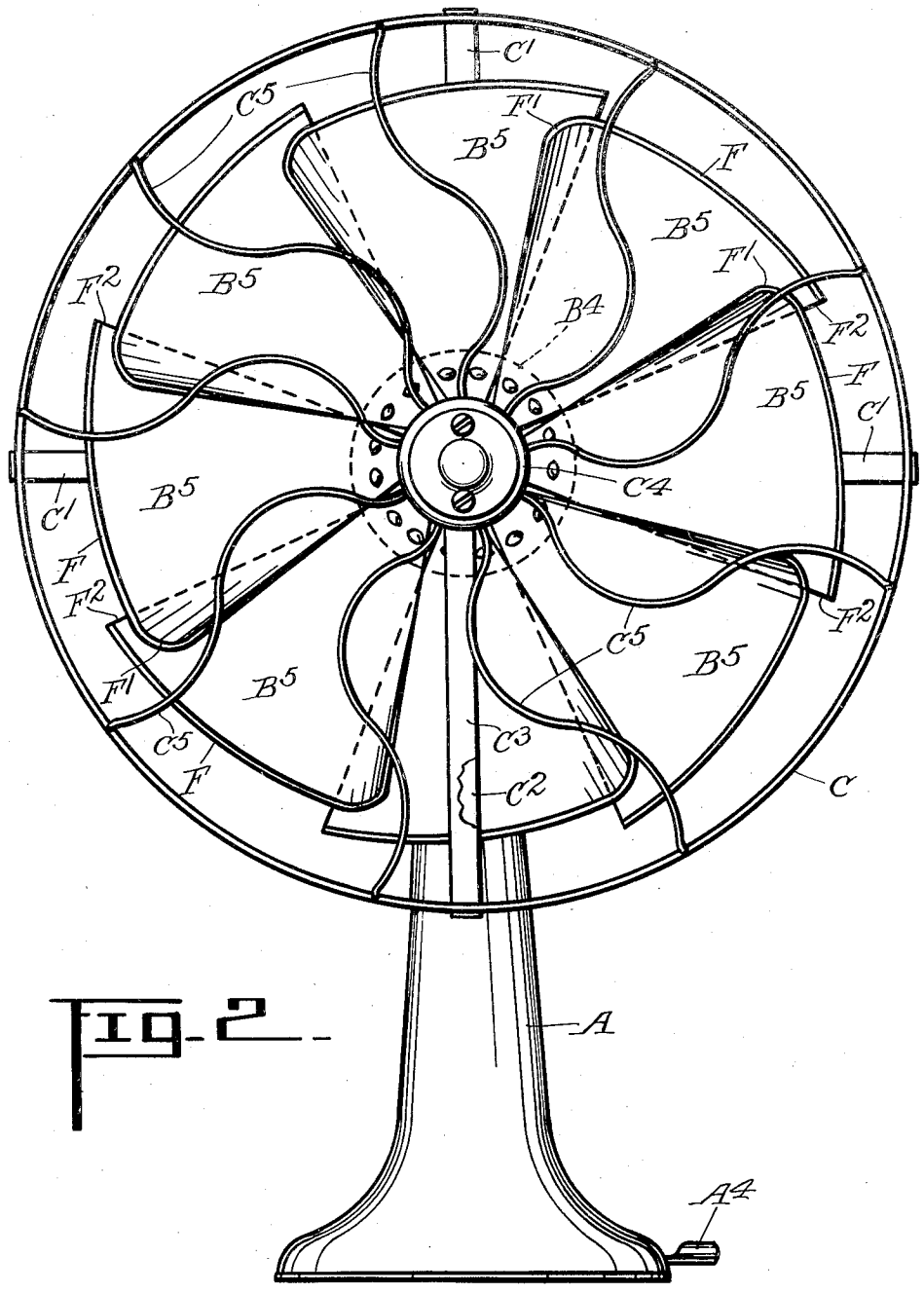


Fig. 2.

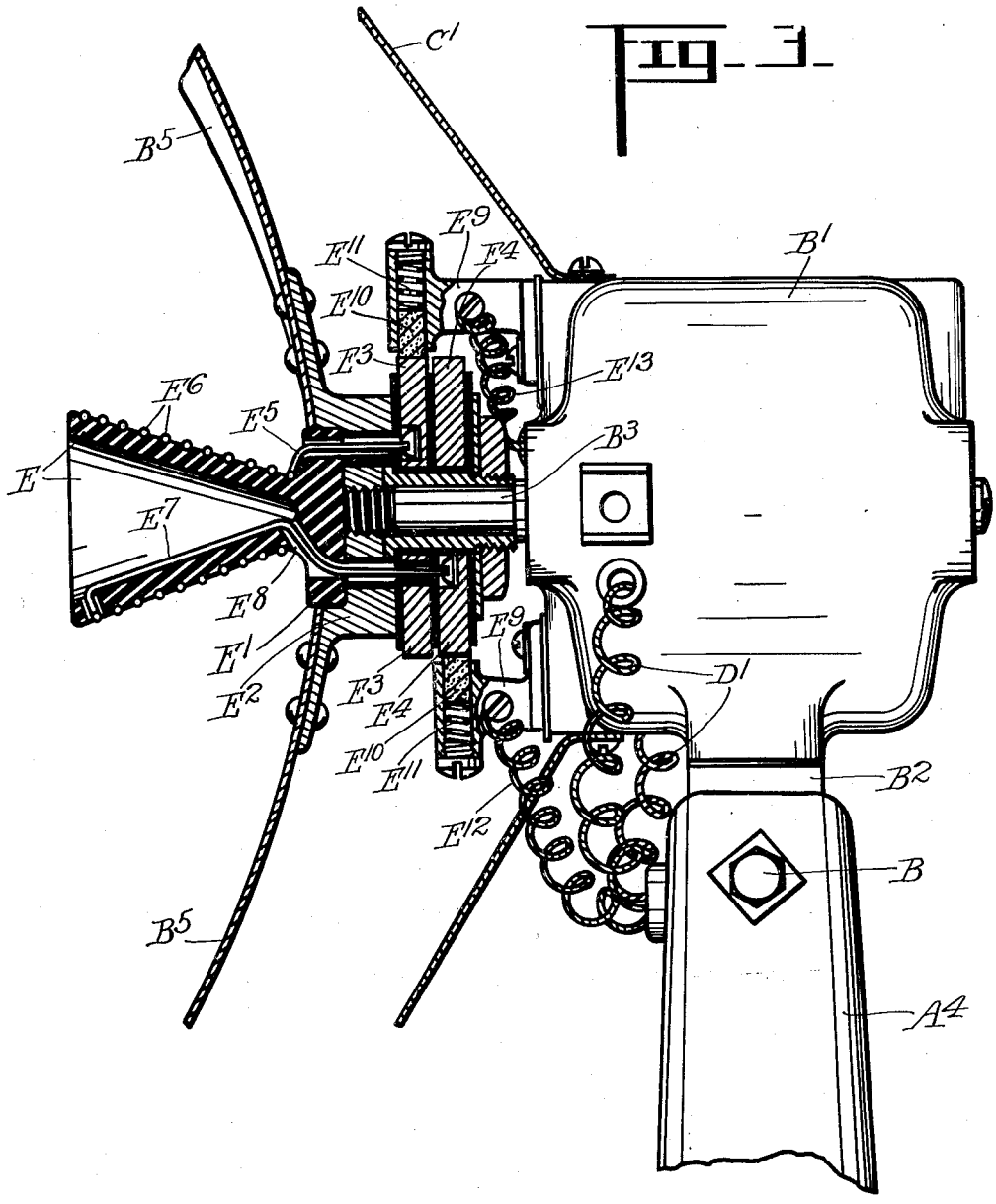
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FIG. 3.



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COMBINED AIR CIRCULATING FAN AND HEATER

Filed Aug. 16, 1930 4 Sheets-Sheet 4

Fig. 4.

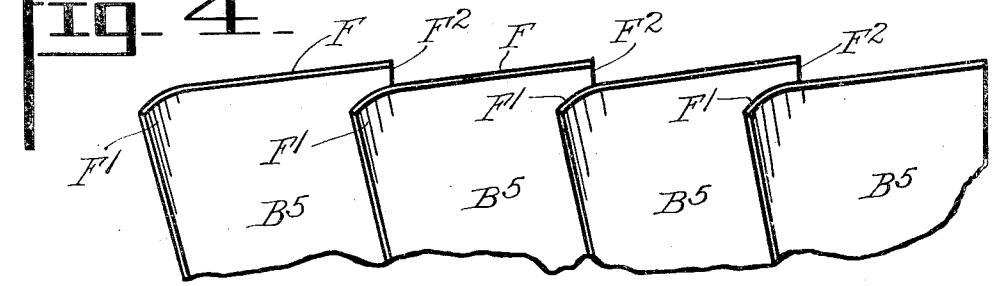
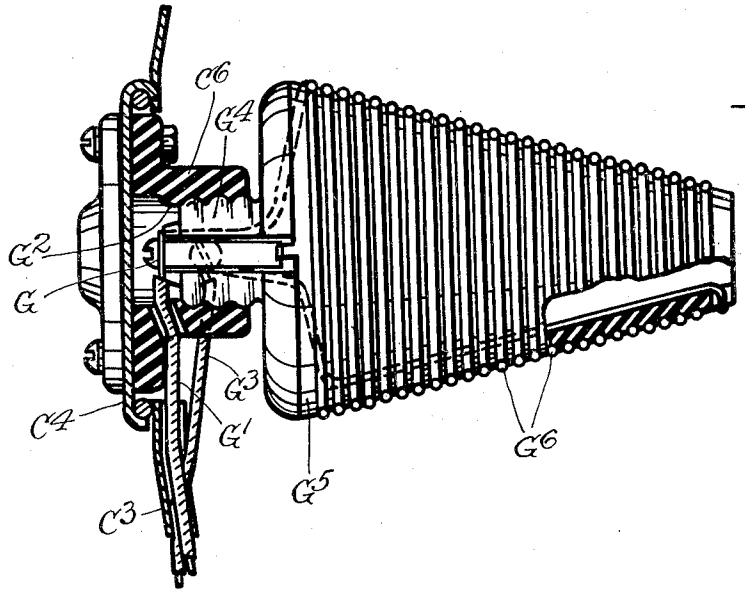


Fig. 5.



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UNITED STATES PATENT OFFICE

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COMBINED AIR CIRCULATING FAN AND HEATER

Application filed August 16, 1930. Serial No. 475,819.

My invention relates to improvements in combined air circulating fan and heater and has for one object to provide in one unitary assembled element an electric motor driven fan to circulate air, a heating unit for air heating and a reflector or reflector bowl to concentrate and direct the heat rays from the heating unit under the control of the operator. Another object of my invention is to provide in combination an air circulating fan, a heat unit, in such wise that the fan blades will form whether in operation or at rest a reflector, preferably bowl-shaped, which will reflect and direct the heat and wherein this reflection and direction of the heat may take place both when the fan is at rest and when it is rotating driven by the motor. Other objects of my invention will appear from time to time throughout the specification and claims.

My invention is illustrated more or less diagrammatically in the accompanying drawings, wherein—

Figure 1 is a side elevation with parts in section;

Figure 2 is a front elevation;

Figure 3 is a side elevation in part section of a modified form;

Figure 4 is a detail perspective of the fan blade lay out;

Figure 5 is a detail perspective in part section of the heater element.

Like parts are indicated by like characters throughout the specification and drawings.

A is the supporting base. To it lead conductors A^1 A^2 adapted to carry electric current for driving the fan and operating the heater. The slot A^3 disposed in the periphery of the base is provided so that the switch handle A^4 may project. It will be noted that there are six positions of the switch handle. The first position at the extreme left breaks the circuit entirely. Fan positions 1, 2 and 3 control the speed of the fan, three being the lowest speed. The fifth position fan heat closes the circuit through the heater and also operates the fan at low speed, it being of course desirable to have a low velocity stream of air pass over the heater when it is operated, as otherwise the air blast would be too cold. The last position is the position with heat only on, the fan and motor being disconnected.

Pivoted on the base A on the pivot bolt B is the motor B^1, the motor having an ear B^2 projecting downwardly to engage the base and to be engaged by the pivot bolt B. B^2 is the fan shaft extending outwardly from the motor carrying the hub B^4 from which project the fan blades B^5. The fan blades as indicated in the drawings are eight in number. They overlap slightly so that looking at the fan from the front there is substantially no clearance apparent between the fan blades and when the fan is rotating the appearance is that of a continuous disc. These blades are bent outwardly and transversely generally into a spherical or parabolic shape so that the blades together define a substantially continuous reflector bowl.

Surrounding the combined fan and reflector bowl is a guard ring C supported on arms C^1 C^2 which arms are screwed to the motor housing; mounted on this ring in line with the arm C^2 is a conduit arm C^3 which terminates in a hub C^4. This hub is also supported by the ring recurved guide arms C^5 from the ring C and carries a threaded socket C^5 in which is threaded the screw base C^6 of the heating element C^6 which heating element when threaded in place is in front of the fan reflector bowl substantially on the axis of rotation of the fan and located generally adjacent to the focal center of the reflector bowl.

D D are conductors coming out from the base A traveling along the member C^2 and C^3 to the socket or base C^5 so that current is provided controlled by the switch A^4 to heat the

heating element. D^1 D^1 are conductors also coming out from the base A and terminating at the motor so as to provide current to operate the motor. These conductors D D^1 being flexible and relatively long make it possible to adjust the angle of the fan without interference from the conductor so that the wind current driven by the fan or the heat rays projected by the fan reflector or bowl may be directed in any desired path.

In the modified form shown in Figure 3, the heating unit comprises a conical-shaped core E flanged at E^1 and socketed in the fan hub E^2. Mounted on the fan hub E^2 and insulated therefrom and from each other are slip rings E^3 E^4. Conductor E^5 leads from the slip ring E^3 out through the hub through the flange E^1 to the heating coil E^6 which is wound around the cone. At the outer end, a conductor E^7 communicates with the heating coil E^6, extends back inside the cone through the aperture E^8 through the hub to make contact with the slip ring E^4. The brackets E^9 mounted on the motor housing carry carbon brushes E^{10} pressed against the slip rings by the springs E^{11}. Conductors E^{12} E^{13} extend out from the housing to the brush brackets to furnish current to the slip rings and thereby excite the heat unit. In this case the heat unit rotates with the fan as against the first case where the heat unit is fixed but in either case the heat unit is located generally at the focal center of the reflector bowl.

In Figure 4 is shown in detail the arrangement of the fan blades B^5. It will be noted that each blade has a generally slightly curved portion F terminating on its edge in a forwardly recurved portion F^1. These portions are of course inclined to the axis of rotation and the air is first engaged by the cutting edge F^2 and as the fan rotates is drawn forwardly first by the slightly curved portion F and finally by the more sharply curved portion F^1.

In the detail shown in Figure 5, it will be understood of course that hub C^4 carries the insulated socket C^5 which socket contains a terminal member G communicating with the conductor G^1, the socket itself being lined by a conducting shell G^2 communicating with the conductor G^3, the threaded base G^4 being adapted to be screwed into the shell and carrying the insulating coil support G^5 the heat coils G^6 and the conductors to complete the electric circuit.

I have not shown in detail the contact or conductor points involved in connection with the controlled switch as manifestly their details of construction form no essential part of my present invention.

I claim:

1. In a combined electric fan and heater, a plurality of fan blades assembled to form a reflector bowl, a separate heating unit, the heat from which is adapted to be reflected forwardly from such bowl, the blades overlapping to form when viewed from front a continuous reflecting surface.

2. In a combined electric fan and heater, a plurality of fan blades assembled to form a reflector, a separate heating unit, the heat from which is adapted to be reflected forwardly from such reflector, the blades overlapping to form when viewed from front a continuous reflecting surface.

3. In combination, an electric motor, a shaft and a hub, a plurality of laterally extended fan blades overlapping along their radial edges and formed into a reflector bowl, a guard frame enclosing the fan, a heating unit mounted on the guard frame in front of the fan and projecting inwardly toward the hub thereof.

4. In combination, an electric motor, a shaft and a hub, a plurality of laterally extended fan blades overlapping along their radial edges and bent to form a reflector bowl, a guard frame enclosing the fan, a heating unit mounted on the guard frame in front of the fan and projecting inwardly toward the hub thereof, electric conductors adapted to supply current to the fan and electric conductors adapted to supply current to the heating unit, a base upon which the motor is adjustably supported, a switch carried thereby adapted separately and selectively to control fan operation and the heating of the heat unit.

5. In combination, an electric motor, a shaft and a hub, a plurality of laterally extended fan blades overlapping along their radial edges and forming a reflector, a guard frame enclosing the fan, a heating unit mounted on the guard frame in front of the fan and projecting inwardly toward the hub thereof, electric conductors adapted to supply current to the heating unit, a base upon which the motor is adjustably supported, a switch carried thereby adapted separately and selectively to control fan operation and the heating of the heat unit.

6. In a heater, a motor, a motor shaft, a hub on the shaft, a plurality of separate fan blades projecting radially from the hub and overlapping along their edges, a heating element located generally in line with the motor shaft and in front of the blades, the blades being disposed to form a generally curved reflecting bowl, the reflecting surface of which is adapted to reflect heat rays forwardly from the heating element in the same general direction as the flow of air propelled by the fan blades, the radius of the bowl being equal to the radius of the fan blades.

7. In a heater, a motor, a motor shaft, a hub on the shaft, a plurality of separate fan blades projecting radially from the hub and overlapping along the radial edges, the edge of each fan blade furthest removed from the

motor being curved forwardly away from the motor with respect to the balance of the fan blade, the heating element located generally in line with the motor shaft in front of the blades, the blades being disposed to form a generally curved reflecting bowl, the reflecting surface of which is adapted to reflect heat rays forwardly from the heating element in the same general direction as the flow of air propelled by the fan blades.

Signed at Chicago, county of Cook and State of Illinois, this 13th day of August, 1930.

ROYAL C. VILAS.