Feb. 6, 1962 I. NAXON 3,020,386

ELECTRIC HEATERS

Filed June 10, 1959

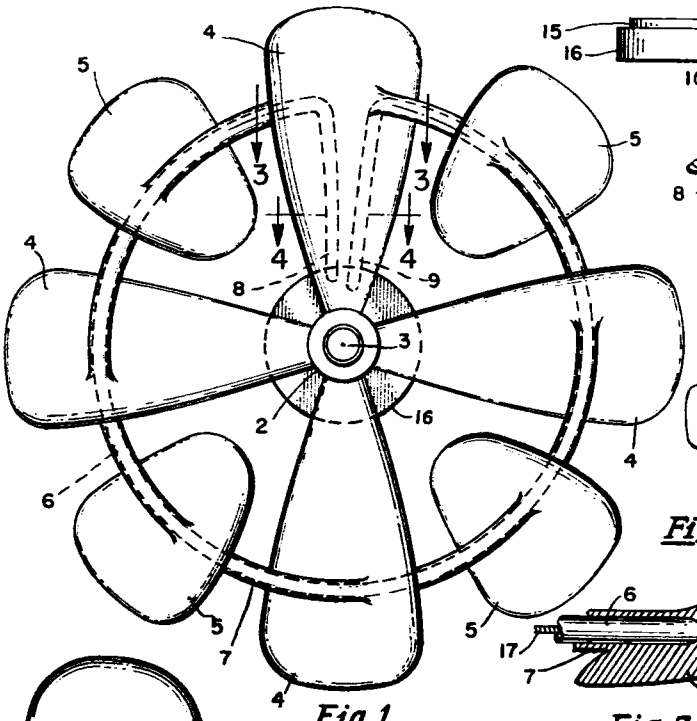


Fig. 1

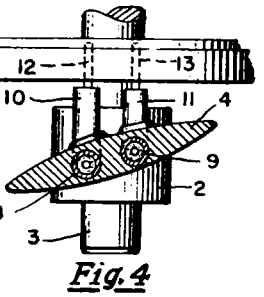


Fig. 4

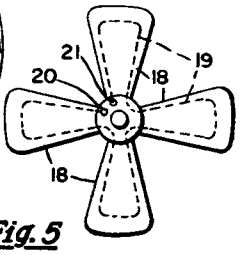


Fig. 5

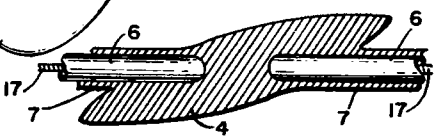


Fig. 3

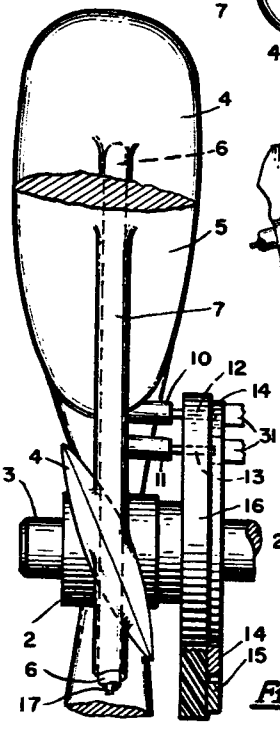


Fig. 2

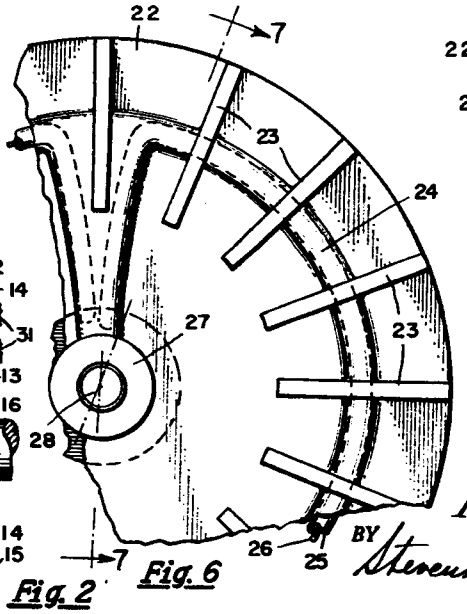


Fig. 6

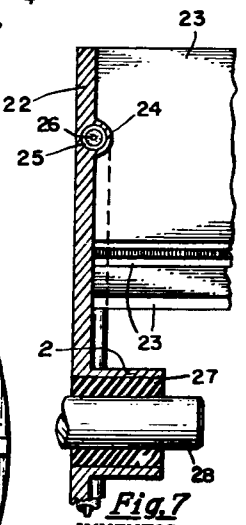


Fig. 7

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ELECTRIC HEATERS

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1 Claim. (Cl. 219—42)

My invention relates to portable electric space heaters, and more particularly to the fan type. The latter usually employs a housing in which an electric heating element is disposed; and a conventional electric fan is situated behind or in front of the heating element for the purpose of creating a forward circulation of the air warmed by the same. The apparatus just explained is therefore in dual form, requiring separate units and a considerable amount of space.

To depart from the above involvements, it is one object of the present invention to provide a fan type space heater which is self-contained.

A further object is to combine an electric fan with means for heating the same, in order that the air projected by the fan may be warmed as the fan is in operation.

An additional object is to provide a unit which is developed in one respect to produce a rotary fan, and in another respect to incorporate an electric heating unit.

Another object is to provide simple electric contact means for supplying the heater with current from a stationary source.

With the above objects in view, a better understanding of the invention may be had by reference to the accompanying drawing, in which—

FIG. 1 is a front elevation of the heater;

FIG. 2 is a right-hand side view of the upper portion of the showing in FIG. 1, partly broken away;

FIGS. 3 and 4 are enlarged sections on the lines 3—3 and 4—4 of FIG. 1;

FIG. 5 is a rear elevation of a modified fan on a smaller scale;

FIG. 6 is a rear view of a portion of a further modification on an enlarged scale; and

FIG. 7 is a section on the line 7—7 of FIG. 6.

In accordance with the foregoing, specific reference to the drawing indicates the frame of the heater as a circular ring 7, the same being of cast metal and developed with a spider of conventional fan blades and intermediate shorter blades 5. As indicated in FIG. 4, it is seen that all the blades have the conventional pitch of rotary fans; and the main blades 4 are joined in the center on a hub 2 journaling a shaft 3. As is the common practice, such shafts are extended from a motor mounted on a stand and equipped with a switch or regulator, these parts not being shown. The frame ring 7 is tubular, and contains a core 6 which is metal tubing, such core terminating with inward bends 8 and 9 embedded in one of the blades 4.

The tubular core 6 contains an electrical heating element 17; and the end portions of this element emerge from the bends 8 and 9 of the core 6 by way of rearward outlets 10 and 11 seen in the center of FIG. 2. These outlets are spaced radially; and the ends of the heating element 17 project from the outlets in the form of terminal rods or stems 12 and 13. In the manufacture of tubular heating elements of the "Calrod" type the wire heating coil 17 is insulated from its tubular support to form a metal-clad tubular heating element. It is understood that, in producing a conventional coiled electric heating element, the distribution of the heat therefrom throughout the entire length of the element can be varied by stretching the turns farther apart at those intervals where less heat is desired. In fact, the heat can

be reduced to a negligible degree if portions of the heater length interconnecting the more densely-coiled portions are stretched to the point of a straight wire. Thus, in FIG. 1 the intensity of the heat can be controlled, so that it is greatest in the region of the blades, while producing little or no heat in the portions interconnecting them. By the same token the inner portions of the heating element in FIG. 5 may be constructed to deliver negligible heat, while the outer portions—which are embedded in the expanse of the blades 18—will require a larger wattage and generate a greater degree of heat as a result.

It is intended that the heating element 17 be put in action when the fan assembly is in rotation. For this purpose, the stems 12 and 13 pass through an insulator disc 16 carried by the hub 2 into a pair of concentrically spaced rings 14 and 15 which receive current-carrying brushes 31 on the rear side. These lead from a convenient current source associated with the motor which operates the fan assembly.

FIGS. 6 and 7 show a blower-type modification where the heater is formed as a flat disc 22 which is enlarged with a circular rib 24 serving in the manner of the frame ring 7, FIG. 7 showing the tubing core 25 and the electrical heating element 26 embedded in the rib 24. In this case, the disc 22 is extended forwardly with fins 23.

FIG. 5 shows a further modification in the form of a fan having only four blades 18. Here, the electrical heating element 19 is embedded in the blades and follows the form thereof, issuing as terminals 20 and 21 having the same functions as the stems 12 and 13 in the main embodiment.

It is preferable in all the forms of the heater that the hub 2 contain a bushing 27 of heat-insulating material. Thus, heat developed by the fan is not dissipated into the shaft and mechanism which operates it.

It will now be apparent that, in any of the forms described, the fan assembly is not only an electric fan, but includes a built-in electric heater which generates heat in the frame ring 7 and conducts it into the blades 4 and 5 by reason of the integral construction of the ring and the blades. Thus, the heated blades warm the air which they project, so that the premises receive a circulation of warm air as the heater is in operation. By its self-contained construction the novel heater is no larger in size or deeper than the conventional electric fan, yet uses all the heat generated within it while creating a circulation of air. Also, the fan assembly may be used during the summertime without turning on the electric heating element, so that no electric fan need be purchased in addition to the heater. Finally, the improved heater is an assembly which is sturdy, compact and an improvement over conventional electric space heaters from the viewpoint of efficiency.

While I have described the invention and its modifications along specific lines, various minor changes or refinements may be made therein without departing from its principle, and I reserve the right to employ all such changes and refinements as may come within the scope and spirit of the appended claim.

I claim:

A heater comprising a bladed electric fan, a tubular circular frame formed with sections interconnecting the outer portions of the blades, and a heating conduit in the frame and formed with end portions directed inwardly through one of the blades to emerge from one side thereof for connection to a current supply source.

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