

July 26, 1932.

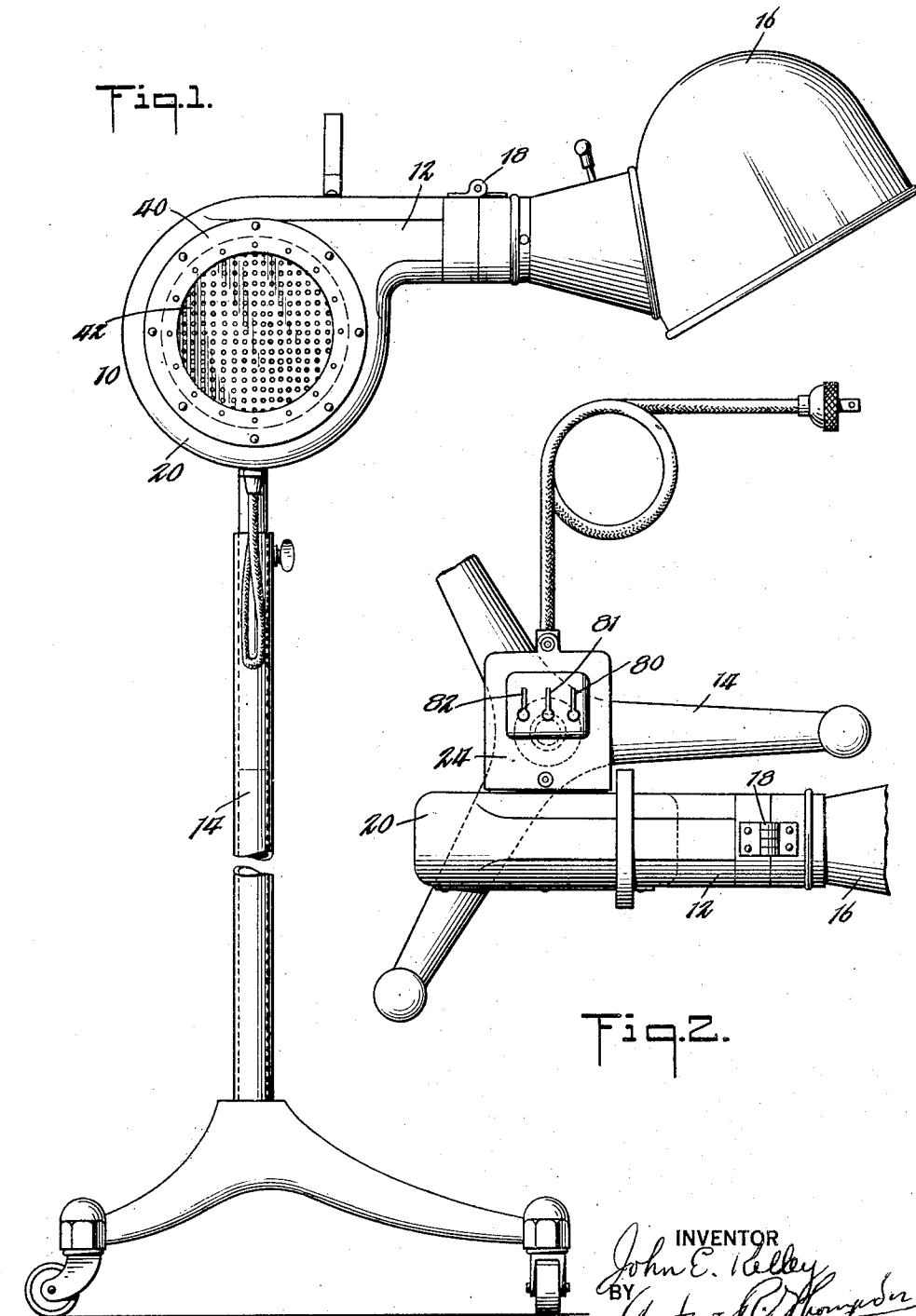
J. E. KELLEY

1,868,905

DRIER OR BLOWER

Filed Dec. 13, 1930

3 Sheets-Sheet 1



INVENTOR
John E. Kelley
BY
Gustav O. Thompson
ATTORNEY

July 26, 1932.

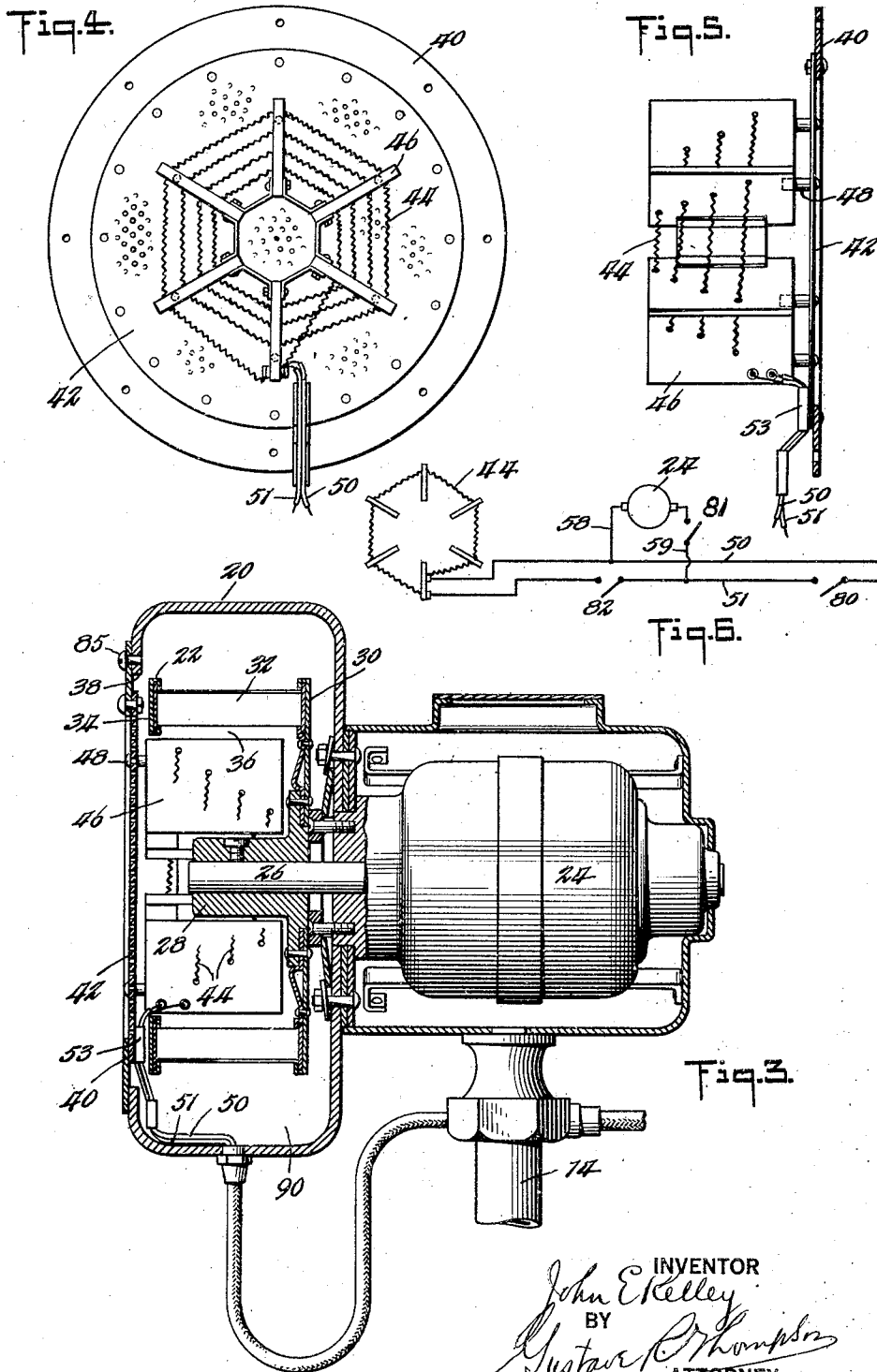
J. E. KELLEY

1,868,905

DRIER OR BLOWER

Filed Dec. 13, 1930

3 Sheets-Sheet 2



INVENTOR
John E. Kelley
BY
Gustav P. Thompson
ATTORNEY

July 26, 1932.

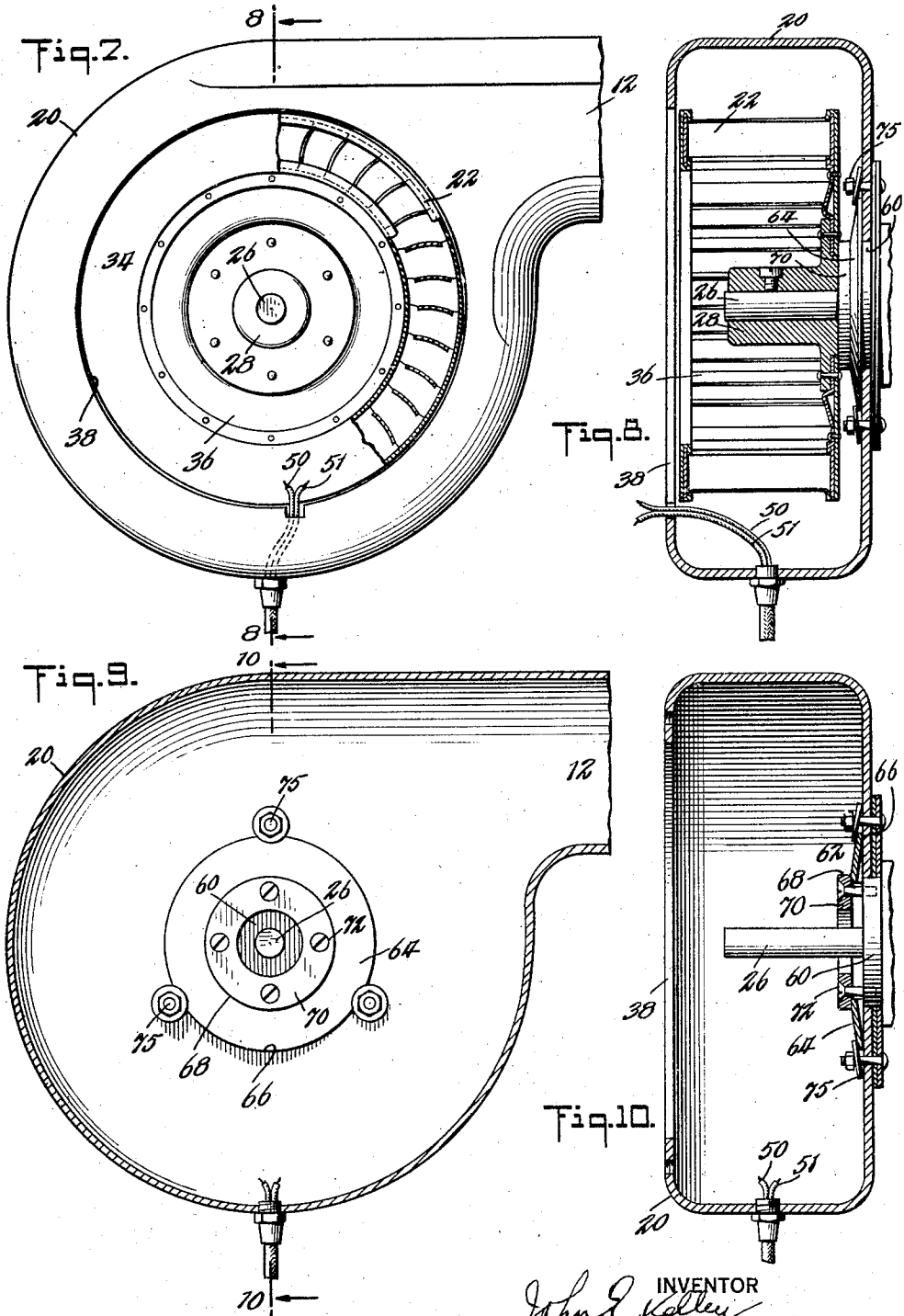
J. E. KELLEY

1,868,905

DRIER OR BLOWER

Filed Dec. 13, 1930

3 Sheets-Sheet 3



INVENTOR
John E. Kelley
BY
Gustave C. Thompson
ATTORNEY

UNITED STATES PATENT OFFICE

JOHN E. KELLEY, OF LARCHMONT, NEW YORK, ASSIGNOR TO EASTERN LABORATORIES, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

DRIER OR BLOWER

Application filed December 13, 1930. Serial No. 502,021.

This invention relates to driers, and particularly to the type used in beauty parlors for hair drying and in lavatories for drying the hair and skin, and provides improvements therein.

Driers of the type described are generally noisy and inefficient in utilizing heat from the heaters usually used in connection therewith, and therefore have objections.

10 The present invention provides a drier of the type described which is virtually noiseless and which effectively utilizes the heat used for heating the air. It also more uniformly heats the air.

15 The invention further provides a drier of the type described of simple and economical construction and readily adaptable to inspection and repair. Other advantages of construction and adaptation to its uses will be set forth in connection with the following detailed description.

20 An embodiment of the invention is illustrated in the accompanying drawings, the invention being shown as embodied in the form of a pedestal hair drier such as used in beauty parlors.

In said drawings:

Figure 1 is a side elevation of said embodiment.

25 Fig. 2 is a top plan view.

Fig. 3 is a vertical section.

Figs. 4 and 5 are respectively a rear elevation and a side elevation of the cover plate and heater detached from the other parts.

35 Fig. 6 is a diagram illustrating the electrical connections to the motor and heater.

40 Figs. 7 and 8 are respectively a side elevation and a vertical section on line 8—8, Fig. 7, of the fan and fan casing, with the cover plate shown in Figs. 4 and 5 removed.

Figs. 9 and 10 are vertical sectional views taken at right angles, the section in Fig. 10 being on line 10—10, Fig. 9.

Referring to said drawings,

45 Numeral 10 designates the fan as a whole. Fan 10 is supported in suitable manner as upon an adjustable pedestal or stand.

50 Numeral 12 designates a delivery tube, through which air is directed on to the hair, or the hands, or other part of the person to

be dried. Delivery tube 12 is here shown as provided with a hood attachment 16, which may be used to advantage in drying the hair, the hood distributing the air over the head to be dried. The hood 16 may be pivotally connected to delivery tube 12, as indicated at 18. This connection permits the hood 16 to be turned back, so that air may be delivered directly from the delivery tube 12.

55 The fan 10 comprises a casing 20 and a fan proper 22 of the peripheral blade type. The fan 22 is preferably driven by an electric motor 24, the motor preferably being arranged with its shaft 26 projecting into the fan casing 22. The fan 22 preferably is provided with a hub 28 which is fixed directly to the motor shaft 26, as shown. Attached to the hub 28 at one side of the fan is a web plate 30 to which one end of each peripheral fan blade 32 is connected. The other end of each peripheral fan blade 32 is conveniently connected to an annular or ring-shaped plate 34 opposite the web plate 30. A central space 36 is provided within the ring of peripheral blades 32, as shown, and this space 36 is open at one side, an opening 38 being provided within the fan casing 20 at one side, opposite the open space 36 in the fan. The opening 38 is preferably slightly larger than the fan 22, which facilitates the mounting and demounting of the fan 22 on the motor shaft 26, and which also facilitates the assembly of other parts of the structure, as hereinafter more fully explained.

60 The opening 38 in the fan casing 20 is preferably covered by a cover plate 40. The cover plate 40 opposite the space 36 within the fan 22 is open to permit air to be drawn into the said space 36. The opening in the cover plate 38 is conveniently provided by a perforated plate 22 forming a part of or attached to the cover plate 40.

65 Numeral 44 designates an electrical resistance heater, for heating the air drawn in by the fan. The electrical heater 44 is positioned within the space 36, in the fan 22. Moreover, the electrical heater 44 is preferably supported on the cover plate 40, in such manner as to be removable therewith. The resistance heater 44 is preferably supported

upon a plurality of radially arranged insulating plates 46, which plates are conveniently attached to the cover plate 40 in suitable manner, as by means of short studs 48. The resistance wire 44 is preferably arranged on the plate 46 in the form of a helix, with the wider spirals facing the opening in the cover plate 40. Electricity is conducted to the heater 44 by means of wires 50, 51, and the cover plate 40 is preferably provided with a strap 53 for holding the wires 50, 51, out of position to be struck by the rim plate 34 of the fan.

Electricity for driving the motor 25 may be supplied through conductors 58, 59 in multiple with the conductors 50, 51.

Means are preferably provided whereby the angle at which air is delivered from the delivery tube 12 may be varied. To this end the fan casing 20 is preferably pivotally mounted around the axis of the motor shaft 26, the motor casing being conveniently provided with a shoulder 60 fitting a corresponding opening in the fan casing. In order to hold the casing 20 in its various positions of adjustment around the axis of motor shaft 26, a friction clutch 62 is preferably provided. The clutch 62 may comprise a plate or ring of metal 64, in the shape of a frusto cone, to provide resiliency. One edge 66 of the resilient plate 64 bears against the casing 20, and the other edge 68 bears against an annular ring 70 fixed to the casing of the motor as indicated at 72. The ring 70 and screws 72 not only serve as a part of the friction clutch 62 but also serve as a means for holding the casing in place on the shoulder 60 of the motor casing. The ring 70 is conveniently formed as a hardened steel ring, and means such as bolts and washers 75 may be provided for binding the outer edge 66 of the resilient disk 64. Resilient disk 64 being bound at its edge 66 by the means 75, movement is favored to take place between the edge 68 of the resilient plate 64 and the hardened ring 70, and thereby reduce wear of the parts of the friction clutch incident to the turning of the casing 20 around the axis of shaft 26.

The circuit to the device as a whole is controlled by means of a switch 80, and the circuits to the motor 24 and to the heater 44 are conveniently controlled by separate switches 81 and 82.

To assemble the device, motor 24 is first mounted upon the pedestal 14. The fan casing 20 is then placed over the motor shaft 26 on the shoulder 60. The ring plate 64 is then placed against the inner face of the motor housing 20. The ring 70 is then placed against the resilient ring plate 64. Screws 72 are then passed through the ring 70 and tightened to bind the said ring 70 against the resilient plate 64, and to at the same time fasten the casing 20 in place on

shoulder 60 of the motor casing. The fan 22 is then passed through opening 38 in the fan casing 20, the hub 28 being placed upon motor shaft 26, and then fastened thereto. The radial insulating plates 46, having been previously fastened to the cover plate 40, and the conductor 50, 51 fastened to the end of the resistance wire 44, the cover plate 40 with the heater assembled thereon is then placed over the opening 38 in the fan casing and fixed in place, as by means of screws 85. When the cover plate 40, is in place, the heater 44 fits in the space 36 within the ring formed by the radial blades 32 of the fan, thereby providing a compact arrangement of the parts, and an advantageous location of the heater, as will be hereinafter more fully described.

Operation

Switch 80 is closed and also switches 81 and 82, thereby admitting electricity to run the electric motor 25 and to heat the heater 44. The fan 22 driven by the electric motor, will draw air in through the perforated plate 42. The air drawn in through the perforated plate 42 will enter the space 36 containing the electric heater 44 and will be heated in passing over and around said heater. The heater 44 being located in the space 36, radiation from the heating wires 44 will strike the parts of the fan, and the casing, and the air in passing over these parts of the fan and casing will receive additional heat from these said parts which have been heated by the radiated heat from the wires 44. Some part of the air passing over the heater 44 will be heated more than other parts, and this unevenly heated air, in passing through the blades of the fan, will be mixed, and this mixing will contribute to the uniformity of the temperature of the air forced by the fan into the compression chamber 90 of the fan casing, and consequently to the uniformity of the temperature of the air delivered through the delivery passage 12.

By reason of the location of the heater 44 in the space 36 on the intake side of the fan, the discharge passage 12 is unobstructed, and thereby the resistance of the air flowing through the discharge passage 12 very much reduced. By reason of this reduction in resistance to the air passing through the discharge passage, the fan 22 is required to compress the air to a less degree of pressure than would be the case where substantial resistance is encountered by the air in passing through the discharge opening 12. Due to the less pressure required, the motor 24 may be driven at a lesser speed, and thereby there is less cutting of the air by the blades of the fan, and consequently the noise of the fan may be so reduced as to be scarcely noticeable. Moreover, by reason of the slower speed of rotation of the electric motor, there will be practically no motor hum. For ex-

ample, fans used for hair driers have heretofore been usually run at about 2,000 revolutions per minute. I have found that by the present invention the speed of the fan may be reduced to as much as 1,000 revolutions per minute, and the same efficiency in the drying of hair obtained as with the old style heater running at much higher revolutions per minute.

As heretofore stated, the present invention provides a drier of the type described, which may be run noiselessly or practically so, which utilizes the heat supplied by the heater very efficiently, and which delivers through the discharge tube a very uniformly heated jet of air. Furthermore, the drier is a very compact and of simple construction.

The invention may receive other embodiments than that herein specifically illustrated and described.

While the invention has been particularly described as a pedestal type of hair drier, nevertheless the inventive ideas may be embodied in driers which are held in the hand for drying hair and other uses, and also in driers such as are used in lavatories and similar places for drying the face and hair.

Moreover, the casing and outlet may be of any suitable type and the outlet may be located in any suitable relation to the casing.

What is claimed is:—

1. A drier of the type described, comprising a fan of the peripheral blade type having a central space within the ring of peripheral blades, a fan casing, a delivery tube connected to said casing and an electric heater said heater being located within said space within the ring of peripheral blades on the intake side of said fan, whereby the casing and tube on the delivery side of said fan are unobstructed by said heater and the work which said fan would have to perform to overcome the choking effect offered by a heater located in the delivery tube, is avoided.

2. A drier of the type described, comprising a fan of the peripheral blade type having a central space within the ring of peripheral blades, a casing around the fan having an intake opening on one side, a cover for said fan intake opening, said cover also having openings therein, and an electric heater located within said space within the ring of peripheral blades, and means for supporting said heater on said cover.

3. A drier according to claim 2, wherein said supporting means comprises a plurality of radial insulating plates attached to said cover.

4. A drier according to claim 2, wherein said heater comprises a resistance heating wire arranged in spirals within said space.

5. A drier according to claim 2, wherein said heater comprises a resistance heating wire arranged as a helix within said space

with its widest spiral adjacent said intake opening in the fan casing.

6. A drier according to claim 2, wherein said fan casing opening is of greater diameter than said fan, whereby to admit of assembly of said fan through said casing opening.

7. A drier of the type described comprising a fan of the peripheral blade type having a central space within the ring of peripheral blades, an electric heater located within the space within the ring of peripheral blades, a casing around the fan having an intake opening on one side, a motor having a shaft extending into said casing, a fixed part, means for fastening the side of said fan casing opposite its open side to said fixed part, said opening in said fan casing being of greater diameter than said fan and said heater, whereby to admit of assembly of said heater and of said fan on said motor shaft, through said casing opening.

8. A drier according to claim 7, wherein said casing has a peripheral delivery tube, and said fastening means comprises a resilient ring bearing against said fan casing, a ring bearing against said resilient ring, and means for fastening said last named ring to said fixed part, said parts of the fastening means constituting a friction clutch admitting of forced movement of said casing with relation to said fixed part to adjust said delivery tube to different angular positions.

9. A drier of the type described, comprising a fan of the peripheral blade type having a central space within the ring of peripheral blades, an electric heater located within said space within the ring of peripheral blades, a fan casing having an unobstructed passage therethrough for the delivery of air, and an electric motor driving said fan, said fan being driven at a speed of rotation below that where whistling is produced by the fan blades in compressing the air.

In witness whereof, I have hereunto signed my name.

JOHN E. KELLEY.