June 5, 1934.

G. L. TINKHAM

1,961,179

ELECTRIC DRIER

Filed Aug. 24, 1931

2 Sheets-Sheet 1

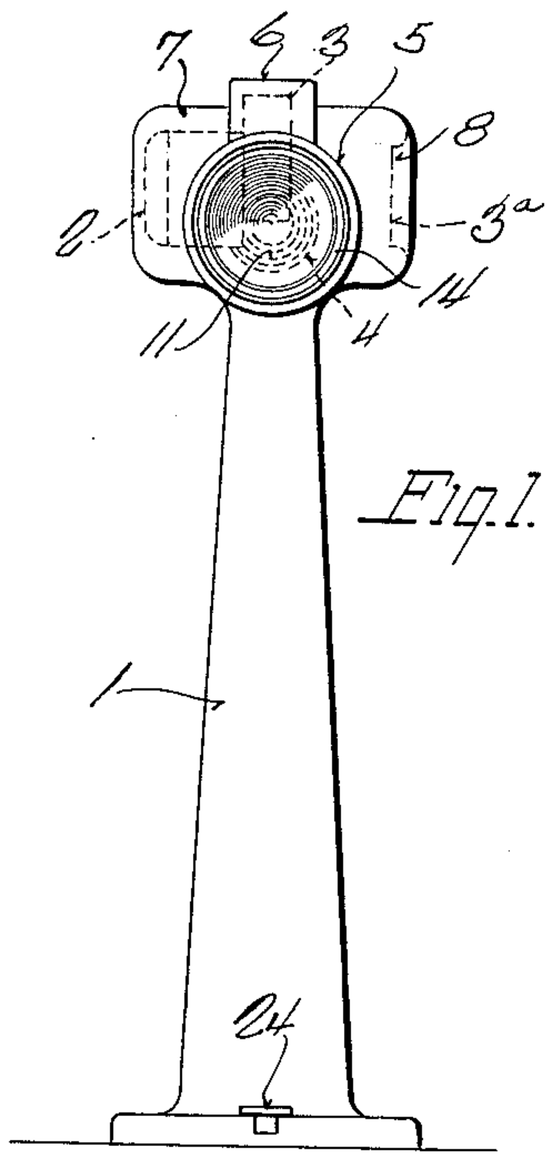


Fig. 1.

Fig. 2.

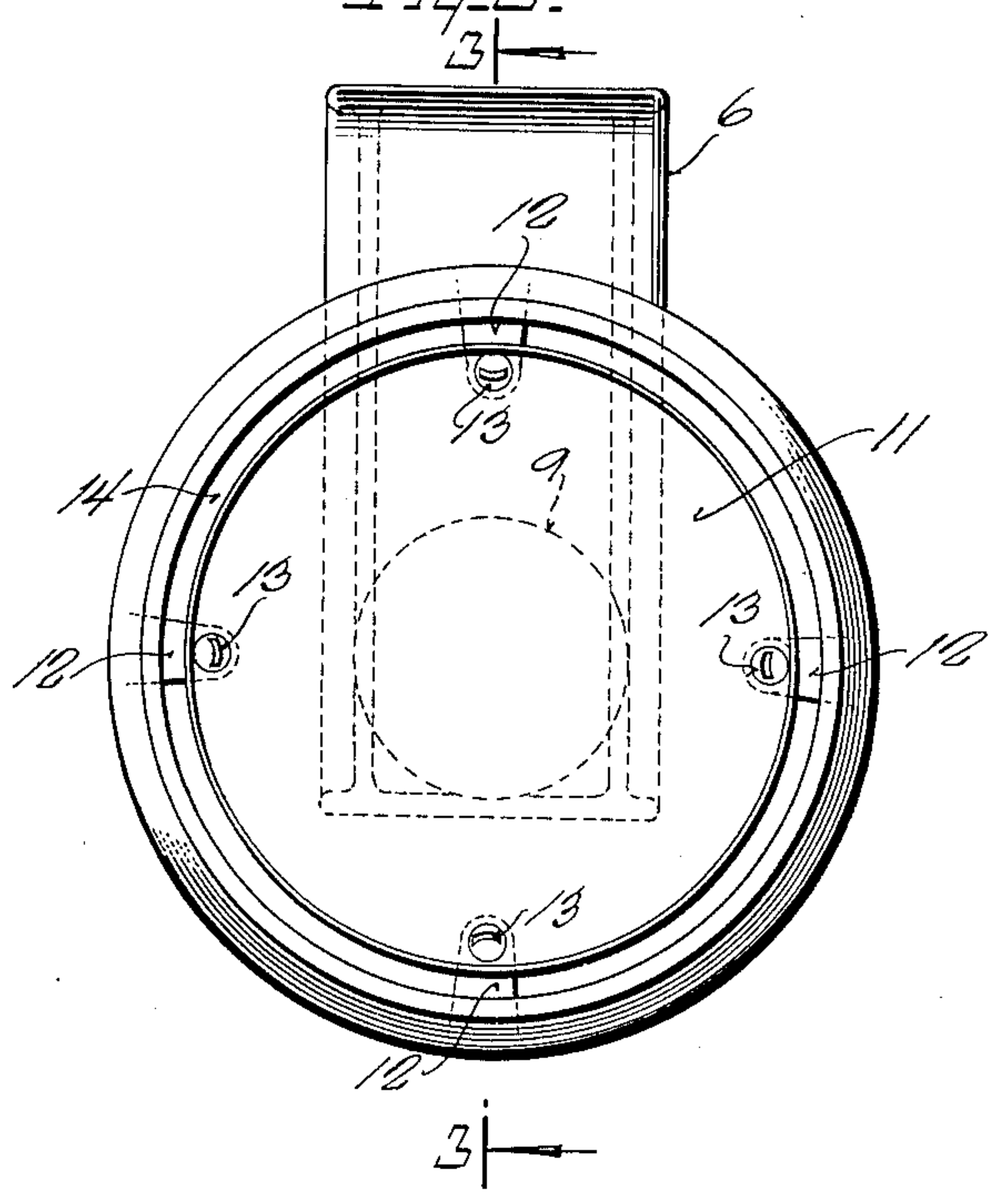
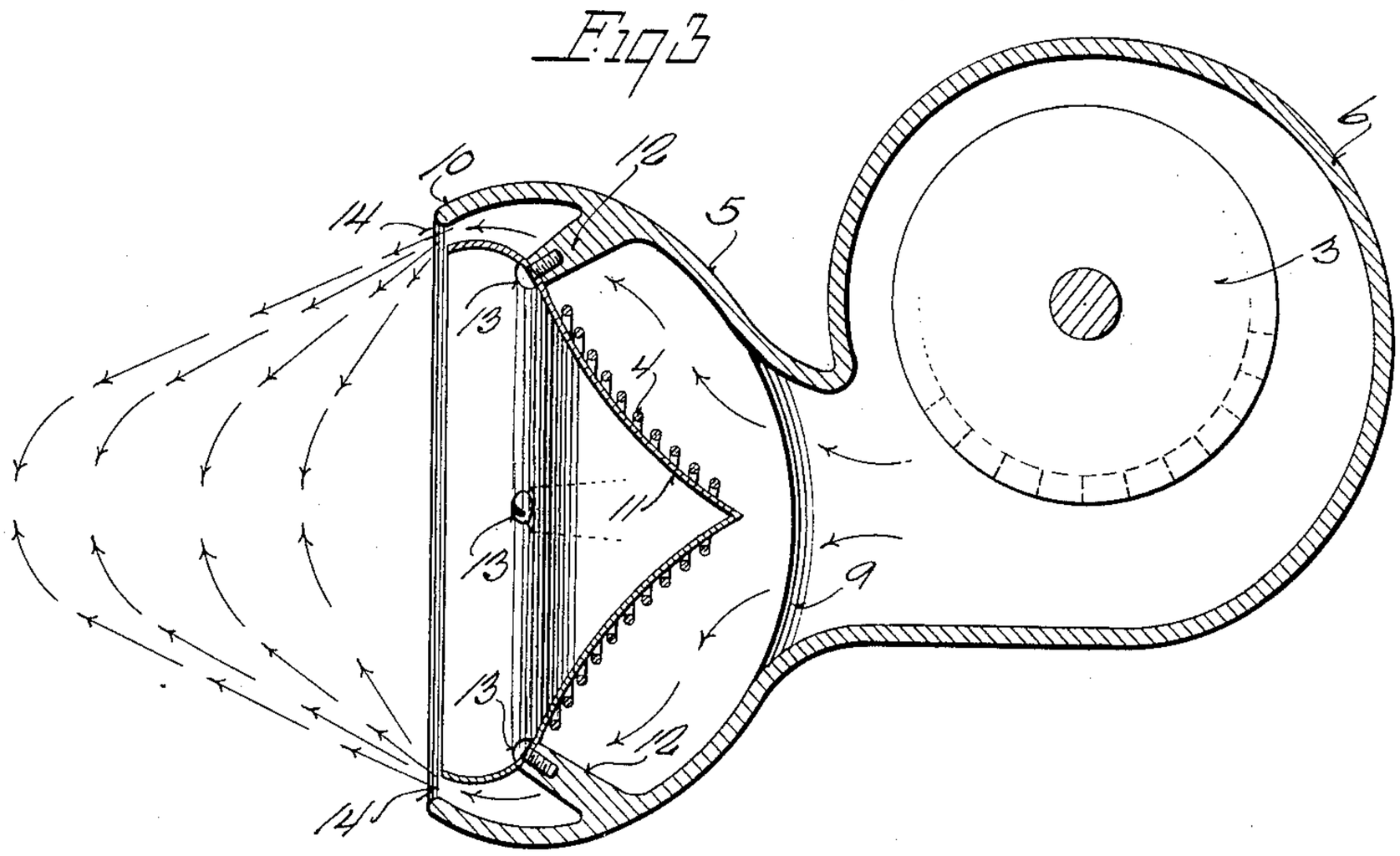


Fig 3



INVENTOR.
Guy L. Tinkham
BY Bottum, Hudnall, Lecher,
McNamara & Michael,
ATTORNEYS

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Fig. 4.

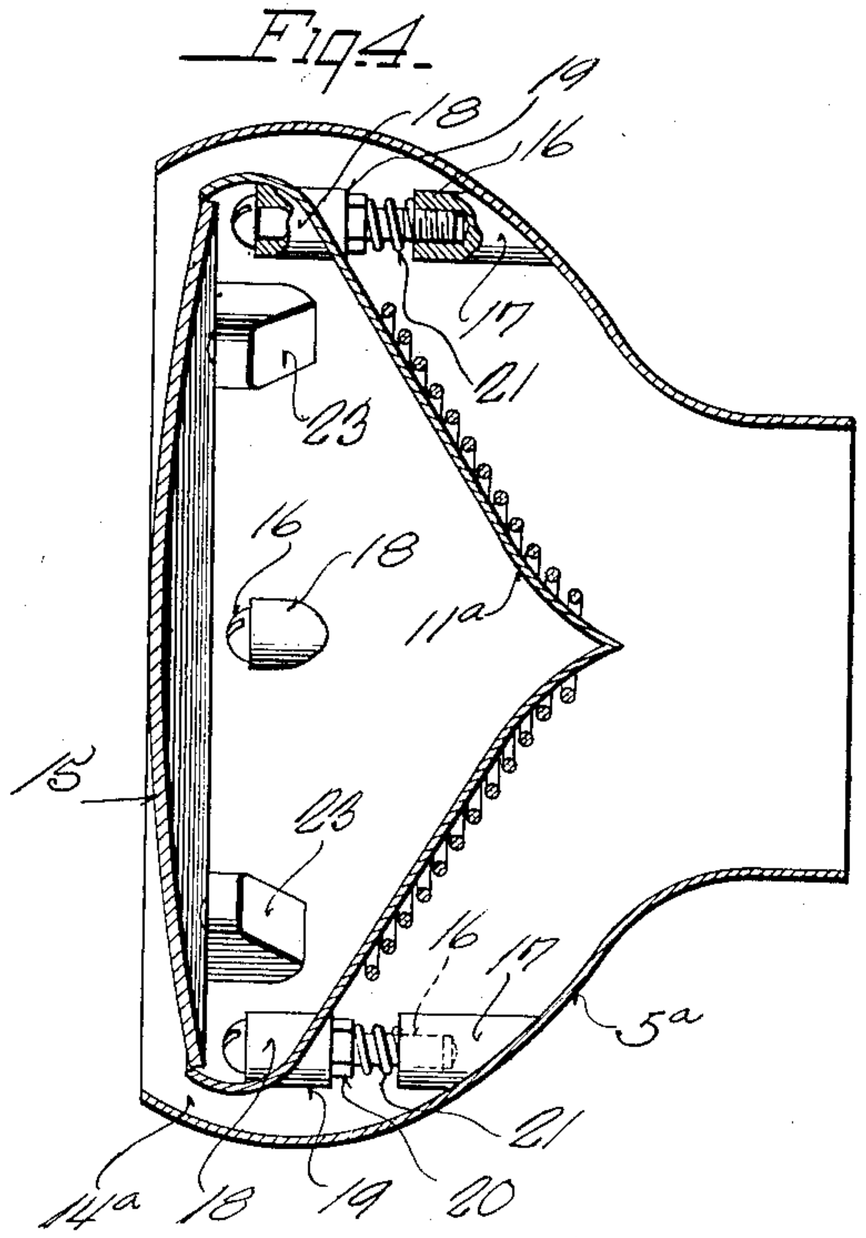


Fig. 6.

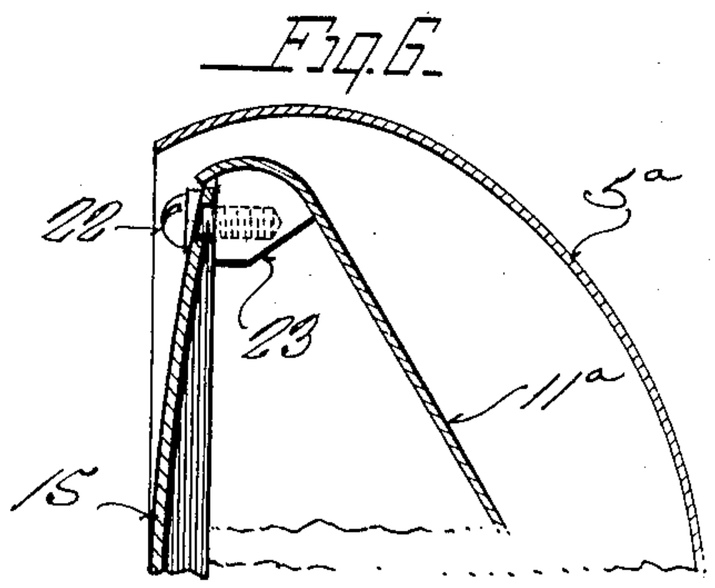
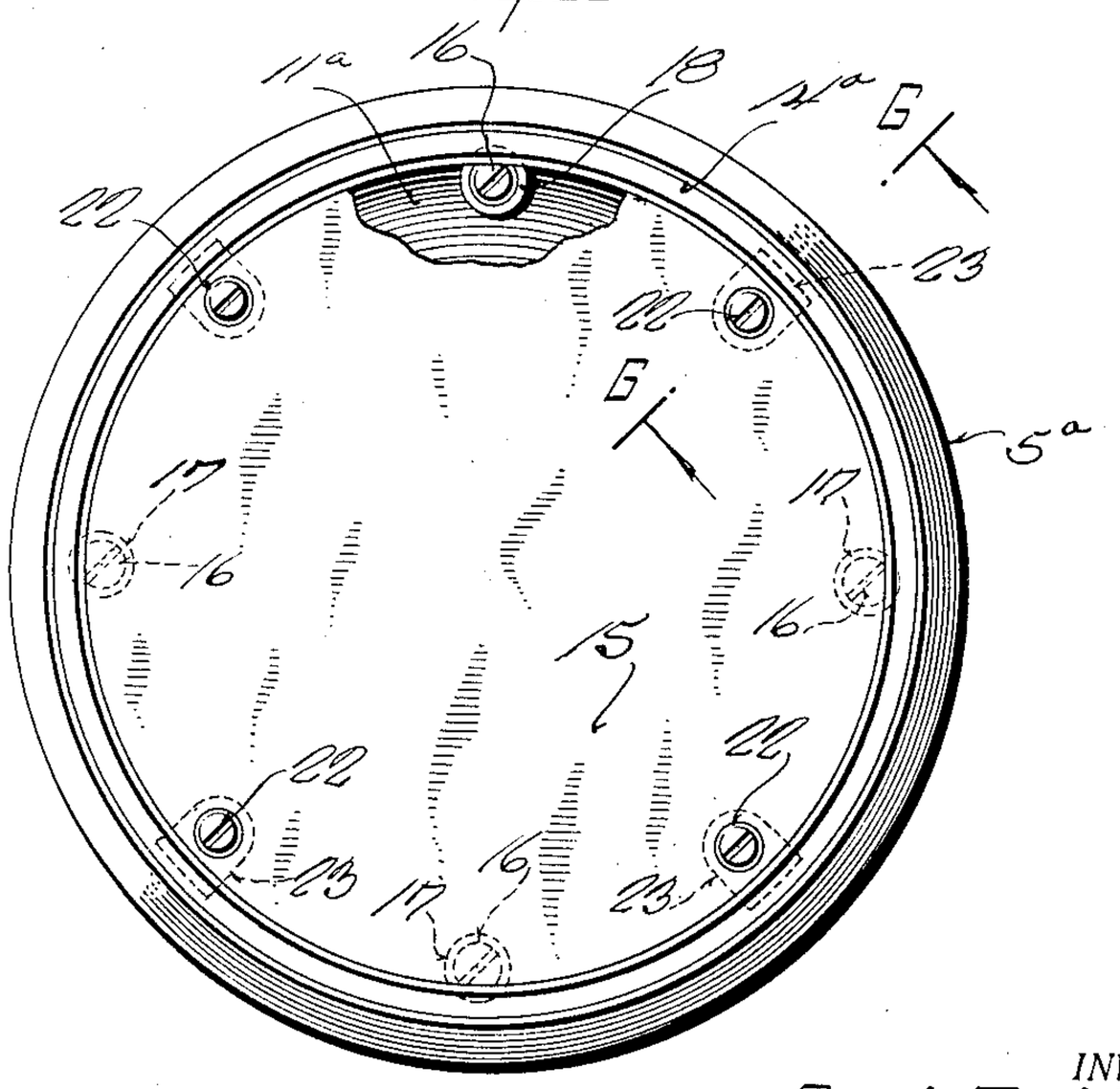


Fig. 5.



INVENTOR.
Guy L. Tinkham.
BY Bottum, Hudnall, Locher, McNamara & Michael,
ATTORNEYS

Patented June 5, 1934

1,961,179

UNITED STATES PATENT OFFICE

1,961,179

ELECTRIC DRIER

Guy L. Tinkham, Detroit, Mich., assignor, by mesne assignments, to McCord Radiator & Mfg. Co., Detroit, Mich., a corporation of Maine

Application August 24, 1931, Serial No. 558,870

2 Claims. (Cl. 34—26)

This invention relates to electrically operated hand and like driers, such as are used in washrooms of hotels, factories, clubs, schools, public service, railway stations and the like.

One object of my inventon is to locate the heating element for the air on the discharge side of the drier so that practically all of the heat generated by the heating element will be utilized in raising the temperature of the air instead of being partially absorbed by the blower and its housing, as when located on the intake side of the device. In locating the heating element on the discharge side of the blower in accordance with my invention, the cold air is passed through the blower and then heated and expanded by the heating element before being discharged from the drier, which insures a greater volume of air discharge than when the air is heated and expanded on passing into or through the blower.

Another object of my invention is to provide a discharge orifice for the drier in the form of a relatively narrow annular slot of sufficient diameter and inclined toward a focal point sufficiently forward of the nozzle and in line with the axial center thereof that the heated air discharged from the nozzle will be in the form of a hollow cone extending outwardly from the nozzle to take in the wrists as well as the hands of the user. As the wrists are usually dry while the hands are wet, the sensation of heated air being delivered from the nozzle is at once apparent, counter-acting sensation of cold air being discharged by evaporation taking place on the wet surfaces of the hands.

A further object of my invention is to adopt the features referred to to a drier of the adjustable nozzle type whereby the air blast may be adjusted as desired by the user of the device.

The invention consists further in the matters hereinafter described and claimed.

In the accompanying drawings—

Fig. 1 is a front elevational view of an electrically operated hand drier embodying the features of my invention;

Fig. 2 is an enlarged front elevational view of the nozzle and blower assembly of the device;

Fig. 3 is a vertical sectional view taken on line 3—3 of Fig. 2;

Fig. 4 is a similar sectional view of the nozzle showing a modified form of construction to be presently described; and

Fig. 5 is a front elevational view of said nozzle.

Fig. 6 is a sectional view showing a detail of the means for fastening the cover plate to the shield.

In Fig. 1, I have shown my invention applied to an electrically operated hand drier of the pedestal type, although the invention may be applied to the wall and other types of driers. In the pedestal type, the drier has an upright supporting pedestal 1 which rests on the floor of the room or compartment in which the drier is used. The operative parts of the apparatus are located at the upper end of the pedestal 1 and include an electric motor 2, a fan or blower 3, a heating element 4 and a nozzle 5.

The blower 3 is of the usual type as employed in these devices and is located in a casing or housing 6 mounted for adjustment about a horizontal axis, being that of the motor 2. The latter is located to one side of the blower 3 in a housing 7 at the upper end of the pedestal 1, as shown in Fig. 1. The air intake 3*a* for the blower 3 is in a housing 8 at the other side of the blower, as shown in said figure. Nozzle 5 is attached to blower housing 6 and extends outward therefrom between housings 7 and 8. With the nozzle so arranged and the blower housing adjustably mounted in the manner referred to, the nozzle on being grasped by the user of the device, may be raised or lowered to direct its air blast upwardly or downwardly or directly outward from the device as may be desired.

The blower 3 is of the centrifugal type having its air intake at one side and its tangential discharge in the peripheral wall of the blower housing, as at 9, in Fig. 3. The nozzle 5 is attached to the peripheral wall of the blower housing 6 about the discharge opening 9 to receive the air blast from the blower. The nozzle is made to flare outwardly from the opening 9 and has circular form with its discharge end 10 inclined toward a focal point sufficiently forward of the nozzle and in line with the axial center thereof to direct the air discharged from the nozzle in the form of a hollow cone extending outwardly from the nozzle to take in the wrists as well as the hands of the user as indicated by the arrows in Fig. 3. The heating element 4 comprises a coil of resistance wire located in the nozzle 5 on the discharge side of the blower 3. In so locating the heating element, practically all of the heat generated by the coil on the passing of an electric current therethrough will be utilized in raising the temperature of the air blast from the blower instead of being partially absorbed by the blower and its housing as when the heating element is located on the intake side of the blower as in devices heretofore used. Moreover, in locating the heating element on the discharge side of the blower,

the cold air is passed through the blower and then expanded by the heat from the element before delivery from the nozzle which creates a greater volume for discharge than if the air were heated and expanded before being passed into the blower as in the previous devices.

The heating element 4 is supported in the nozzle 5 by a shield 11 which in the form shown in Fig. 3 is somewhat conical in shape. The shield 11 is arranged in the nozzle 5 with its apex directed toward the discharge opening 9 of the blower and thus deflects the air blast from the blower toward the flared outer walls of the nozzle, as indicated by the arrows in Fig. 3.

The shield 11 may be secured in the nozzle in any preferred manner. In the drawings, I have shown a series of lugs 12 cast on the surrounding wall of the nozzle and providing a support for the shield, the latter being secured to the lugs by screws or other fastening members 13, 13. The lugs extend inward from the nozzle wall to an extent sufficient to provide a relatively narrow annular slot 14 between the outer ends of the shield and nozzle, as shown in Fig. 3. The heated air is discharged from the nozzle through this slot and thus takes annular or ring form. The slot 14 provides such a narrow orifice for the air delivered by the drier that screening of the opening is unnecessary and consequently there is nothing extending over the discharge opening to retard or impede the air flow or to become clogged or choked to create a back pressure in the device. Moreover, the slot is so narrow that the hands or fingers of the operator cannot be thrust into the device either against the heater coils or into the blower itself. The shield 11 is arranged in front of the heating coils to protect and cover the same from the exterior of the device.

With an annular orifice 14 for the discharge of air from the nozzle, the air can be delivered over a relatively large area without materially reducing its velocity. For example, the effective area represented by the annular orifice can be made substantially the same as a regular circular nozzle, the air volume and velocity remaining the same. With the annular orifice however, the air can be distributed in the form of a large ring which will cover the hand area more completely than the small diameter covered by the circular or other nozzles heretofore employed. One very pleasing result with the ring discharge is that the area covered by the ring is so large that a portion of the heated air impinges on the wrists of the user of the device and as the wrists are usually dry while the hands are wet, the sensation of heated air being delivered from the device is at once apparent. In the old type of nozzle, the air discharge is confined to the area of the wet hands which by immediate evaporation counteracts the effect of the heated air and gives the user the impression that cold and not heated air is being delivered from the nozzle.

In Figs. 4 and 5, I have shown a cover plate 15 secured over the outer end of the shield 11*a* to close the recess or cavity made by the shield by reason of its conical form. This closes the recess and prevents the deposit of foreign matter therein, as is possible when the recess is open as in Figs. 1 to 3.

The shield 11*a* is adjustably mounted in the nozzle 5*a* so that the width of the annular orifice 14*a* may be adjusted as desired. This adjustment is accomplished through the use of screws 16 threaded into lugs 17 formed integral with or soldered to the surrounding wall of the nozzle 5*a*. The screws pass through lugs or spacers 18, 19 on opposite sides of the shield and a clamp nut 20 is employed on each screw to secure the shield thereto. Coil springs 21 are located about the screws between the nuts 20 and lugs 17. This arrangement not only allows for the adjustment of the annular orifice 14*a*, but also yieldably mounts the shield and deflector in the nozzle. The cover plate 15 is secured to the shield 11*a* by a number of screws 22 extended through the plate and into lugs 23 on the front side of the shield as shown in Fig. 6.

The switch device for turning on and off the current to the motor 2 and the heating element 4 is controlled through a foot pedal 24 at the base of the pedestal 1, as shown in Fig. 1. When my invention is applied to other types of driers, the control for the switch is located within convenient reach of the operator of the device. The nozzle may be cast integral with the blower housing 6, as shown in Figs. 1 to 3, when such parts are to comprise one fixture. A sheet metal nozzle may be used, as shown in Figs. 4 to 6. With such a nozzle, its blast receiving end will be shaped to fit over a suitable projection on the blower housing about its discharge opening 9.

The details of structure and arrangement of parts shown and described may be variously changed and modified without departing from the spirit and scope of my invention, except as pointed out in the appended claims.

I claim as my invention:

1. In an electrically operated hand or like drier, a blower having intake and discharge openings, a nozzle connected with the blower at the discharge opening and flared outwardly therefrom to provide the nozzle with a relatively large outer end to encompass the hand and wrist area of a user of the drier, an electric heating element for heating the air discharged from the nozzle, and a shield fitted in the nozzle for deflecting the air from the blower toward the flared walls of the nozzle, said shield having its outer marginal portion adjacent the outer end of the nozzle and spaced inwardly therefrom to provide a relatively narrow discharge orifice for the nozzle, said shield and nozzle being substantially circular in transverse section to give annular form to said discharge orifice, the outer end of the nozzle and the portion of the shield defining said discharge orifice extending forwardly and inclined toward a focal point sufficiently forward of the nozzle and in line with the axial center thereof to direct the discharged air in the form of a hollow cone extending outwardly from the nozzle to take in the wrists as well as the hands of the user.

2. In an electrically operated hand or like drier, a blower having intake and discharge openings, a nozzle connected with the blower at the discharge opening and flared outwardly therefrom to provide the nozzle with a relatively large outer end to encompass the hand and wrist area of the user of the drier, an electric heating element in the nozzle for heating the air discharged therefrom, a conical-like shield in the nozzle to deflect the air from the blower toward the flared walls of the nozzle and to support the heating element therein, said shield being arranged in the nozzle with its apex end extending inwardly and its outer end adjacent the outer end of the nozzle and spaced inwardly therefrom to provide a relatively narrow discharge orifice for the nozzle, said nozzle and deflector being substantially circular in transverse