

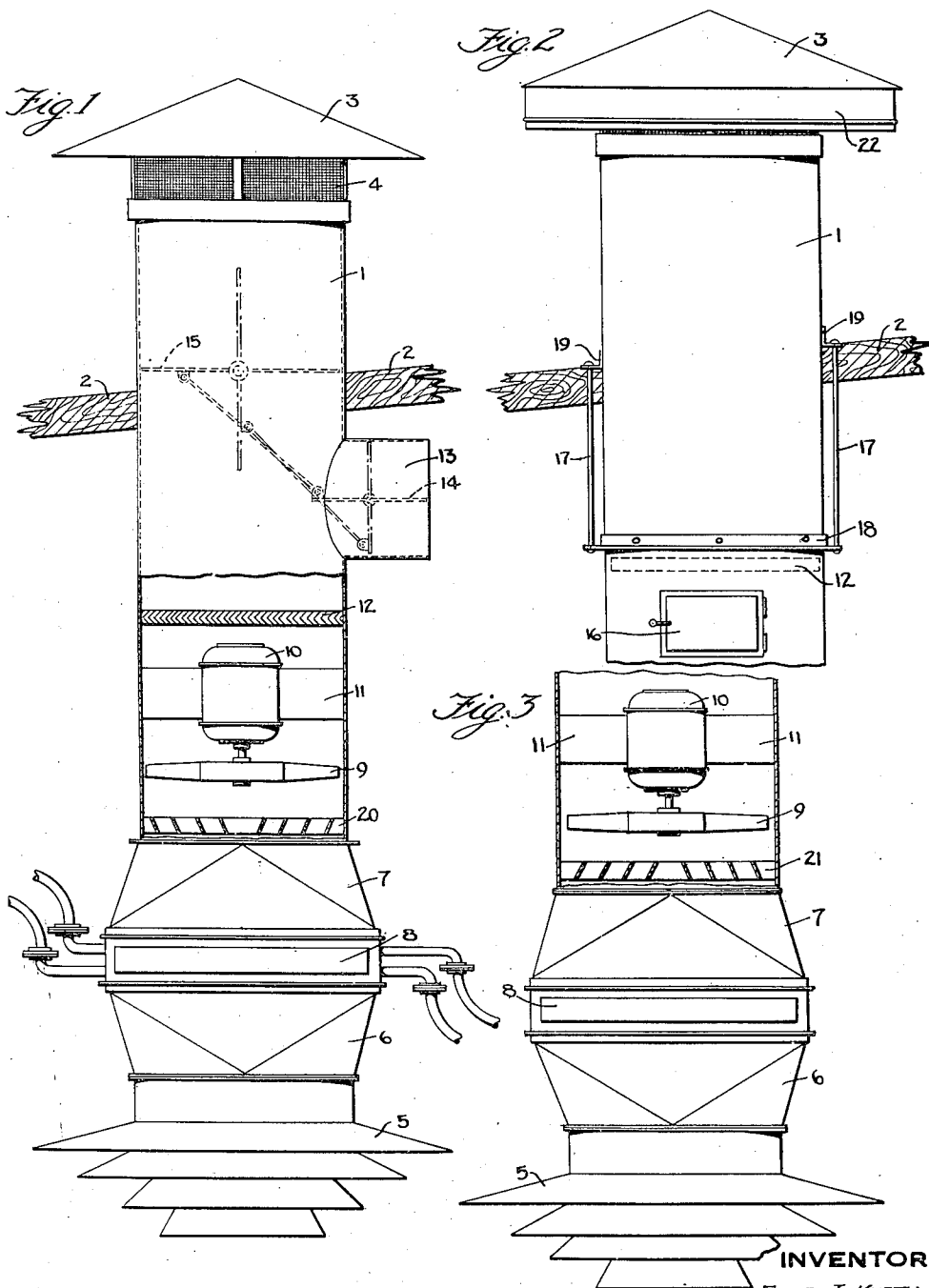
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COMBINED VENTILATING AND HEATING DEVICE

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COMBINED VENTILATING AND HEATING
DEVICEFranz Josef Kurth, New York, N. Y., assignor to
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1 Claim. (Cl. 98—39)

My invention relates to ventilating devices and more in particular ventilating devices equipped with a heating element, whereby a closed space, while being ventilated, can at the same time be heated.

A considerable drawback of devices of this kind is that because of their large dimensions, the installation cost is high, aside from the other drawbacks that the volumes of air introduced by such devices enter the room not only unevenly heated, but with too great a velocity with the result that persons in the room are subjected to the inconvenience of objectionable draft.

To obviate these drawbacks, is the object of the present invention.

The combined ventilating and heating device embodying my invention is so designed that notwithstanding its small dimensions it has a great ventilating and heating capacity, that it can be operated with a minimum of expense and that large volumes of cold or heated air are introduced into a room without the sensation of draft being experienced by persons in the room. Furthermore, my device is so designed, that thereby even very large rooms, e. g. manufacturing plants, or the like, can be effectively and economically ventilated and at the same time heated.

In the annexed drawing, in which I have shown, by way of illustration, an embodiment of my invention, Fig. 1 is an elevation of the device, a portion of the wall of the tube being broken away to show the electric motor and the fan-wheel operated thereby; Fig. 2 is a similar view as Fig. 1, of the upper portion of the device showing the manner of fastening it to the roof; Fig. 3 is a view of the lower part of the device showing a modification.

In the drawing, at 1 is indicated the preferably cylindrical tube, which, as shown in Figs. 1 and 2, extends with its upper portion through the roof indicated at 2, and above said roof is covered by a hood or cowl shown at 3. Below the latter, there is mounted on the open upper end of the tube an annular body of fine wire mesh, shown at 4, to prevent any coarse particles, small birds, insects, or the like, being sucked into the tube.

At the lower end of the tube there is provided the air-distributing body 5, which is so designed that the large volumes of air passing through the tube, notwithstanding their considerable velocity, are introduced into the room to be ventilated and heated uniformly and without any draft being experienced by the persons in the room. The air distributing body 5 is secured by

angular collars, or the like, to an inverted hollow conical connecting piece, shown at 6. Above the same there will be seen at 7 a hollow conical connecting piece which, by means of angular collars, or the like, is secured to the lower end of tube 1 and serves as a holder for a heating body indicated at 8. The latter can be designed for steam or hot water, but may also be an electric heating body. In any event, it is so constructed that the volumes of air passing it on their way to the room to be ventilated and heated can be heated to various temperatures. The heating body may also be cut out, if desired.

At 9 is shown a fan-wheel of special design and provided with a plurality of blades. This fan-wheel is mounted direct on the shaft of an electric motor indicated at 10. By said fan-wheel large volumes of air are sucked through the tube to be introduced into the room to be ventilated and heated. The electric motor 10, as shown in the drawing, is entirely enclosed in a smooth-walled jacket and thus is protected against moisture. It is supported on brackets 11 inwardly projecting from the inner wall of tube 1, which brackets are so designed as to act as vanes for guiding the air to the vanes or blades of the fan-wheel 9.

In order that no dust is carried by the air sucked in by the fan-wheel, there is provided above the electric motor 11 a filter shown at 12.

As will be seen in Fig. 1, there is provided on one side of tube 1 a laterally projecting short tube 13, which terminates in a corresponding opening in the wall of tube 1 and through which air from the room to be ventilated and heated may be drawn into tube 1. In the short tube 13, there is oscillatingly mounted a damper 14, whereas in the upper portion of tube 1 there is provided a similar damper shown at 15. These two dampers are so connected with each other by a suitable chain or cord, that upon the damper 15 in tube 1 being moved to the open position indicated by the broken line in Fig. 1, the damper 14 in the short tube 13 is moved to a closed position, and vice versa. In the former case, only outside air is sucked into the tube 1 to be introduced into the room to be ventilated and heated, while in the latter case only room air is sucked into tube 1. Depending on the adjustment of the two dampers to intermediate positions, both outside air and room-air may be sucked into tube 1 in varying proportions to be introduced together into the room to be ventilated and heated.

As will further be seen in Fig. 1 of the drawing, there are mounted intermediate the fan-wheel 9

and the heating body 8 several sheet-metal rings of frusto-conical shape, indicated at 20, which rings with their smaller ends are directed toward the heating body 8 so that the volumes of air sucked in by the fan-wheel 9 are conducted more toward the center of the heating body to compensate for the tendency of the fan to throw the air outwardly.

As shown in Fig. 3, the frusto-conical metal rings indicated in said figure at 21 have their larger ends directed toward the heating body 8, so that the volumes of air are directed more toward the circumference of the heating body 8 in cases where the fan tends to direct the air inwardly. In both cases, the volumes of air sucked into tube 1 to be introduced into the room to be ventilated and heated are deflected by the interposed sheet metal rings 20 and 21 respectively, to assure the flow of substantially equal amounts of air through all portions of the heating body 8, which necessarily is of greater surface area than the cross-sectional area of tube 1 so as to have ample heating area without such depth as to offer to the flow of air any material resistance.

In order to make the electric motor 10 operating the fan-wheel 9 readily accessible, there is provided, according to Fig. 2, in the wall of tube 1 at a suitable place an opening of appropriate size which is ordinarily tightly closed by a door shown at 16.

In Fig. 2, moreover, are shown the means for securing the device to the roof indicated at 2. These means comprise adjustable bolts shown at 17. The lower ends of these bolts pass through angular sheet-irons fastened to the outer wall of tube 1, as shown at 18. The upper ends of the bolts pass through angle-pieces 19 fastened to the outer wall of tube 1 past above the roof 2. If desired, turn-buckles (not shown) may be interposed.

In case the heating body 8 for the heating of the air, carried by the hollow conical connecting piece 7, is designed for steam, it is preferably mounted with two elements, that is to say, double connections for steam and double connections for condensation, so that the heating device can be adjusted to 50%, which is especially desirable in

the spring and in the fall, when the device, while supplying the full amount of ventilating air is not called upon to supply the full amount of heat. Of course, also more than two elements with a corresponding larger number of connections can be provided.

By the provision of the second hollow conical connecting piece (6) a suitable connection of small dimensions between the heating body 8 and the circular inlet end of the air-distributor 5 is provided. Because of the special design of the air-distributor 5, which is of the type disclosed in my prior Patent No. 1,973,490, dated September 11, 1934, a draftless even distribution of air in the room to be ventilated and heated is insured.

As the drawing shows, only a small surface of the roof is required for the installation or mounting of the device, and because of the small dimensions of the device and the even distribution of air large enclosed spaces, e. g. manufacturing plants, can be most economically ventilated and heated.

I claim:

A device of the character described comprising an air conduit having an open outer end for inlet of air, means for mounting said conduit in an opening in a wall of an enclosure with its outer end disposed outside of said enclosure, means at the inner end of said conduit for the draftless distribution of air flowing through said conduit, a fan and a driving motor therefor mounted within said conduit for producing an inward flow of air therethrough, said conduit having a laterally enlarged portion between said fan and said air distributing means, an air temperature changing unit within said laterally enlarged portion of said conduit, said conduit flaring inwardly toward said laterally enlarged portion and tapering inwardly from said laterally enlarged portion toward said air distributing means, and means within said conduit between said fan and said air temperature changing unit for distributing air flowing through the device uniformly over said air temperature changing unit, said conduit and fan and motor and air temperature changing unit and both of said air distributing means all being disposed in alined axial relationship.

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