(No Model.) 2 Sheets—Sheet 1.

W. MATTHEWS & J. & W. YATES.

APPARATUS FOR HUMIDIFYING AIR AND VENTILATING.

No. 516,770. Patented Mar. 20, 1894.

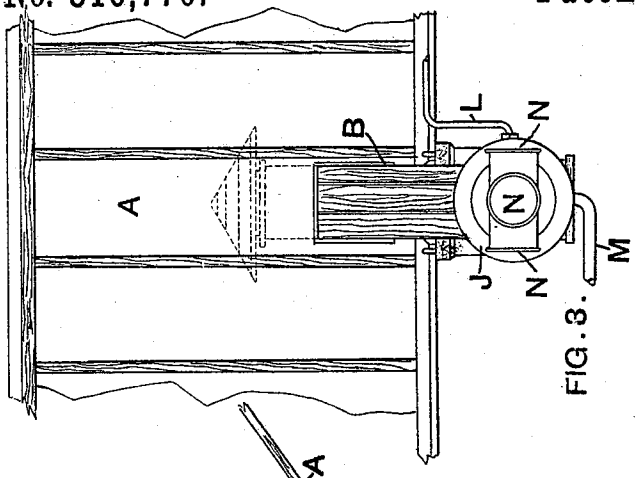

FIG. 3.

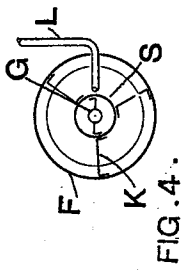

FIG. 4.

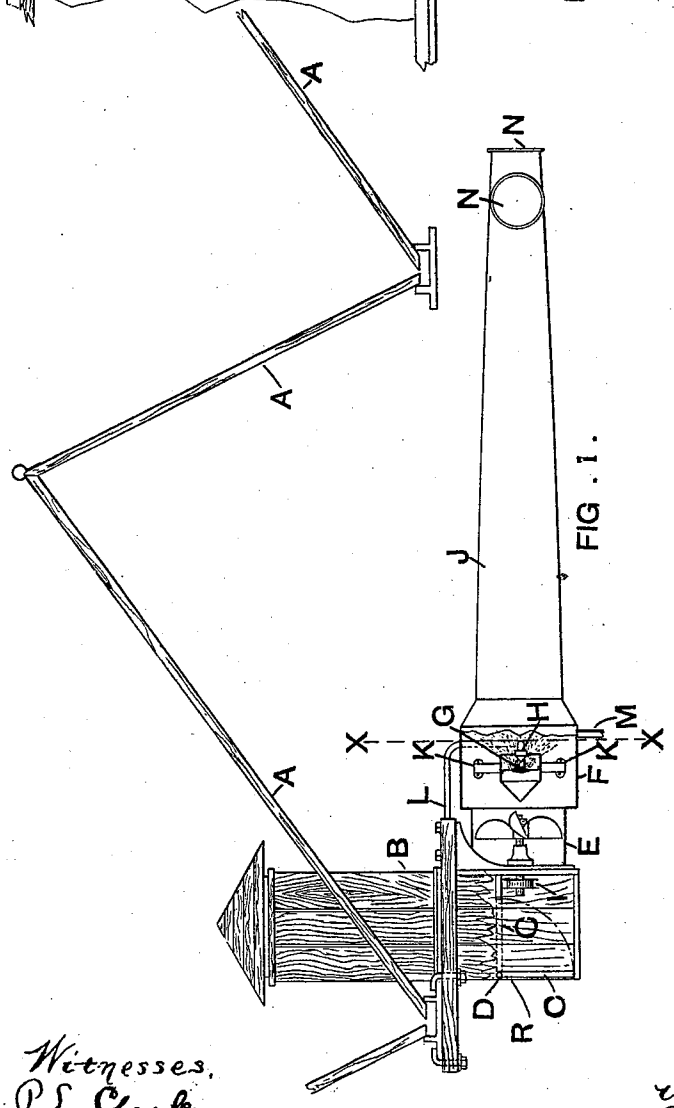

FIG. 1.

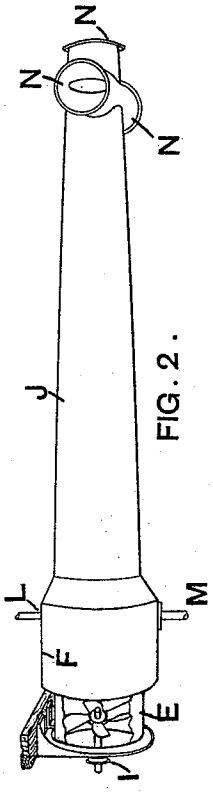

FIG. 2.

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H. H. Baldwin

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(No Model.) 2 Sheets—Sheet 2.

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APPARATUS FOR HUMIDIFYING AIR AND VENTILATING.

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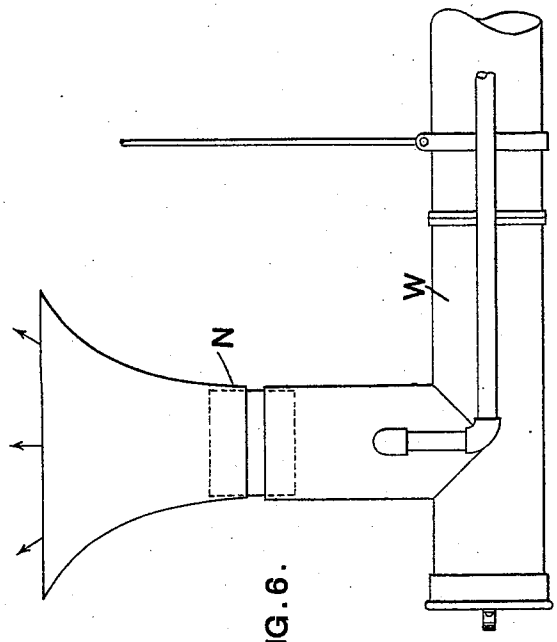

FIG. 6.

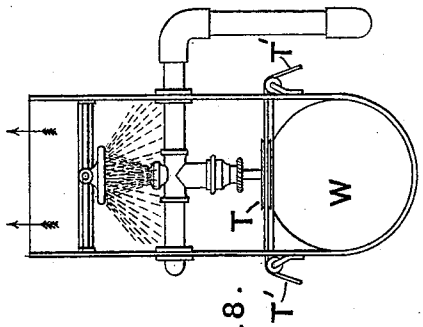

FIG. 8.

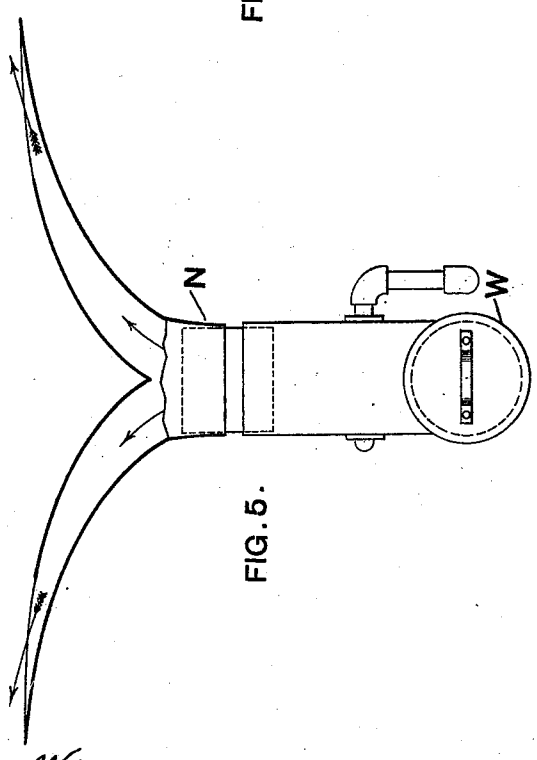

FIG. 5.

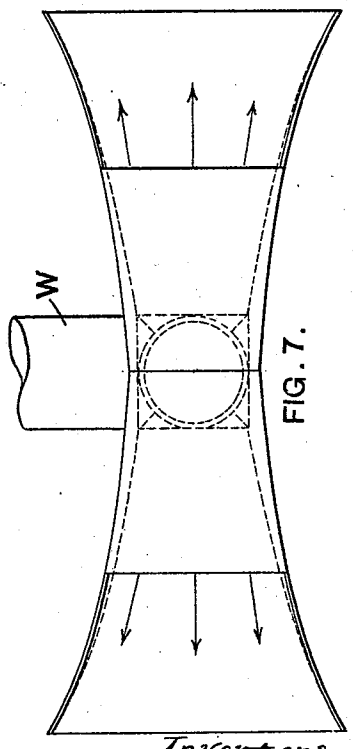

FIG. 7.

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UNITED STATES PATENT OFFICE.

WILLIAM MATTHEWS, JOSEPH YATES, AND WALTER YATES, OF MANCHESTER, ENGLAND.

APPARATUS FOR HUMIDIFYING AIR AND VENTILATING.

SPECIFICATION forming part of Letters Patent No. 516,770, dated March 20, 1894.

Application filed September 29, 1892. Serial No. 447,260. (No model.) Patented in England September 26, 1890, No. 15,240.

To all whom it may concern:

Be it known that we, WILLIAM MATTHEWS, JOSEPH YATES, and WALTER YATES, subjects of the Queen of Great Britain and Ireland, residing at Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Apparatus for Humidifying Air and Ventilating, (for which we have obtained Letters Patent in England, No. 15,240, dated September 26, 1890,) of which the following is a specification.

This invention relates to apparatus for simultaneously humidifying air and ventilating.

In an apparatus constructed according to these improvements, air is caused to circulate through a tube or similar passage within which or within a chamber in or a branch from which the circulated air is more or less saturated with water in spray or in a fine state of division. The moistened air passes from the apparatus into the shed, room, or apartment where it is required, and the air to replace it therein is drawn or forced either from the external atmosphere, from the internal atmosphere, or from both sources. A ventilating fan is preferably used for circulating the air, and the humidification may take place before the air passes the fan, or (and preferably) afterward. The finely divided water may be obtained from a jet of steam or a jet of water, but we prefer to obtain it from the impingement of a jet of water against a fixed plate, as hereinafter described.

We will particularly describe our invention with reference to the accompanying drawings in which—

Figure 1 is a side view partly in section; and Fig. 2 is a perspective view, also partly in section, of a modified form of the construction represented by Fig. 1. Fig. 3 is an end view of Fig. 1; and Fig. 4 a vertical transverse section along the line X—X Fig. 1. Fig. 5 is an end view; Fig. 6 a side view; Fig. 7 a plan, and Fig. 8 a vertical section of a modified construction and arrangement of the apparatus.

In each of the figures in which the parts are represented, similar details of construction are indicated by similar letters of reference.

In the form of the apparatus represented by Figs. 1 and 3, the air is drawn by the fan E from the external atmosphere, through the casing B, the lower part of which may be provided with a flap or swing door C hinged at D. This door is adapted to close either the opening R, opposite to the fan E, or, when in the horizontal position, as represented by the dotted lines in Fig. 1, the area of the casing B. In each of the positions the door should be made so as to be capable of being securely fastened, in order that it may not be displaced by the induced current of air. When the door C is fixed in the horizontal position, the fan E will draw the air from the interior of the room or shed through the opening R, and will force it through the apparatus, in which it is humidified, into the room again, so that in this case the air is moistened over and over again, and is simply circulated without being changed. When on the other hand, the door is fixed in the vertical position as shown in Fig. 1, covering and closing the opening R, the air is drawn from the external atmosphere, through the casing B, and is humidified in the apparatus as before described. In this case, therefore, the supply of air is being continually renewed, and the apparatus is more perfectly a ventilator. The fan E is arranged at the rear of the humidifying chamber F, which is preferably tubular and co-axial with the fan, and which contains the small spray plate G. In front of the spray plate, in the center of the chamber, there is arranged a jet H, directed against the spray plate, so that the water or steam issuing therefrom impinges upon the spray plate, which, in the case of water, completely pulverizes it, breaking it up into fine spray, and which in either case deflects the spray and steam and completely diffuses it throughout the forward part of the chamber, where it is caught by the current of air and carried forward through the tube J, whence it emerges through the lateral or axial openings N into the shed or room. By the time that the spray or steam, whichever may be used, reaches the outlets N, it is completely diffused in the air which

is thus completely humidified without at the same time containing free globules or drops. The fan E may be driven by means of a belt running upon the pulley I, and through the closed sides or bottom of the casing B. The spray plate G may be fixed in the center of the chamber F, by means of two or three metallic strips K, fixed to the wall of the chamber, or to an annular casing S around the spray plate G, as indicated by Figs. 1 and 4, the annular casing S being secured to the walls of the chamber F. This annular casing assists in the production of a fine spray from water. At the back of the casing and spray plate there may be fixed a cone as shown in Fig. 1, for the purpose of deflecting the incoming current of air from the fan. The water or the steam, according to which may be used, is supplied through the pipe L which is shown as being broken off in Fig. 4 so as not to obstruct the view of the spray plate. Any water which may be condensed or collect in the apparatus may be arranged to flow back into the chamber F, whence it may escape through the outlet pipe M, Figs. 2 and 3. The tube may if desired, be extended to the limits of the room in which it is placed, or be extended to other rooms also, the outlets N being suitably arranged. Also instead of employing a single humidifier in the main tube J, separate humidifiers may be arranged in each outlet or in each group of outlets as illustrated by Figs. 5 to 8 inclusive.

In the modification represented by Fig. 2, no provision is indicated for deriving the air from an external source. Such an arrangement may be employed when it is desired to humidify the air only, and not to draw the external air also.

The modified construction of the outlets illustrated by Figs. 5, 6, 7, and 8, is designed to produce a more uniform and wider distribution of the issuing spray charged air. The outlet N is bifurcated, flattened, and widened, so that the air issues therefrom as indicated by the arrows. The jet and spray plate are arranged in the branch leading to the bifurcated outlet, and may be constructed as described with reference to Figs. 1 to 4. The supply of air is derived from the air trunk W, connected with a suitable fan.

This modification of the apparatus is more especially adapted for use in works to which the transport is difficult, as it may be packed in a small case. It is also preferred to use it when a spray laden, rather than a moisture laden air is required. The issue of the spray or steam from the jets may be controlled through a grooved pulley T around which a cord T′ passes (Fig. 8) the lower ends of the cord being within hand reach.

For ordinary purposes, and in ordinary weather, we prefer to employ water for the humidification of the air, but under exceptional conditions and in cold weather, we may employ steam and water alternately. If water be used, it may be either warm or cold according to the season of the year, the temperature, or the degree of humidity required.

The efficiency of the apparatus may be increased by arranging one or more exhaust or ventilating fans, to remove the air from the room or shed; these fans being arranged in such positions distant from the moistened air inlets N, as may be suitable or convenient.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is—

1. In an apparatus for humidifying air, the combination with a tube, of means for forcing air therethrough, a spray plate having at its back a deflecting cone with its apex toward the incoming air current, and a jet delivering water or steam against the front of said spray plate, substantially as described.

2. An apparatus for humidifying air, consisting of an inclosing tube, a fan for forcing air through said tube, a centrally arranged spray plate, a deflecting cone at the back of the spray plate, and a central jet delivering water or steam against said plate in a direction opposite to that of the air current, substantially as described.

3. In an apparatus for humidifying air, the combination with the tube having outlets, of a fan for forcing air through said tube, an annular casing supported in front of the fan, a spray plate fixed in said casing, a deflecting cone at the back of the casing, and a jet delivering water or steam against the spray plate in a direction opposite to that of the air current, substantially as described.

In testimony that we claim the foregoing as our invention we have signed our names, in presence of two witnesses, this 29th day of July, 1892.

WILLIAM MATTHEWS.
JOSEPH YATES.
WALTER YATES.

Witnesses:
WILLIAM E. HEYS,
ARTHUR PULMAN.