

Nov. 26, 1929.

E. J. P. PLANERT

1,736,799

HUMIDIFIER

Filed Dec. 5, 1927

2 Sheets-Sheet 1

Fig. 1.

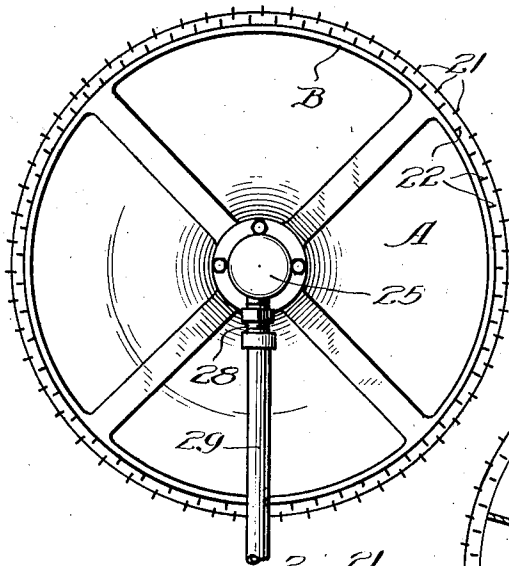


Fig. 2.

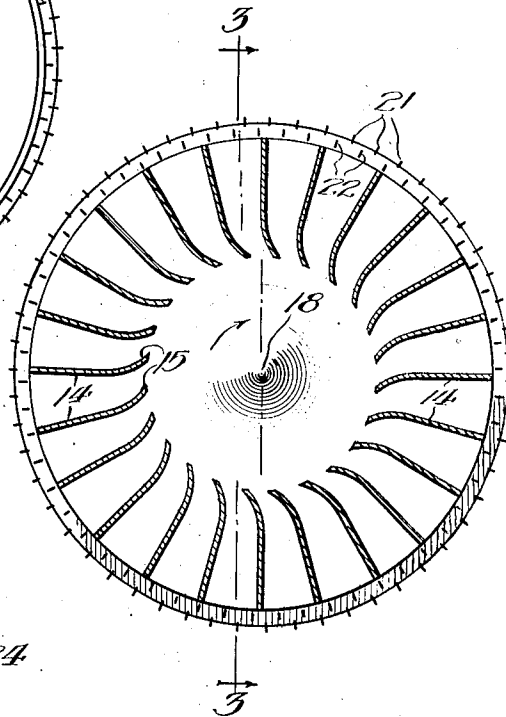


Fig. 3.

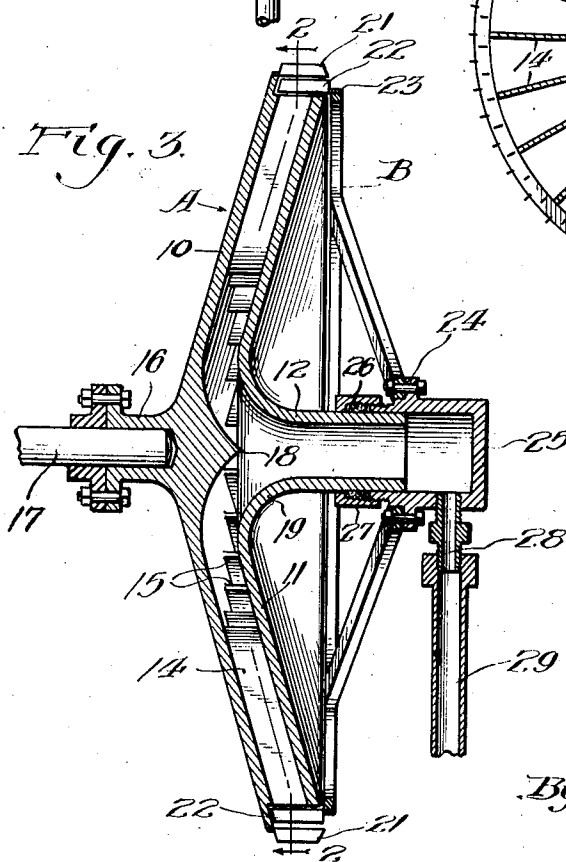
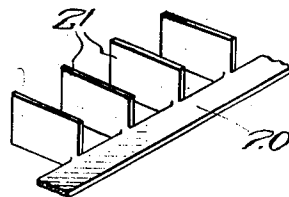


Fig. 4.



Inventor:
E. J. P. Planert,
By *Wm. H. H. H.*

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Fig. 5.

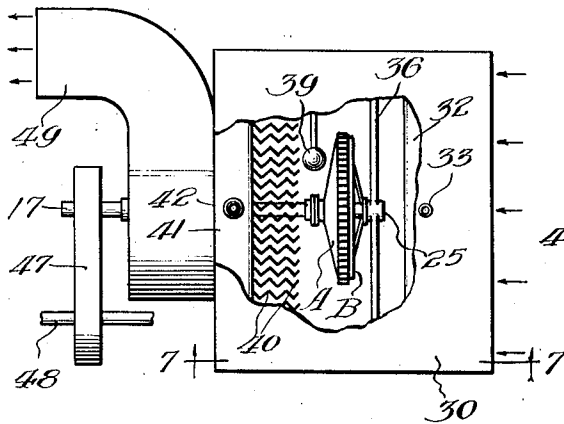


Fig. 6.

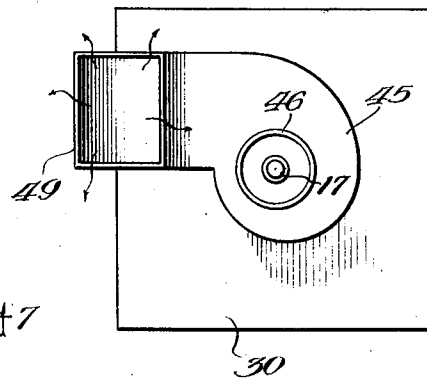


Fig. 7.

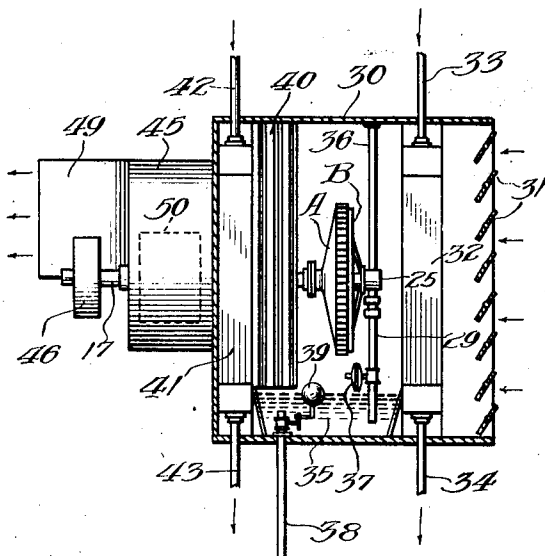


Fig. 8.

Inventor:
E. J. P. Planert,
By *Wm. J. & Wm. J. Lilly's*

UNITED STATES PATENT OFFICE

EMIL J. P. PLANERT, OF UNION CITY, NEW JERSEY

HUMIDIFIER

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This invention relates to a humidifying apparatus with which may be used a spray device which is improved in certain particulars. The object of this invention is to provide a humidifier which is susceptible of accurate control whereby to produce a desired moisture content in a given body of air, and also to simplify to a considerable extent the spray device used in connection therewith, so as to break up into exceedingly small particles the water which supplies humidity to the air.

An exemplification of this invention is set forth in the accompanying drawing in the manner following:

Figure 1 is a front elevation of the spray device;

Fig. 2 is a transverse section therethrough taken on line 2—2 of Fig. 3;

Fig. 3 is a longitudinal section therethrough taken on line 3—3 of Fig. 2;

Fig. 4 is a fragmentary detail in perspective of one of the bands which is mounted adjacent the periphery of the spray device;

Fig. 5 is a view in plan of the humidifier cabinet, a portion of the rear wall thereof being broken away to exhibit the arrangement of the several operating units;

Fig. 6 is a rear elevation thereof;

Fig. 7 is a vertical section through the humidifier cabinet taken on line 7—7 of Fig. 5; and

Fig. 8 is a front elevation of the humidifier with the shutters and heater therein broken away in different planes to exhibit the interior construction.

Referring particularly to Figs. 1 to 4, the spray device therein shown comprises two units, a rotor A and a stator B. The rotor may consist of a casting having a pair of spaced parallel walls 10 and 11 which extend angularly from a hub 12 after the manner of a shallow cone. Connecting the two walls and extending between them are radial vanes 14 which proceed inwardly from the peripheries of the walls to a point substantially half

way toward the center of the rotor. The inner ends 15 of the vanes are curved to one side, and all in the same direction, as shown best in Fig. 2. The outer wall 10 is provided centrally with an axial sleeve 16 wherein is received one end of a driving shaft 17 to which the rotor is fixedly connected. On its inner side the wall 10 is also curved forwardly to an axial point 18 in general conformity with the curvature 19 which joins the inner wall 11 with the hub 12.

The outer wall of the rotor is shown as having its periphery extended slightly beyond that of the inner wall. By this arrangement I am enabled to mount on the periphery of the outer wall a band 20 which carries a plurality of wings 21 extending across the ends of the vanes 14. Between these wings and the periphery of the inner wall 11 is a space sufficient for the accommodation of a complementary set of wings 22 which extend laterally from a second band 23 having a mounting on the stator the form of which is preferably that of a spider plate, as shown. The arms of the stator are joined to a flange 24 upstanding from a bearing box 25 in which is journaled the hub 12 of the rotor. Any suitable means for providing a water-tight joint between the hub of the rotor and its bearing may be used, such as the packing 26 and gland 27.

From the lower side of the bearing box is extended a nipple 28 in connection with an intake pipe 29 through which water is taken in to the spray device. Rotation of the shaft 17 causes the rotor to be revolved with a consequent turning movement of the vanes 14 and outer wings 21. The direction of the rotor movement is as indicated by the arrow in Fig. 2. A suction effect is thereby created sufficient to draw through the pipe 29 water which is standing at a lower level. The water so taken into the rotor is advanced by centrifugal force to the periphery thereof where it is discharged first against the inner

wings 22 which are stationary with the stator. After being broken up into fine particles, the water is then acted upon by the outer wings 21 which further comminute and break up the water particles. Thus in the condition of a very fine spray the water is discharged from the device.

A spray device having these characteristics may be used with advantage in a humidifier of the general kind which is shown in Figs. 5 to 8 inclusive. This apparatus is housed within a cabinet 30 which is open only at the front where I have provided adjustable shutters 31. Rearwardly of the shutters is a heater 32 which may desirably consist of a cellular construction through which steam is circulated by means of inlet and outlet pipes 33 and 34, respectively. The air which is admitted through the shutters and then advanced to a higher temperature by the heater is taken over a body of water 35 which is contained within a tank at the bottom of the cabinet. Over this tank is mounted a spray device which may be the same as the construction shown and described in connection with Figs. 1 to 4 inclusive: The bearing box 25 of this sprayer may be connected to one or more struts 36 by which additional support is afforded thereto. The inlet pipe 29 is shown as depending into the water body 35 so as to draw its supply therefrom. If desired, a thermostatic valve 37 may be interposed in the feed pipe. A supply pipe 38 is also provided in connection with the tank containing this water, and, if desired, a float valve 39 may be connected therewith to maintain the body of water at a selected level.

Rearwardly of the spray device are water eliminators 40 which may conveniently comprise a series of closely arranged parallel plates having corrugations or angularities, as shown best in Fig. 5. The moisture-laden air leaving the sprayer is required to pass between these plates which segregate water particles of excess size, causing same to drain into the tank at the cabinet bottom. Rearwardly of the water eliminators, I have shown a second heater 41 to which is connected inlet and outlet pipes 42 and 43, respectively. This heater may be of the same general construction as the heater 32 already described.

The rotor shaft 17 extends outwardly from the cabinet through a second housing 45 wherein is mounted a rotary fan 50. The shaft carries near its outer end a pulley 46 over which a driving belt 47 may run to impart motion which is received from a power shaft 48. Extending from the fan housing 45 is a duct 49 which leads to one or more places where the moisture-laden air is to be used.

The humidifier of this invention is advantageous because of the simplicity of its construction, and because of the complete

control which may be exercised over its operation. In the structure of the spray device is combined a plurality of vanes which exert a pumping force such as to assure a feeding of water from a lower level. An associated unit, the eliminators, is so placed as to cause the excess moisture to be drained into the body of water which supplies the feed pipe for the spray device. The water used for this purpose may be supplemented, as necessary, from an outside source, its inflow being controlled by the float valve 39. The air which is taken into the humidifier is treated and conditioned by the several units which act upon it so as to be rendered suitable, both as to temperature and moisture content, for any selected purpose.

I claim:

1. A spray device which comprises a conical rotor with double walls connected by radially extending vanes the inner ends of which are curved in one direction, a stator associated with the rotor and having a series of closely spaced wings overlying the periphery of the latter, other wings carried by the rotor overlying the wings of the stator whereby liquid which is centrifugally discharged from the rotor is caused to impinge first against the wings of the stator, and then is impinged by the wings of the rotor, and means for supplying liquid to said rotor.

2. A spray device in which is comprised a hollow rotor having radial vanes extending close to its periphery, a stator associated with the rotor and having a series of closely spaced wings extending across the periphery of the rotor, other wings carried by the rotor and lying to the outside of the stator wings, the rotor being adapted to discharge centrifugally water against the wings of the stator and thereafter to strike the same with its own wings, and means for supplying liquid to said rotor.

3. A spray device in which is comprised a rotor and a stator, the former consisting of a pair of spaced walls connected by vanes and between which liquid is moved centrifugally for discharge at its periphery, a series of closely spaced wings carried by the stator and overlying the periphery of the rotor, a second series of closely spaced wings carried by the rotor and revolving in a plane to the outside of the stator wings whereby the discharged liquid is caused to impinge against the wings of the stator and thereafter to be impinged by the wings of the rotor, and means for supplying liquid to the said rotor.

4. A spray device in which is comprised a rotor having a pair of spaced walls one of which is provided with an axial hub, a plurality of vanes extending radially between the two walls and connecting them in unitary relation, all the vanes having their in-

ner ends curved in one direction and their outer ends terminating close to the periphery of the rotor, a stator having a series of closely spaced wings extended laterally to overlie the periphery of the rotor, a second series of closely spaced wings carried by the rotor for rotation just outside the wings of the stator whereby water which is discharged centrifugally from the rotor is impinged first against the wings of the stator and then is impinged by the wings of the rotor, and means for supplying liquid to the center of said rotor.

EMIL J. P. PLANERT.

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