

Sept. 17, 1935.

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2,014,773

AIR HUMIDIFIER

Filed Jan. 24, 1933

2 Sheets-Sheet 1

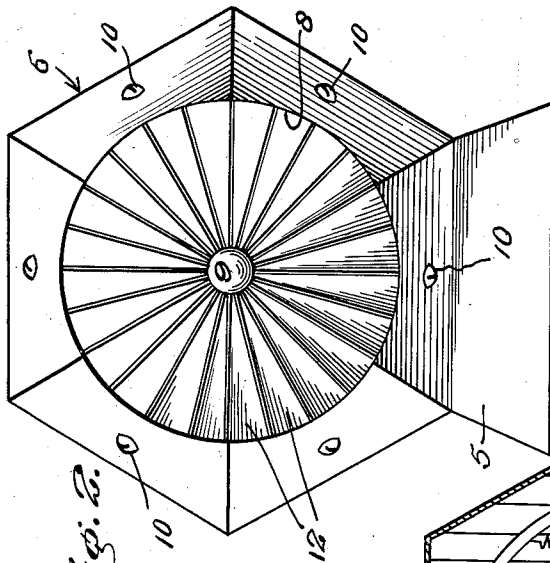


Fig. 2.

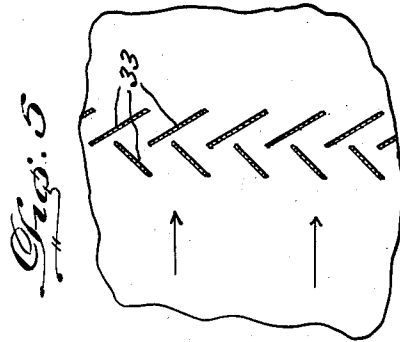


Fig. 5.

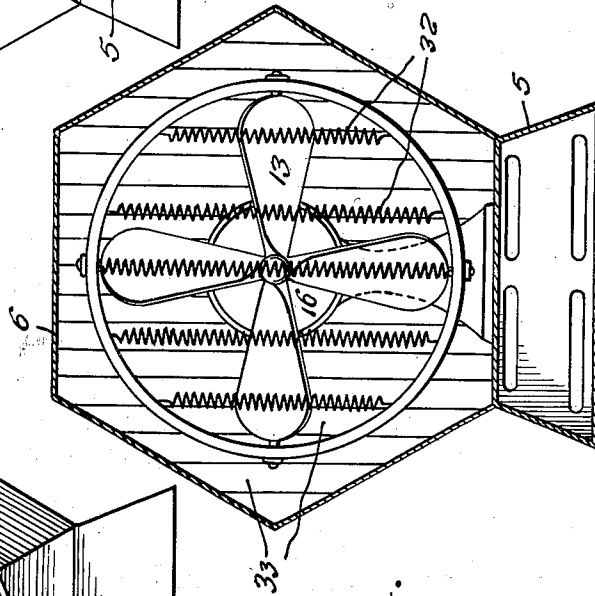


Fig. 4.

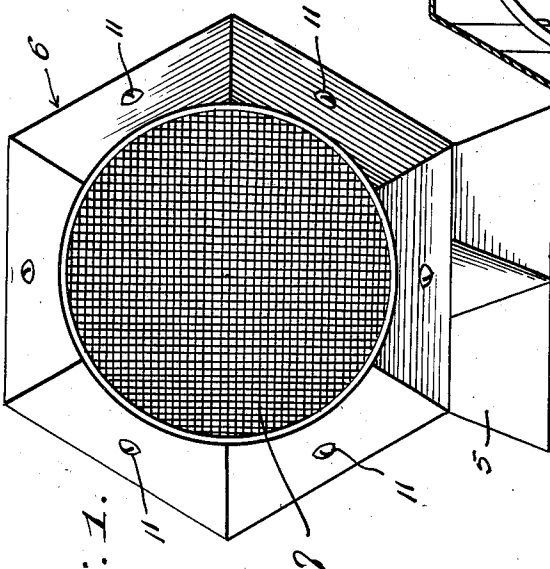


Fig. 1.

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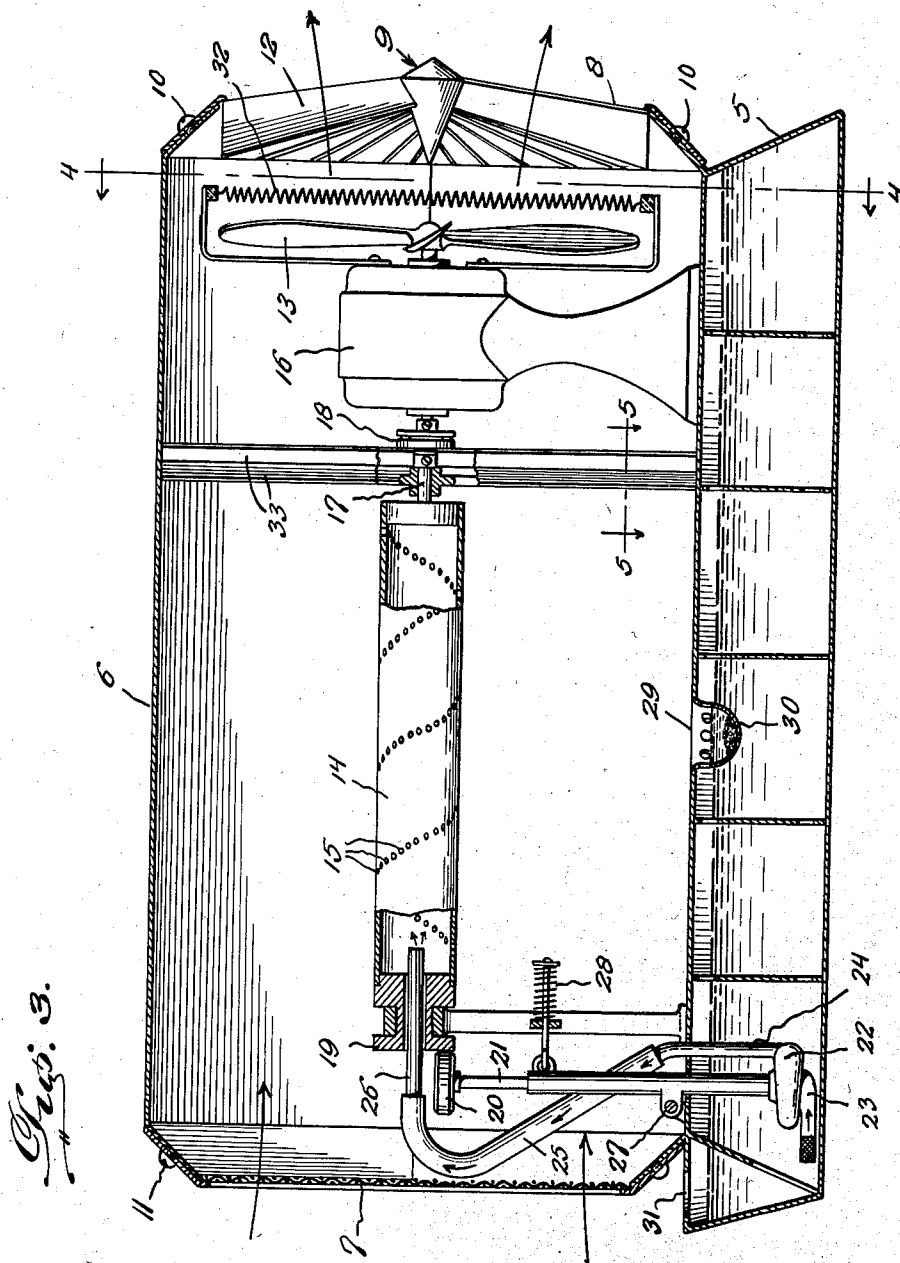
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2 Sheets-Sheet 2



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AIR HUMIDIFIER

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Application January 24, 1933, Serial No. 653,304

1 Claim. (Cl. 261—29)

This invention relates to an improved humidifier adapted to be used for moistening and cooling or heating the air in or supplied to a room, receptacle, or the like.

5 The primary object of the present invention is to provide an air humidifier of the above kind which is extremely efficient in operation, and which is characterized by being of very simple, compact and durable construction.

10 A further object of the present invention is to provide an air humidifier including an open-ended casing, positive means for causing a rapid flow of air through the casing, and efficient means for thoroughly moistening the air as it
15 flows rapidly through the casing, whereby relatively great air humidifying capacity is insured for a humidifier of given size.

Another object of the invention is to provide an air humidifier including improved and efficient means for positively saturating the air as
20 it is caused to flow through the casing of the humidifier.

Still another object of the invention is to provide means at the outlet end of the casing of the humidifier for causing the moistened air to
25 whirl and spread rapidly, thereby avoiding a concentrated blast of air where the latter issues from the humidifier, and giving a general movement of air entirely over the space to be humidified.

Other objects and features of the invention will become apparent from the following description when considered in connection with the
30 accompanying drawings, in which:

35 Figure 1 is an end elevational view of an air humidifier embodying the present invention, looking toward the intake end of the casing.

Figure 2 is a view similar to Figure 1, looking toward the outlet or discharge end of the casing.

40 Figure 3 is a central longitudinal sectional view of the humidifier.

Figure 4 is a transverse section on line 4—4 of Figure 3; and

45 Figure 5 is a fragmentary horizontal section on line 5—5 of Figure 3.

Referring in detail to the drawings, 5 indicates a covered elongated water pan or receptacle of shallow form, providing a base upon which is constructed or mounted an elongated horizontal open-ended casing 6. The casing 6 has a
50 screened inlet 7 at one end and an outlet 8 at the opposite end in which is mounted a unit 9 for giving the air a whirling movement and causing it to spread rapidly as it issues from the outlet 8. This unit 9 is detachably secured in place
55

as at 10 so that it may be removed for access to the interior of casing 6, and the screen 7 at the inlet of casing 6 is similarly detachably secured in place as at 11. The unit 9 includes a spreading cone and a circular series of radial pitched
5 vanes 12 extending from the cone at the center of the outlet opening 8 to the periphery of the latter. As the moistened air issues from the outlet 8, the blades 12 give the same a whirling motion and together with the cone cause it to spread rapidly
10 so as to avoid a concentrated blast issuing from the casing 6. This is attendant with many advantages and particularly gives a general movement of air entirely over the space to be humidified so that the latter maintains a nearly uni-
15 form temperature throughout.

A motor driven fan 13 is mounted in the casing 6 near the outlet 8, and has for its purpose to positively cause a rapid flow of air into and through the casing 6 to be humidified. Jour-
20 naled centrally of the casing 6 between the inlet 7 and the fan 13 is a hollow, horizontal, elongated, cylinder or cylindrical water spraying element 14 that is closed at the ends and provided substantially from end to end with a spiral series of peripheral spray openings 15. The cylindrical
25 spraying element 14 is driven by the motor 16 of fan 13, the element 14 having a shaft 17 at the end adjacent motor 16 coupled to the power shaft of the latter as at 18. In this way, the spraying
30 element 14 is rapidly rotated as the fan 13 is driven.

A gear 19 is provided on the shaft of spraying element 14 at the opposite end of the latter adjacent the inlet 7, and meshing with gear 19 is a
35 gear 20 secured on the drive shaft 21 of a water pump 22 arranged within the adjacent end of water pan 5 with its inlet 23 adjacent the bottom of the latter. The outlet 24 of pump 22 extends
40 upwardly into casing 6 where it is connected by a pipe 25 with an axial water inlet pipe 26 for spraying element 14. It will thus be seen that when motor 16 is placed into operation, the fan
45 13 is driven thereby, as is also the spraying element 14, which in turn drives the pump 22 through the gearing 19 and 20. The pump 22 is shown as tiltably mounted on a horizontal axis
50 27 so that its shaft 21 may swing toward gear 19 to bring the gear 20 into engagement with the latter, such engagement being yieldingly effected
55 by resilient means as at 28, and the gears 19 and 20 being of the friction type. However, it is obvious that beveled gears may be used in place of gears 19 and 20, in which case the same are preferably provided in a suitable housing.

As the pump 22 is driven in the manner described above, water is drawn from pan 5 and forced into spraying element 14 by pump 22, whereupon the water issues from the small openings 15 in a substantially spiral film that is rapidly rotated due to rotation of element 14. This causes complete and thorough saturation of the entire volume of air passing through casing 6 in a uniform and positive manner, and makes possible the practical use of fan 13 by which the air is rapidly caused to flow through casing 6 for maximum air humidifying capacity.

The top of water pan 5 has a drain opening at 29 associated with a sediment trap 30, by means of which excess moisture supplied to casing 5 by spraying element 14 may be drained from the casing 6 back to the pan 5 for re-use, and by means of which impurities extracted from the air passing through casing 6 may be collected. In small air humidifying devices, the pan 5 may be filled with water or may have its water supply replenished from time to time through a top filling opening 31 provided in an extended end of the pan as shown clearly in Figure 3.

Under ordinary conditions, when the air passes through casing 6 and is moistened, it issues from the casing 6 in a considerably cooled state. However, in case it is desired to heat the air before it issues from casing 6 and after being humidified, either to bring the air back to or above room temperature, I provide an electrical air heater as at 32 in a vertical position coincident with outlet opening 8 and between fan 13 and unit 9. This electrical heater may be suitably mounted by brackets secured to the casing of motor 16, and may consist in a series of vertical resistance coils, as shown. Any suitable means may be provided for controlling and adjusting the air heater so that the latter will heat the air to the desired temperature, but such controlling and adjusting means is not shown in view of the fact that the same may take any conventional or well known form and constitutes no specific part of the present invention.

In order to remove excess moisture from the air before it is heated and discharged from casing 6, I preferably provide suitable vertical overlapping baffles 33 extending obliquely and from top to bottom of the casing 6 between the spraying device 14 and the motor 16. It will be apparent that the moistened air striking against these baffles before issuing from the casing, will have excess moisture removed therefrom, thus insuring issuing of the air from the casing free of suspended particles of water to an objectionable degree.

The operation of the device having been explained as the description of the construction progressed, it is believed that the operation and advantages of the invention will be readily understood and appreciated by those skilled in the art without further detailed description. It will be apparent that the invention provides a very practical arrangement for carrying out the stated objects thereof, and it is to be understood that minor changes are contemplated in the construction illustrated and described without departing from the spirit and scope of the invention as claimed.

What I claim as new is:

In an air humidifier, a water pan, an open-ended casing mounted on said water pan, a fan mounted in the casing for causing flow of air through the latter, said fan having a driving motor, an elongated cylindrical drum journaled axially of the casing at the receiving side of said fan and operatively connected at one end to the motor of the fan, said drum being provided with a series of peripheral water discharge openings, means including a pump in the pan for supplying water under pressure from said pan to the cylinder, said pump having an upwardly extending drive shaft, and a direct driving connection between the other end of the cylinder and said drive shaft of the pump.

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