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HUMIDIFIER AND EVAPORATIVE COOLER

Filed Sept. 22, 1950

3 Sheets-Sheet 1

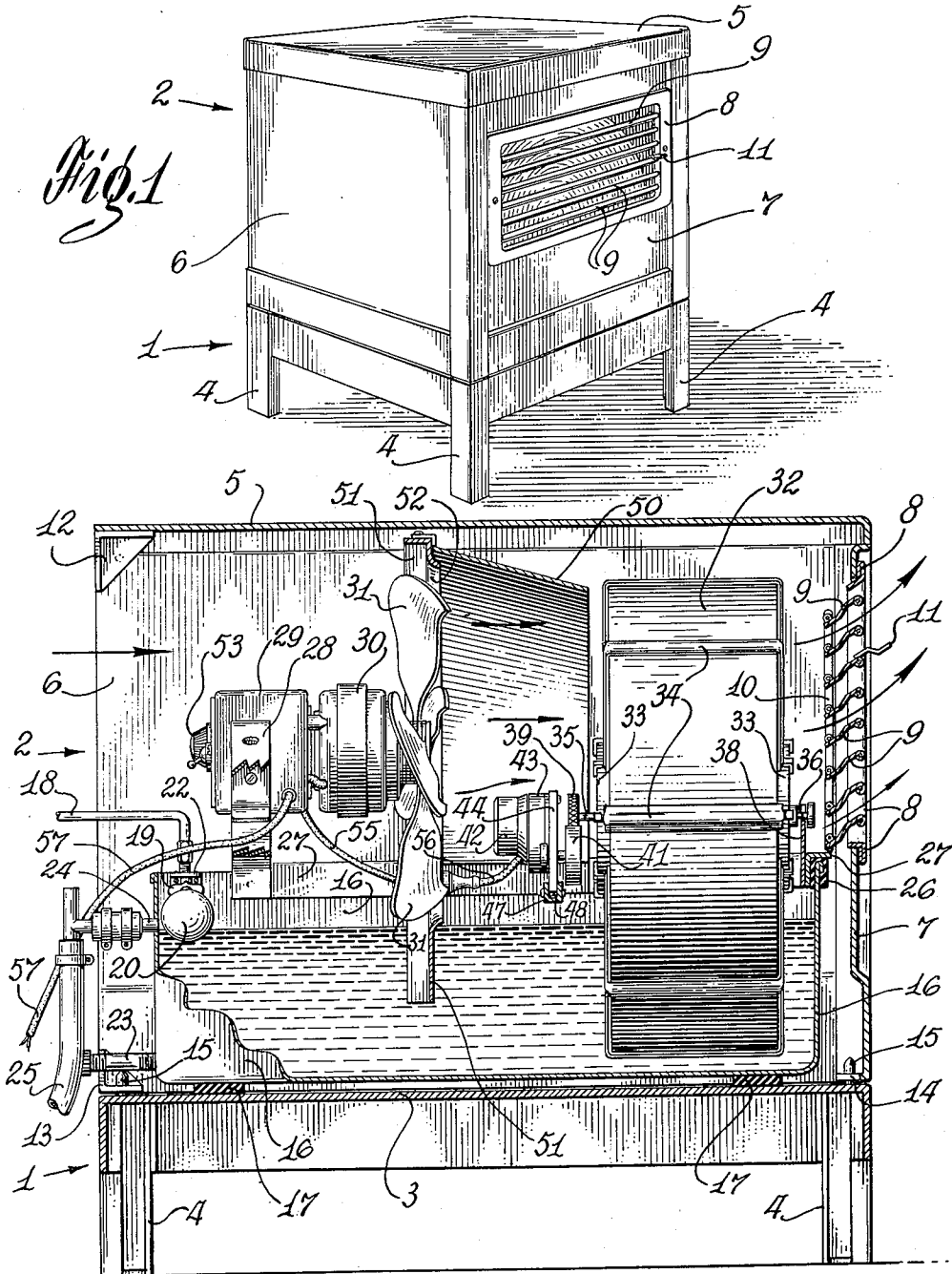


Fig. 2

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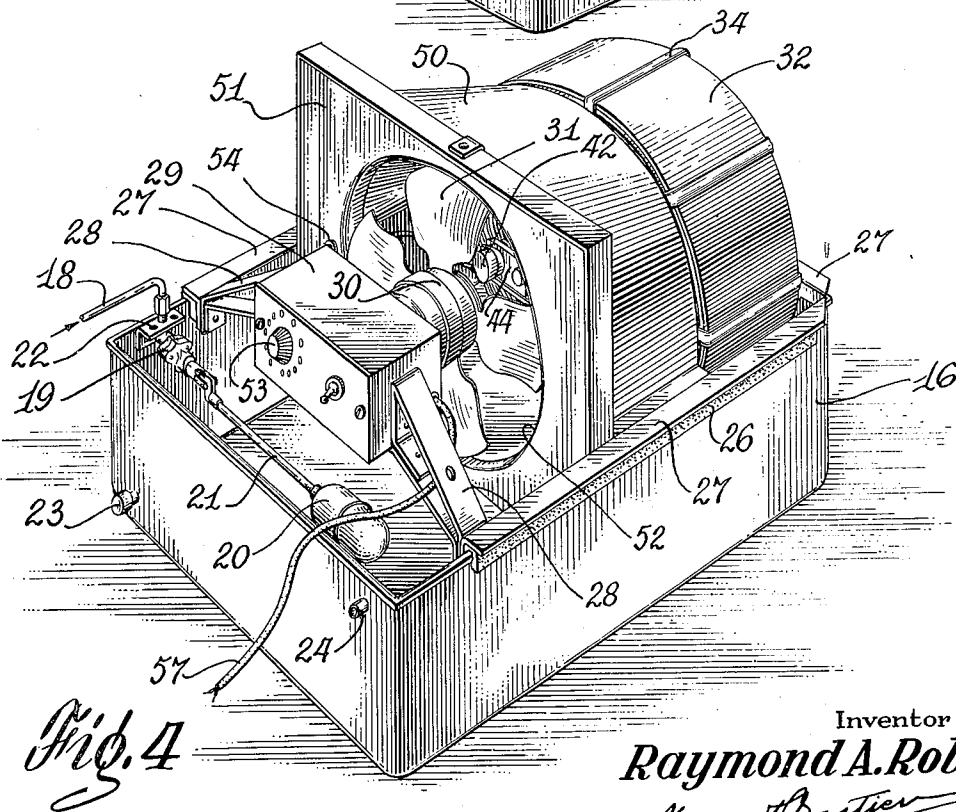
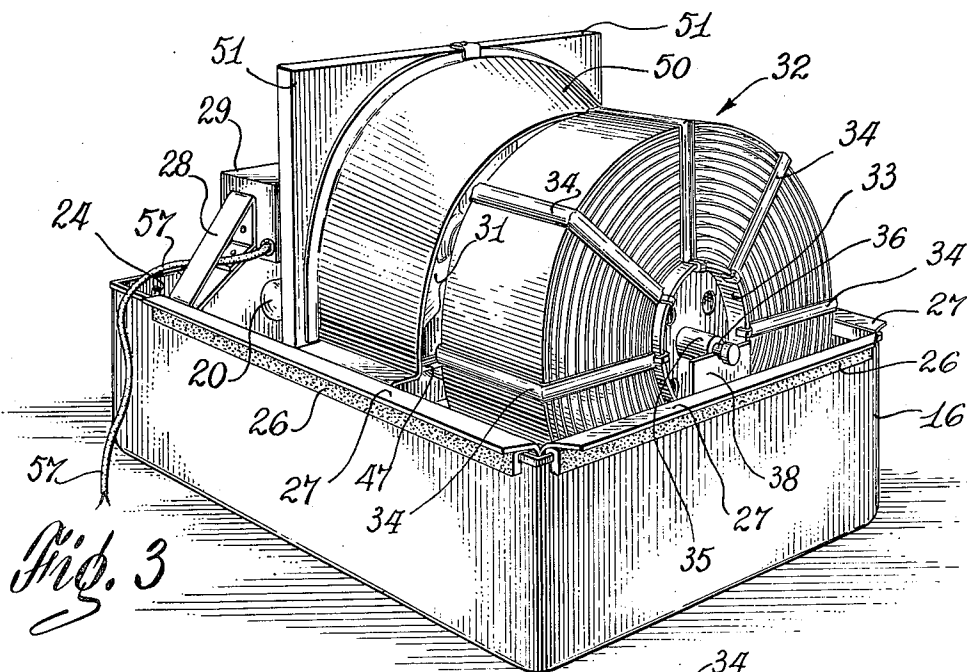
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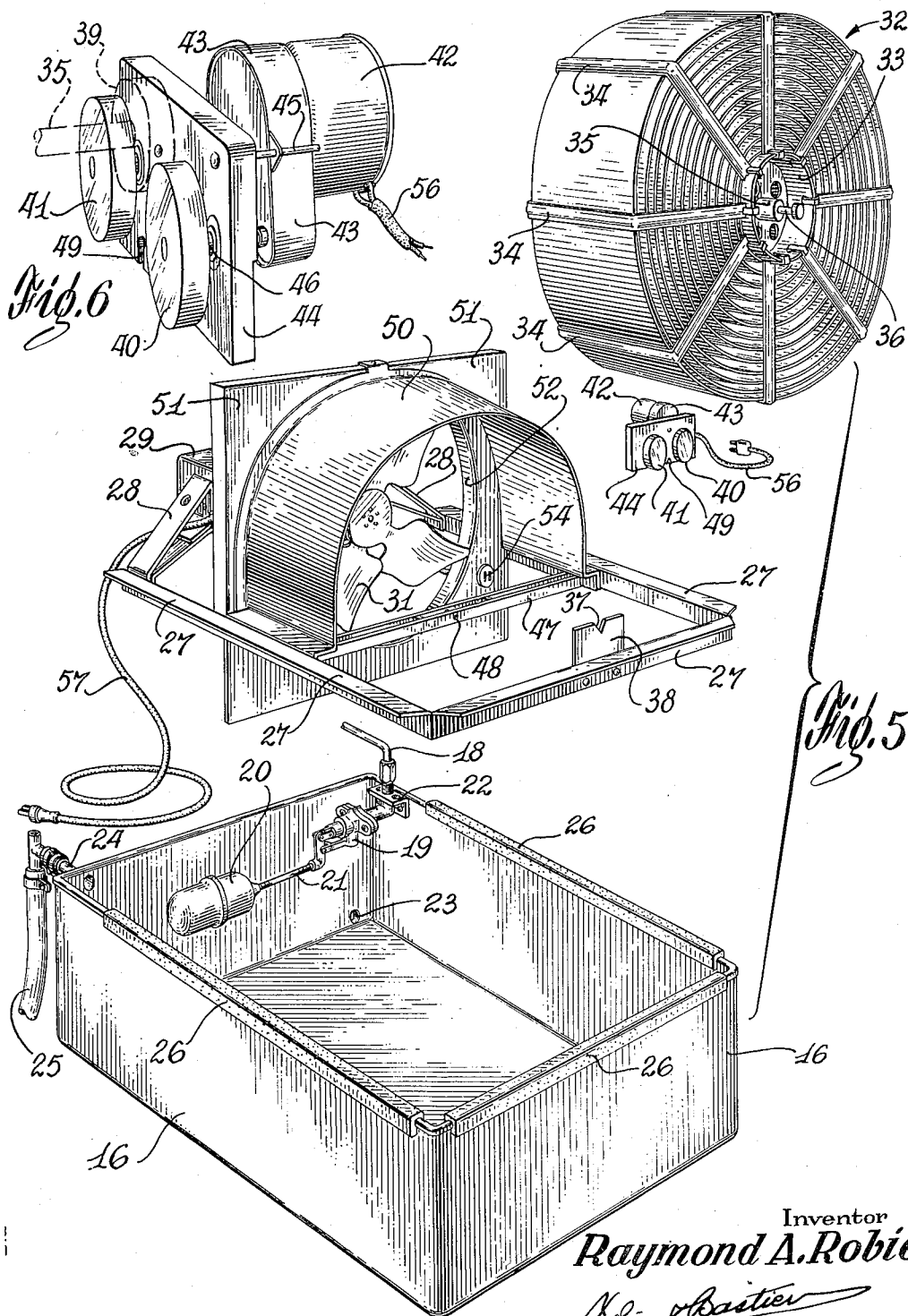
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3 Sheets-Sheet 3



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HUMIDIFIER AND EVAPORATIVE COOLER

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7 Claims. (Cl. 261-92)

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The present invention relates to a humidifier and evaporative cooler and more particularly to a humidifying apparatus of the domestic portable type adapted to be used for humidifying and cooling the air in homes and the like enclosed relatively small spaces.

The main object of the present invention is the provision of a humidifier and evaporative cooler which is very compact, having a very large evaporative capacity relatively to its size.

Another important object according to the present invention, is the provision of a humidifier of the character described which is enclosed in an ornamental cabinet adapted to suit the furniture of a house.

Still another important object of the present invention, is the provision of a humidifier and evaporative cooler enclosed in a cabinet the top portion of which is bodily removable to uncover the internal mechanism of the apparatus according to the invention.

Still another important object according to the present invention, is the provision of a humidifier and evaporative cooler the internal mechanism of which consists of a minimum of units easily and readily detachable from one another for cleaning, repairs or replacement of parts, these separate units being maintained in their cooperative positions by virtue only of their weight.

Still another important object, according to the present invention, is the provision of novel and improved driving means for the evaporative wheel of the humidifier according to the invention.

The foregoing and other important objects according to the present invention will become more apparent during the following disclosure and by referring to the drawings in which:

Figure 1 is a perspective view of the humidifier and evaporative cooler according to the invention;

Figure 2 is a longitudinal section of the same;

Figure 3 is a perspective view of the internal mechanism of the humidifier according to the invention;

Figure 4 is a rear perspective view of the same;

Figure 5 is an exploded perspective view of the internal mechanism showing the separable units constituting the same; and

Figure 6 is a perspective of the evaporative wheel driving mechanism:

Referring now more particularly to the drawings in which like reference characters indicate like elements throughout, the cabinet for the humidifier comprises a base 1 and a top portion 2;

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the base 1 consists of platform 3 supported on four legs 4; the top portion 2 of the cabinet is open at the rear and comprises a top wall 5, side walls 6, and a front wall 7. The front wall 7 has an air outlet window in which is mounted a frame 8 carrying a plurality of transverse spaced parallel air guiding vanes 9 pivoted at both ends to said frame 8 at their front longitudinal edge and pivotally linked together at their rear edge by means of a common bar 10. A thumb grip 11 secured to one of the guiding vanes 9 will, when actuated, cause said vanes to assume any desired vertical angle so as to suitably direct the air emerging from the humidifying apparatus.

Corner members 12 shown in Figure 2 serve to reinforce the rear end junction between the top wall 5 and the side walls 6. The apertured corner members 13 are secured at the lower rear end of the side walls 6, and the apertured turned-in corner portions 14 of the front wall 7 are adapted to receive the registering pins 15 projecting upwardly from the platform 3 of the base 1 of the cabinet according to the invention. Thus the top portion 2 of the cabinet is maintained in place by simply engaging said pins 15.

A water reservoir 16 extending substantially the length and width of the platform 3, is supported by the latter and rests on foot pads 17.

Said reservoir may be filled either by hand or preferably by means of a water supply pipe 18 terminated by a float valve 19 having a float 20 connected by means of the rod 21 to the latter. The float valve 19 is secured to the top edge of the reservoir 16 by means of the angle bracket 22 as shown in Figure 4.

Furthermore, the water reservoir 16, according to the invention, may be provided with a drain outlet 23, normally plugged and an overflow outlet 24 usually connected to the drain by means of a suitable tubing 25.

The upper edge of the side walls and the front walls of the open top reservoir 16 is preferably lined with rubber strips 26 as shown in Figure 5 to receive and support a U-shaped frame 27 of a size to register with said reservoir 16 and made of angle iron facing outwardly in such a manner that the horizontal flange of said U-shaped frame 27 will rest on the rubber strips 26.

The free ends of the U-shaped angle frame member 27 are maintained in their desired position by means of triangular brackets 28 secured to said free ends and projecting inwardly therefrom to receive and support therebetween the rheostat and switch housing 29 of the fan motor 30. The motor 30 is directly secured to the

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housing 29 and extends above the water reservoir such that the blades of the fan 31 will pass just slightly above the water surface when the water reservoir 16 is normally filled.

The evaporative wheel 32 is of the type comprising a metal sheet spirally wound on two cup members 33 and maintained in place by U-shaped straps 34 surrounding the spirals of the metal sheet and secured to the cup members 33.

The evaporative wheel 32 is provided with an axle 35 extending therethrough and having at its front end an annular groove 36 adapted to rest in a U-shaped notch 37 made at the upper edge of a supporting plastic plate 38 secured to the middle front portion of the U-shaped frame 27. The rear end of the axle 35 of the wheel 32 is provided with a knurled small wheel 39 preferably made of metal and resting on two spaced parallel plastic wheels 40, 41 of the evaporative wheel driving mechanism.

Said mechanism shown more particularly in Figure 6 and forming a single unit further comprises a synchronous motor 42, a speed reducing mechanism contained in a housing 43 secured to a support plate 44 made of plastic or other insulating material, by means of the tie rods 45. The wheel 40 is directly connected to the driving shaft 46 projecting from the housing 43 and extending through the support plate 44.

The wheel 41 is freely and rotatively mounted on the support plate 44 in spaced relationship with the driving wheel 40.

The support plate 44 is adapted to freely engage and rest against the bottom of a transverse channel 47 secured at both ends to the U-shaped frame 27 and extending parallel with the front portion of said member substantially forwardly of the fan 31. Sideways displacement of the plate 44 is prevented by a pin 48 extending through the channel 47 and which engages a suitable recess 49 made at the bottom edge of the plate 44. In order to direct the air from the fan through the emerged portion of the evaporative wheel 32, an air funnel 50 is disposed between said fan and said wheel and converging towards the latter is formed of a semi-circularly bent metal sheet with outwardly turned lower ends secured to the sides of the frame 27. An upright partition 51 extending substantially below the frame member 27 inside the reservoir 16 and secured to said frame member 26 and to the rear edge portion of the air funnel 50, prevents any air current from by-passing the latter. This partition 51 is centrally apertured at 52 to receive the fan 31.

The humidifier according to the present invention, operates as follows: the evaporative wheel 41, which is partly immersed in the water tank 16 is continuously rotated by the motor 42 through the intermediary of the speed reducing mechanism and the driving wheel 40. Thus a water film is continuously formed on the surfaces of the wheel 32, said water film being evaporated by the air currents passing through the emerged part of the wheel and generated by the fan 31 driven by the motor 30 at a speed which may be adjusted by manipulating the knob 53 of the rheostat.

The water reservoir 16 may be easily filled by hand or preferably automatically kept at a constant water level by means of the float valve 19 and water supply pipe 18.

For cleaning, repairing or replacement of parts, the apparatus, according to the invention, may

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be easily dismantled: the top portion 2 of the cabinet is bodily removed from engagement with the pins 15 of the base 1 of said cabinet. Then the evaporative wheel 32 is simply removed by lifting the same. Similarly the evaporative wheel driving mechanism shown in Figure 6 may be easily lifted out of engagement with the channel 47 and finally the rest of the humidifying mechanism comprising the frame 27, the air funnel 50 and the fan 31, is removed as a unit. This is clearly shown in Figure 5.

For better convenience, the partition 51 is provided with an electric outlet 54 connected to the rheostat housing 29 by means of the electric cord 55, said outlet 54 serving to connect the electric cord 56 of the synchronous motor 42.

Thus a single electric cord 57 is necessary to supply both motors 30 and 42 with electrical energy.

While a preferred embodiment according to the present invention has been illustrated and described it is understood that various modifications may be resorted to without departing from the spirit and scope of the appended claims.

What I claim is:

1. A humidifying apparatus comprising an open top rectangular water tank, a U-shaped frame registering with and removably supported on the edges of the walls of said water tank, an elongated member extending transversely of said frame and secured to both legs thereof, an upstanding support plate secured medially to the cross leg of said frame, a rotative evaporative wheel having a shaft projecting from both ends thereof and terminated at one end by a small knurled wheel, an evaporative wheel driving unit comprising a support member detachably mounted on said elongated member, a motor, an idle wheel and a driving wheel spacedly and rotatably mounted on said support member, said knurled wheel of the shaft of said evaporative wheel adapted to rest on said spaced wheels, and the other end of said shaft provided with an annular groove to rest on said support plate, whereby said evaporative wheel extends partly within said tank, and air circulating means mounted at the free ends of said frame to direct an air current through the portion of said evaporative wheel projecting from said tank.

2. A humidifying apparatus comprising an open top rectangular water tank, a U-shaped frame made of angle iron registering with and removably supported on the edges of the walls of said water tank, a channel member extending transversely of said frame and secured to both legs thereof, an upstanding support plate having a notch at its upper edge and secured medially to the cross leg of said frame, a rotative evaporative wheel comprising a metal sheet spirally wound over itself to form a plurality of spaced layers, a shaft for said wheel projecting from both ends thereof and provided with an annular groove at one end to removably engage said notch of said support plate, a small knurled wheel secured to the other end of said shaft, an evaporative wheel driving unit comprising a support member, an electric motor and speed reducing unit drivingly interconnected and secured to said support member, an idle wheel and a driving wheel spacedly and rotatably mounted on said support member, said driving wheel connected to said speed reducing unit, said support member removably engaging said channel member at its middle portion, said knurled wheel of the shaft of said evaporative wheel resting on

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said spaced idle and driving wheel to be driven by the latter, whereby said evaporative wheel is in upstanding position and extends substantially halfway within said water tank, and air circulating means mounted at the free ends of said frame to direct an air current through the portion of said evaporative wheel projecting from said tank.

3. A humidifying apparatus as claimed in claim 2 wherein U-shaped rubber strips receive a substantial portion of the upper edges of the walls of said water tank, said U-shaped frame resting on said rubber strips.

4. A humidifying apparatus as claimed in claim 3 wherein said upstanding support plate, and said support member together with said idle and driving wheels of said evaporative wheel driving unit are made of electric insulating material.

5. A humidifying apparatus as claimed in claim 4 wherein said air circulating means comprise an electric motor driving an air fan, a rheostat for said motor, a housing for said rheostat to which is secured said motor, and brackets fastening said housing to said frame above said water tank.

6. A humidifying apparatus as claimed in claim 5 further comprising an air funnel mounted on said frame and interposed between said evaporative wheel and said air fan, said funnel

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made of an inverted substantially semi-circularly bent metal sheet extending transversely of said frame and secured thereto at its lower ends, and a transverse partition secured to said frame and along one edge of said metal sheet, said partition extending below said frame within said water tank and provided with a central circular opening to receive said fan.

7. A humidifying apparatus as claimed in claim 6 further comprising an all enclosing cabinet comprising a base and a top portion, said base comprising a platform to support said water tank and upstanding pins at the corners thereof to engage registering holes made at the lower corners of said top portion.

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