April 11, 1933. J. J. LAWLER 1,903,745

AUTOMATIC HUMIDIFYING APPARATUS

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Fig. 2.

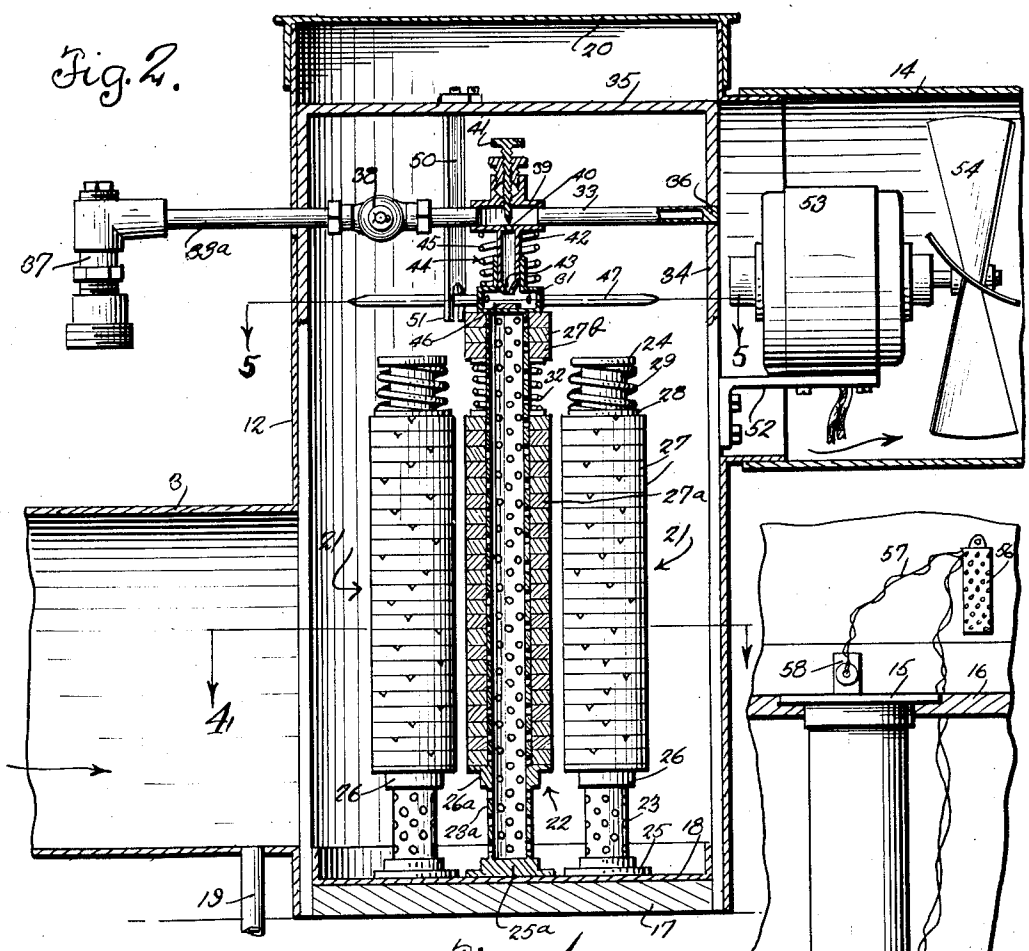
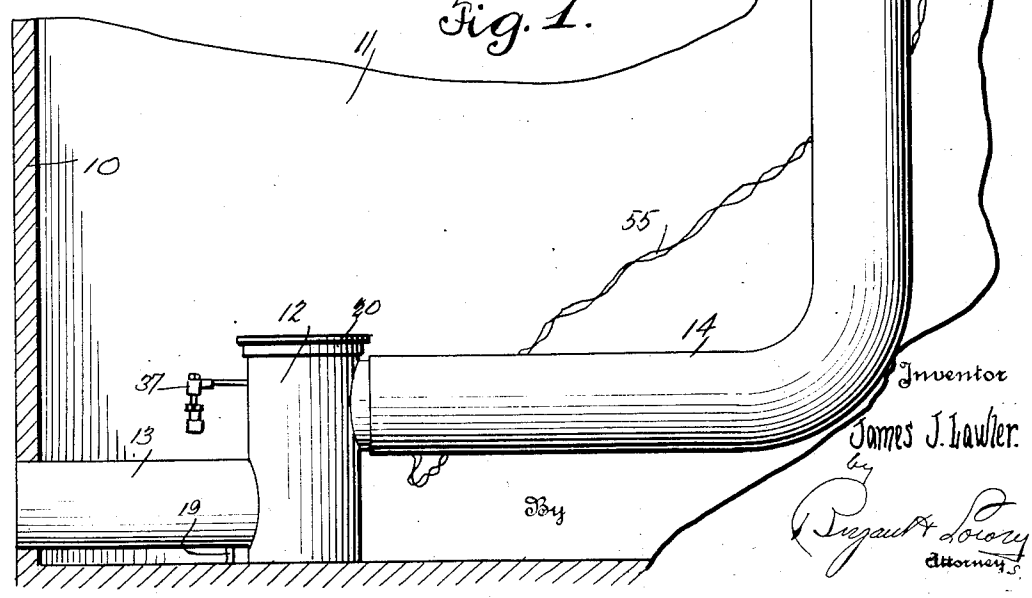


Fig. 1.



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AUTOMATIC HUMIDIFYING APPARATUS

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Fig. 3.

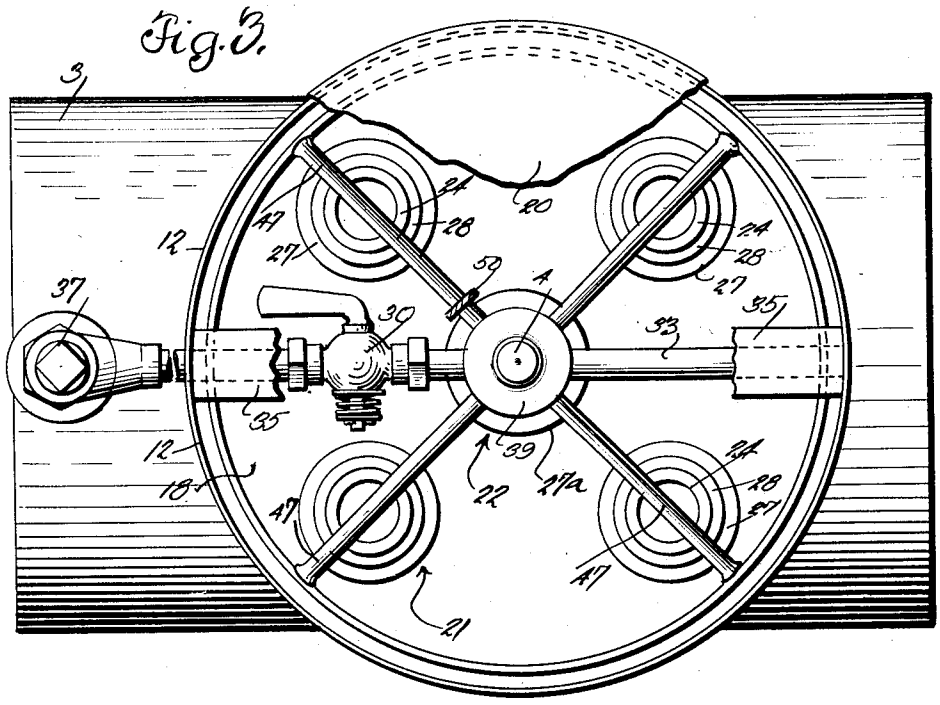
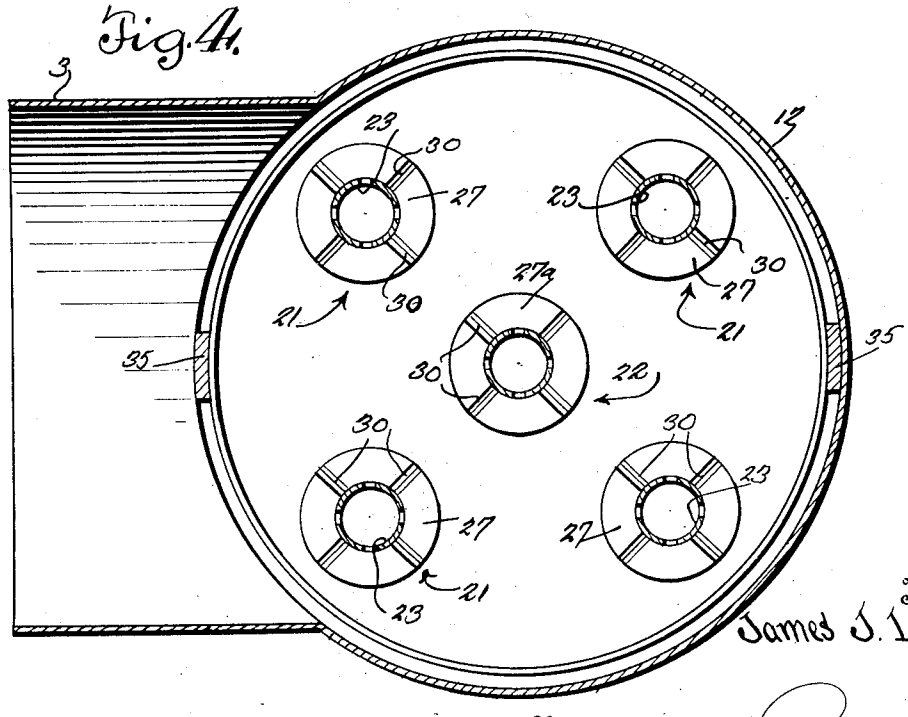


Fig. 4.



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AUTOMATIC HUMIDIFYING APPARATUS

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Fig. 5.

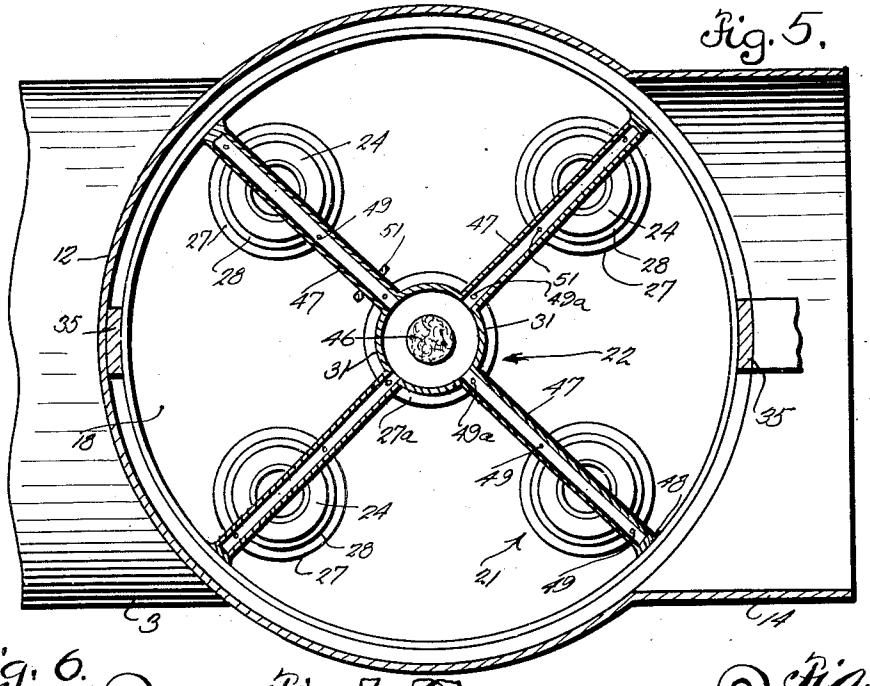


Fig. 6.

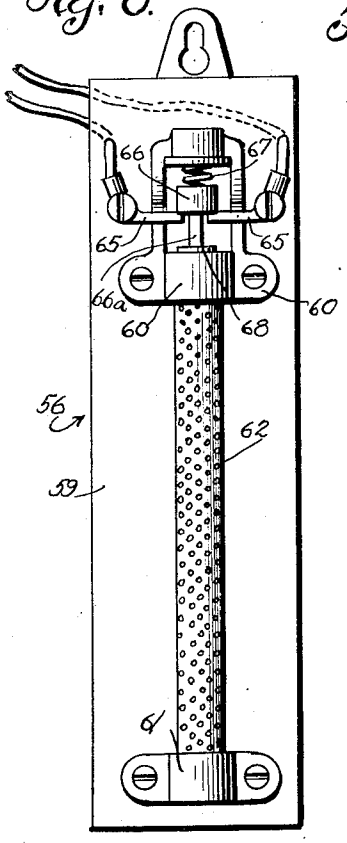


Fig. 7.

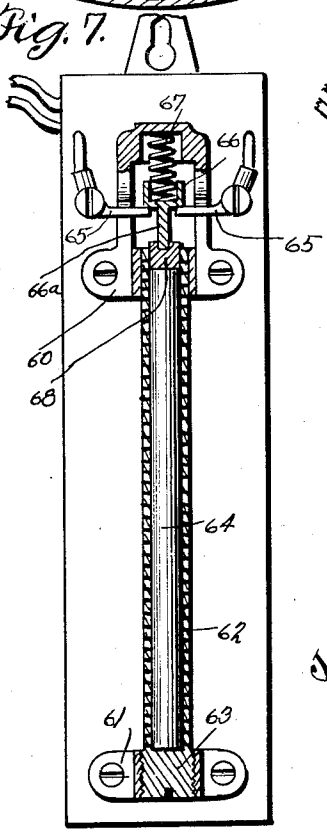
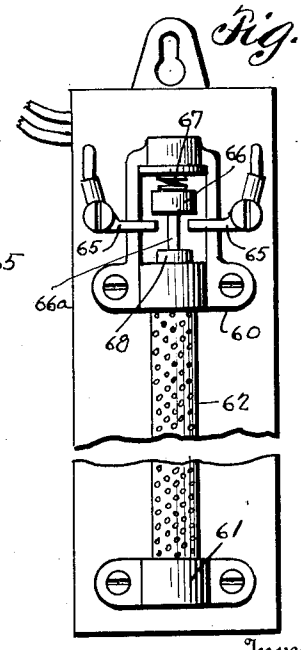


Fig. 8.



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Patented Apr. 11, 1933 1,903,745

UNITED STATES PATENT OFFICE

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AUTOMATIC HUMIDIFYING APPARATUS

Application filed October 29, 1931. Serial No. 571,889.

This invention relates to certain new and useful improvements in automatic humidifying apparatus.

The primary object of the invention is to provide an automatic humidifying apparatus operating to promote circulation of washed moist air through a room or other enclosure, there being provided a fan motor to promote the circulation of moist air that is automatically controlled in its operation by the degree of humidity contained in the air at a point adjacent to or remote from the humidifying apparatus.

A further object of the invention is to provide automatic humidifying apparatus of the foregoing character wherein devices subject to expansion and contraction in the presence of water are operatively engaged with the water supply means for automatically shutting off the supply of water when the fluid contents of said devices is sufficient to produce the proper degree of moisture in the air to be delivered to a room or other enclosure.

It is a further object of the invention to provide a hygrostatic device for the automatic operation of an electric switch controlling operation of a fan motor forming a part of the humidifying apparatus.

With the above and other objects in view that will become apparent as the nature of the invention is better understood, the same consists in the novel form, combination and arrangement of parts hereinafter more fully described, shown in the accompanying drawings and claimed.

In the drawings:—

Figure 1 is a fragmentary sectional view of a room or building structure having the improved automatic humidifying apparatus therein;

Figure 2 is a vertical longitudinal sectional view of the humidifying apparatus showing the water supply devices, the water sustaining means over which air is drawn and the automatic means for the closing of the water supply devices;

Figure 3 is a top plan view of the apparatus with the cover wall thereof partly broken away;

Figure 4 is a horizontal sectional view taken on line 4—4 of Figure 2;

Figure 5 is a horizontal sectional view taken on line 5—5 of Figure 2, showing the water supply pipe disposed above the water sustaining devices;

Figure 6 is a front elevational view of the hygrostatically operated switch device controlling operation of the fan motor;

Figure 7 is a vertical longitudinal sectional view of the hygrostatic device; and

Figure 8 is a fragmentary front elevational view, showing the hygrostatic device in shifted position with the switch contacts moved to spaced position.

Referring more in detail to the accompanying drawings, the humidifying apparatus for purposes of illustration is shown as associated with a building structure comprising an outside wall 10, a compartment 11 for the humidifying apparatus that includes a casing 12 having an air inlet pipe 13 adjacent its lower end that extends through the building wall 10 and an outlet pipe 14 adjacent its upper end in communication with a floor register 15 in the floor 16, it being understood, however, that the installation of the apparatus may take on other forms.

While the casing 12 may be of any form desired, the same is herein illustrated cylindrical, open at both ends with a base plate 17 set into the lower end and supporting a drip pan 18 for any excess water that may be delivered to the humidifying devices with the excess water discharged through the drain pipe 19 as shown in Figures 1 and 2. The open upper end of the casing 12 is closed by a removable cover 20 permitting access to the interior mechanism.

The humidifying devices include a plurality of vertical standards 21 and 22 supported upon the drip pan 18, the standard 22 being disposed centrally thereof while the standards 31 are circumferentially spaced and located adjacent the side wall of the casing 12. Each of the standards 21 includes a stand pipe 23 perforated over the side walls thereof, open at its upper end and carrying an annular flange 24 while the lower end of the stand pipe 23 is carried by a base

plate 25 that is anchored in any suitable manner to the drip pan 18. A collar 26 is carried by the stand pipe 23 adjacent its lower end and supports in enclosing relation upon the stand pipe a plurality of superposed contacting wooden rings 27 that may also be formed of other material responsive to expansion and contraction in the presence of moisture, the upper ring 27 being engaged by a washer 28 with a coil spring 29 surrounding the upper end of the stand pipe 23 between the washer 28 and upper end flange 24 for maintaining contacting relations between the several rings 27. As shown in Figure 4, the upper face of each ring 27 is radially grooved as at 30 so that water delivered to the upper ends of the standards will flow downwardly over the rings 27 and enter the grooves 30 for the more effective saturation of the wooden rings 27. The coil spring 29 associated with each vertical standard 21 permits expansion and contraction of the rings 27 during operation of the humidifying apparatus.

The central standard 22 is associated with the water supply devices and includes a base plate 25*a* having a vertical stand pipe 23*a* rising therefrom and perforated over the side walls thereof, the stand pipe 23*a* being provided with an annular collar 26*a* adjacent its lower end for the support of superposed and contacting rings 27*a*. A cylindrical casing 31 rests upon the upper end of the stand pipe 23*a* and as illustrated in Figure 2, several of the ring members 27*b* at the upper end of the stand pipe 23*a* are spaced from the ring members 27*a* by an intervening coil spring 32 surrounding the stand pipe 23*a*.

The water supply devices for the humidifying standards include a pipe 33 extending transversely of the upper end of the casing and supported in the side legs 34 of an inverted U-shaped iron that has a cross head 35 disposed above the pipe 33, one end of the pipe 33 being closed as at 36 while the other end thereof projecting from the casing as at 33*a* is equipped with connecting devices 37 for attachment to a water supply pipe. A water control valve 38 is set in the pipe 33 within the casing 12. A valve casing 39 is set into the pipe 33 within the casing 12 directly above the stand pipe 23*a* of the vertical standard 22 and has a valve opening 40 in its bottom wall that is controlled by the needle valve 41, the valve opening 40 being surrounded by a depending nipple 42 having a valve outlet 43 at its lower end with the nipple telescoping within an upstanding sleeve 44 rising from the casing 31, the coil spring 45 surrounding the nipple 42 in the sleeve 44 normally retaining the casing 31 at its limit of downward movement, the bottom wall of the casing 31 carrying a valve seat 46 that is adapted to be moved into engagement with the valve opening 43 in the lower end of the nipple 42 upon upward movement of the casing 31 in response to expansion of the ring members 27*a* and 27*b*. Water delivered by the pipe 33 into the casing 39 passes through the valve opeing 40 under control of the needle valve 41 and through the valve opening 43 in the nipple 42 to enter the casing 31. As shown more clearly in Figures 3 and 5, the casing 31 carries radially extending pipes 47 in communication therewith and closed at their outer ends as at 48, each of said pipes 47 having a pair of spaced openings 49 in the lower side thereof disposed directly above the peripheral edges of an associated vertical standard 21, while two of said radial pipes 47, each have an additional perforation 49*a* therein adjacent the casing 31 so that water may be delivered to the central vertical standard 22. To maintain the radial pipes 47 directly positioned above the vertical standards 21, a depending strap iron 50 is carried by the cross head 35 of the angle iron within the casing with the lower end thereof bifurcated as at 51 for straddling one of the radial pipes 47 as shown more clearly in Figures 2 and 5.

As shown in Figure 2, a fan motor is set into the pipe 14 at the air outlet side of the casing 12, the support for the motor including an angle bracket 52 connected to one of the legs 38 of the angle iron frame and upon which bracket the fan motor 53 is mounted, the shaft of the motor carrying fan blades 54. Electric wires or conductors 55 extend from the motor 53 to a hygrostatic element 56 for engagement with contacts therein while other wires 57 leading from said contacts are adapted to be placed in communication with a source of potential, such as an electric wall plug 58 as shown in Figure 1.

The hygrostatic element 56 includes a bracket plate 59 having spaced bearing supports 60 and 61 thereon in which a perforated tube 62 is mounted, the lower end 63 of the tube having threaded engagement with the bearing 61 with the perforated tube 62 containing an expansible element 64 that is responsive to humid or moisture conditions, such as a wooden stick. A pair of electric terminals 65 are associated with the bearings 60 and another contact 66 is normally spring pressed into engagement with the contacts 65 as at 67, the contact 66 including a pin 66*a* extending between the spaced contacts 65 that is engaged at its lower end by a plug 68 set into the upper end of the perforated tube 62 and engaged with the hygrostatic element 64, this construction being illustrated in Figures 6 to 8.

It being the object of the invention to produce the desired moisture content or humidity in the air of a room or other enclosure, the apparatus herein disclosed is automatically operable for accomplishing this purpose. When the moisture content or humidity of

the air drops below a predetermined point, the hygrostatic device then operates upon contraction of the hygrostatic element 64 which is effected by moisture in the air moving in contact therewith through the perforated tube 62, contracts and permits the contact 66 to descend from the position illustrated in Figure 8 to the positions shown in Figures 6 and 7 for engagement with the contacts 65 for energizing the fan motor 53 for the rotation of the fan wheel 54. Operation of the fan wheel 54 draws air through the inlet pipe into the casing 12, air flowing over the vertical standards 21 and 22 and through the standards 21 and 22 by way of the perforations thereof to the outlet at the upper end of the casing 12 and to be blown through the outlet or delivery pipe 14 into the room or other enclosure. When the air in the room contains the proper humidity, the hygrostatic element 64 expands for separating the contact 66 from the contacts 65, thereby shutting off the fan motor 53. The supply of water to the vertical standards 21 and 22 is controlled by the standard 22, expansion of the rings 27*a* and 27*b* thereof causing an upward expansive movement of the casing 31 moving upwardly upon the nipple 42 to cause the valve seat 46 to close the valve opening 43 at the lower end of the nozzle 42, the central standard 22 regulating the supply of water discharged by way of the radial pipe 47 upon the upper ends of the standards 21 and 22. The needle valve 41 may be regulated to produce a constant drip of water upon each vertical standard, the dripping of the water being automatically controlled by the central standard 22, while the apparatus may be entirely shut off by the valve 38.

From the above detailed description of the invention, it is believed that the construction and operation thereof will at once be apparent, and while there is herein shown and described the preferred embodiment of the invention, it is nevertheless to be understood that minor changes may be made therein without departing from the spirit and scope of the invention as claimed.

I claim:—

1. Humidifying apparatus comprising means adapted to be saturated with water, water supply means therefor, means for drawing air over the water saturated means and a part of the water saturated means being operable to shut off the water supply means.

2. Humidifying apparatus comprising means adapted to be saturated with water, water supply means therefor, means for drawing air over the water saturated means and a part of the water saturated means being operable to shut off the water supply means, and hygrostatically operated means controlling operation of the air drawing means.

3. Humidifying apparatus comprising means adapted to be saturated with water, water supply means therefor, means for drawing air over the water saturated means and a part of the water saturated means being operable to shut off the water supply means, the water saturated means including vertical standards constructed to permit the flow of air over and through the same.

4. Humidifying apparatus comprising means adapted to be saturated with water, water supply means therefor, means for drawing air over the water saturated means and a part of the water saturated means being operable to shut off the water supply means, and hygrostatically operated means controlling operation of the air drawing means, the water saturated means including vertical standards constructed to permit the flow of air over and through the same.

5. Humidifying apparatus comprising means adapted to be saturated with water, water supply means therefor, means for drawing air over the water saturated means and a part of the water saturated means being operable to shut off the water supply means, the water saturated means including vertical perforated stand pipes, contacting superposed wooden rings mounted thereon, and each ring being radially grooved to permit the flow of water between the rings.

6. Humidifying apparatus comprising means adapted to be saturated with water, water supply means therefor, means for drawing air over the water saturated means and a part of the water saturated means being operable to shut off the water supply means, and hygrostatically operated means controlling operation of the air drawing means, the water saturated means including vertical perforated stand pipes, contacting superposed wooden rings mounted thereon and each ring being radially grooved to permit the flow of water between the rings.

7. Humidifying apparatus comprising means adapted to be saturated with water, water supply means therefor, means for drawing air over the water saturated means and a part of the water saturated means being operable to shut off the water supply means, the water saturated means including vertical perforated stand pipes, contacting superposed wooden rings mounted thereon, each ring being radially grooved to permit the flow of water between the rings, and means permitting expansion and contraction of the rings on the stand pipes and maintaining the rings in contacting relations.

8. Humidifying apparatus comprising means adapted to be saturated with water, water supply means therefor, means for drawing air over the water saturated means and a part of the water saturated means be-

ing operable to shut off the water supply means, and hygrostatically operated means controlling operation of the air drawing means, the water saturated means including vertical perforated stand pipes, contacting superposed wooden rings mounted thereon and each ring being radially grooved to permit the flow of water between the rings, and means permitting expansion and contraction of the rings on the stand pipes and maintaining the rings in contacting relations.

9. Humidifying apparatus comprising means adapted to be saturated with water, water supply means therefor, means for drawing air over the water saturated means and a part of the water saturated means being operable to shut off the water supply means, the water saturated means including vertical standards constructed to permit the flow of air over and through the same, the water supply means including a pipe extending over each vertical standard and having ports in its lower side to effect dripping of water on the upper end of the standard, a valve controlling the supply of water to said pipe, and one of said standards being operable to close the valve.

10. Humidifying apparatus comprising means adapted to be saturated with water, water supply means therefor, means for drawing air over the water saturated means and a part of the water saturated means being operable to shut off the water supply means, and hygrostatically operated means controlling operation of the air drawing means, the water saturated means including vertical standards constructed to permit the flow of air over and through the same, the water supply means including a pipe extending over each vertical standard and having ports in its lower side to effect dripping of water on the upper end of the standard, a valve controlling the supply of water to said pipe, and one of said standards being operable to close the valve.

11. Humidifying apparatus comprising means adapted to be saturated with water, water supply means therefor, means for drawing air over the water saturated means and a part of the water saturated means being operable to shut off the water supply means, and hygrostatically operated means controlling operation of the air drawing means including a perforated tube, an expansible core therein and electric contacts, one of which is engaged with the core to be moved in response to expansion and contraction of the core for separating and joining the contacts.

12. Humidifying apparatus comprising means adapted to be saturated with water, water supply means therefor, means for drawing air over the water saturated means and a part of the water saturated means being operable to shut off the water supply means, and hygrostatically operated means controlling operation of the air drawing means, the water saturated means including vertical standards constructed to permit the flow of air over and through the same, the hygrostatically operated means including a perforated tube, an expansible core therein and electric contacts, one of which is engaged with the core to be moved in response to expansion and contraction of the core for separating and joining the contacts.

13. Humidifying apparatus comprising means adapted to be saturated with water, water supply means therefor, means for drawing air over the water saturated means and a part of the water saturated means being operable to shut off the water supply means, the water saturated means including vertical perforated stand pipes, contacting superposed wooden rings mounted thereon, each ring being radially grooved to permit the flow of water between the rings, and the means for drawing air over the water saturated means including a fan blower disposed laterally of and in a plane above the water saturated means.

14. Humidifying apparatus comprising means adapted to be saturated with water, water supply means therefor, means for drawing air over the water saturated means and a part of the water saturated means being operable to shut off the water supply means, and hygrostatically operated means controlling operation of the air drawing means, the water saturated means including vertical perforated stand pipes, contacting superposed wooden rings mounted thereon and each ring being radially grooved to permit the flow of water between the rings, and the means for drawing air over the water saturated means including a fan blower disposed laterally of and in a plane above the water saturated means.

In testimony whereof I affix my signature.

JAMES J. LAWLER.