June 24, 1930. J. O. WRENN 1,765,960

CONDENSER

Filed June 2, 1927

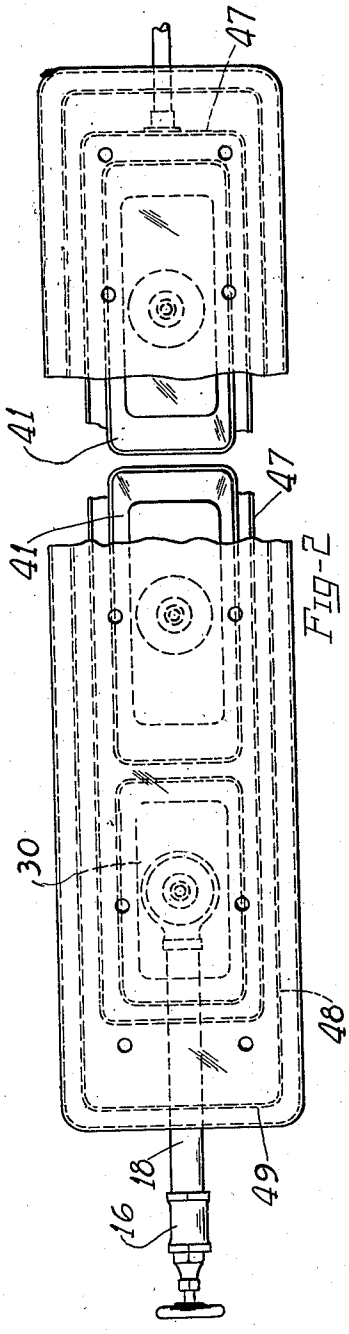


Fig-2

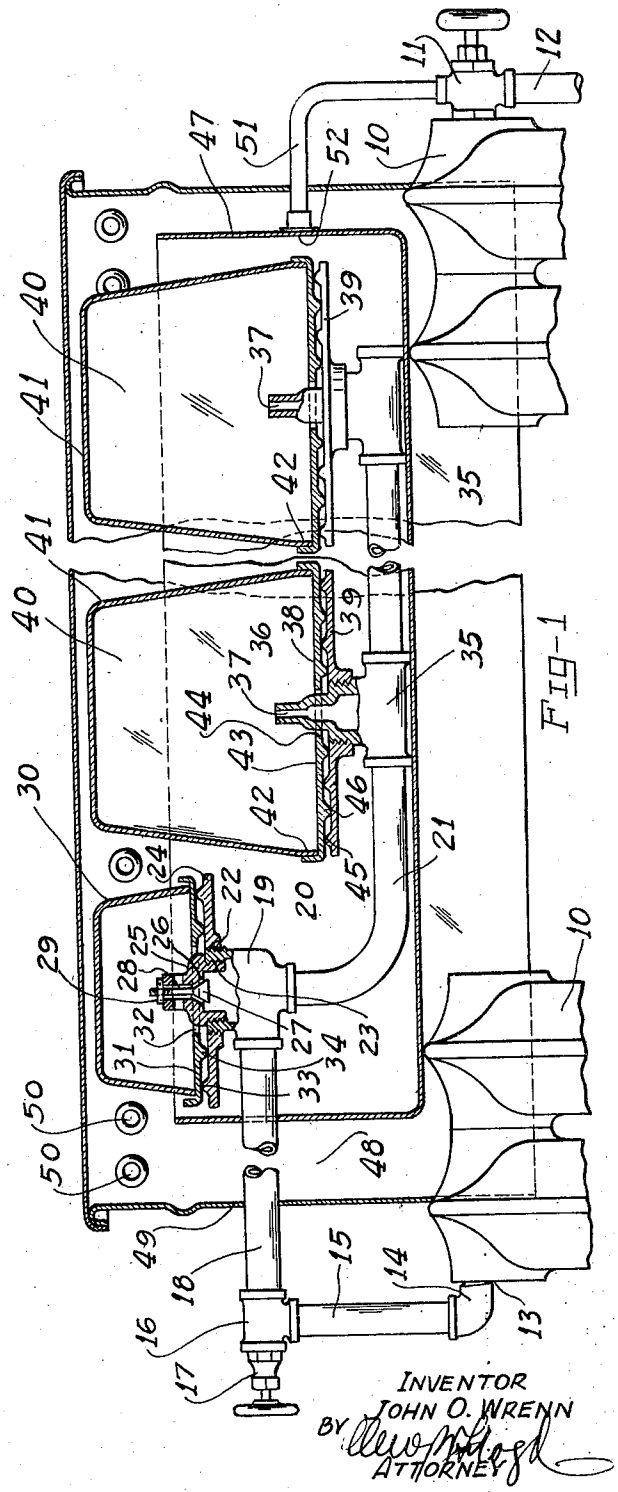


Fig-1

INVENTOR
JOHN O. WRENN
BY
ATTORNEY

Patented June 24, 1930 1,765,960

UNITED STATES PATENT OFFICE

JOHN O. WRENN, OF CHICAGO, ILLINOIS

CONDENSER

Application filed June 2, 1927. Serial No. 195,956.

This invention relates to humidifiers, and more particularly to means for humidifying heated air, although it may be employed with equal advantage for other purposes.

It contemplates more especially the provision of novel means for insuring the proper association of moisture with air to effect the humidification thereof.

Air under normal atmospheric conditions is ordinarily humid and contains sufficient moisture to be conducive to healthful conditions. On the other hand, artificially heated air is substantially devoid of the requisite moisture, and as a consequence thereof it is instrumental in affecting the health of individuals exposed thereto.

In view thereof, heat must be properly balanced with humidity to be healthful. The absence or insufficiency of moisture in heated air will result in the absorption thereof from the bodies subjected thereto, thereby depriving individuals of their normal heat and vitality.

Numerous types of humidifiers have heretofore been proposed, but these are not altogether desirable in that they are productive of vapors which create a fog on the confines of a room wherein one of them is situated and especially on the windows thereof; however, the greatest possible benefit is derived from a uniform distribution of moisture in the medium to be heated usually consisting of air, such a distribution being impossible of attainment with known humidifiers of inexpensive design.

One object of the present invention is to improve the operation and simplify the construction of devices of the character mentioned.

Another object is to provide a novel means for humidifying air, which is durable, reliable in operation, and sanitary.

Still another object is to provide humidifying means in association with a heat source to effect a constant and uniform association of moisture with the surrounding air.

A further object is the provision of means for condensing vapors to effect the revaporization thereof in association with the surrounding air.

A still further object is the provision of condensing means in association with a heat source which effects the vaporization of the condensate in association with the surrounding air to effect the humidification thereof.

Still a further object is the provision of a series of condensers in association with a device which vaporizes the condensate and simultaneously directs heated air in association therewith to effect a uniform distribution of moisture therein.

Other objects and advantages will appear from the following description of an illustrated embodiment of the present invention.

In the drawings:

Figure 1 is a sectional view in elevation of a device embodying features of the present invention; and

Figure 2 is a plan view of the device shown in Figure 1.

The structure selected for illustration is capable of association with various heat sources which give up heat to the air to effect the proper humidification of the said air consistent with healthful conditions.

The preferred embodiment of the invention is shown in association with a radiator 10 of standard construction which receives steam, hot water, or other heat transmitting mediums to effect heat radiation through the walls thereof, thereby heating the surrounding air. The radiator 10 is provided with the usual valve 11 which controls the supply of steam to the radiator 10 through the pipe 12.

Radiators are universally provided with an air release, so that the entrance of steam or water therein will cause the expulsion of air therefrom, since otherwise it would be impossible to distribute the heat throughout the confines of the radiator 10. The air outlet is in this instance provided in an end segment of the radiator 10, it constituting a threaded aperture 13 receiving an elbow 14 which is in threaded engagement with a pipe 15 to effect the communication thereof with the interior of the radiator 10. As shown, the pipe 15 extends vertically, and terminates in a standard angle valve 17.

To effect the condensation of a predeter-

mined quantity of steam or other vapor issuing from the radiator 10 through the pipe 15, means are provided to precipitate a condensate in association with the heat source to effect the revaporization thereof in association with heated air, thereby properly humidifying the said air. The condensing means, in this instance, are in communication with the valved vapor source by virtue of the pipe 18 which is in threaded communication with the valve. The pipe 18 terminates in a fitting 19 which has a branch 20 thereof communicating with a pipe 21 extending therebelow for disposition in a substantially horizontal position, it being slightly inclined so that any condensate within the pipe 18 will drain to the extreme portion of the pipe 21 where it is readily vaporized in the manner to be hereinafter described.

Another branch of the fitting 19 is provided with spaced threads 22 and 23 on the exterior and interior walls thereof to threadedly receive a plate 24 and valve body 25, respectively. The valve body 25 is provided with a port or valve seat 26 which receives a correspondingly shaped valve 27 terminating in a valve stem 28 having a nut 29 fixed thereto to prevent the removal of the valve 27 from the port 26. A container 30 of any suitable configuration, preferably of non-corrosive metallic construction, is provided with a rigid plate 31 hermetically sealed thereto about the peripheral edge thereof, the plate 31 being provided with an axial aperture 32 which is sufficiently large to permit fluid passage therethrough exteriorly of the valve body 25.

As shown, the plate 31 rests on the plate 24 adjacent thereto, the confronting faces of the plates 24 and 31 being provided with alternate concentric rings or corrugations 33 and 34, respectively, which provide a tortuous path therebetween. The plates 24 and 31, while resting one upon another, are not so closely secured one to another that liquid or gaseous material will not pass between the rings upon one and the contiguous flat material upon the other. The vapors present in the pipe 18 from the radiator 10, will pass through the port 26 of the valve body 25 until the pressure union 19 reaches a predetermined value. The valve 27 will then embrace its seat 26 to prevent the introduction of more vapor within the container 30 wherein condensation is effected, the condensate passing between the plates 24 and 31 and eventually dropping therefrom for revaporization in the manner to be more fully described hereinafter. Air is introduced in the radiator 10 in the absence of vapor pressure therein, since it is admitted between the plates 24 and 31 through the port 26, and it also serves the purpose of the usual air vent provided in radiators, that is, it permits the escape of air, the air vent or valve being removed entirely.

The condensation of the vapors is effected by means of a series of condensers communicating with the pipe 21 which is disposed adjacent the upper surface of the radiator 10. The pipe 21 is provided with spaced fittings 35, in this instance two, each having a branch 36 thereof defining a constricted orifice 37 preferably terminating at a point below the passage level defined by the pipe 18. The exterior annular surface of the branch 36 is provided with threads 38 to receive a plate 39 in engagement therewith to effect a connection therebetween. Condensers 40 are disposed on plates 39, they comprising non-corrosive metallic containers 41 of any suitable configuration, each having the peripheral edge 42 thereof hermetically sealed to a plate 43 in any appropriate manner, the plate 43 being provided with an axial opening 44 which is sufficiently large to permit the passage of vapors therethrough and simultaneously accommodate the projecting orifice 37. The plates 43 are disposed on the rigid plates 39, confronting surfaces thereof being provided with alternate concentric rings 45 and 46 which effect a tortuous path therebetween in much the same manner as described in connection with the plates 24 and 31. The contact between the plates 38 and 39 upon the tops of rings 45 and 46 is such that fluid may flow between the materials to the adjacent plates.

Obviously, the vapors passing through the pipe 21 will be discharged through the orifices 37 and contact with the interior confines of the containers 41 whereupon condensation is effected, the result being that the condensate flows between the confronting plates 39 and 43 and eventually is deposited therebelow. To collect the condensate, a pan 47 is disposed on the radiator 10 in direct thermal contact therewith to receive the condensate from the containers 30 and 40, thereby effecting the vaporization thereof in association with the heated air which is propelled from the exterior surfaces of the radiator 10 through a passage 48 defined by a casing 49 disposed over the pan 47. The heated air and vapor commingle therein prior to its discharge through suitable apertures 50 provided in the casing 49.

With the arrangement of parts above described, it will be apparent that novel humidifying means have been provided, in that the amount of vapor discharged to the condensers 30 and 40 may be controlled by the valve 17, thereby regulating the humidity of the heated air within the confines of any area. In the event the condensate confined in the pan 47 reaches a predetermined level, the withdrawal thereof can be automatically effected by virtue of a pipe 51

which is in communication therewith as at 52. The pipe 51 establishes communication, in this instance, with the valve 11 which may be provided with a one-way check valve (not shown) to permit the flow and return thereof to the system, this being especially adaptable to hot water systems.

Various changes may be made in the embodiment of the invention herein specifically described without departing from or sacrificing any of the advantages thereof as defined in the appended claims.

I claim:

1. In a humidifier, the combination with a steam delivery element of a condenser comprising a bell over said steam delivering element, and a plate about said element, said condenser being disposed over said element for support by said plate to enable the passage of liquid therebetween.

2. In a humidifying device a condenser for use in combination with a steam delivery element and comprising a plate associated with said delivery element, and a bell disposed over said element and supported by said plate in a manner to enable the passage of liquid therebetween, said bell having a bottom forming with said plate a tortuous passage for the condensate from said condenser.

3. In a humidifying device a condenser in combination with a steam delivery element and comprising a horizontal plate about said steam delivery element, a container over said element to condense the vapors issuing therefrom, and an apertured plate constituting a bottom wall for said container, and adapted to rest on said fixed plate, there being projections on the confronting surfaces of said plates to define a tortuous path to prevent the escape of vapors from and to receive the condensate of said container.

4. In a humidifying device, a condenser in combination with a steam delivery element and adapted to be seated thereover and comprising a rigid horizontal plate having a helical rib thereover, a bell over said element to condense the vapors issuing therefrom, an apertured plate constituting a wall of said container and resting upon said fixed plate, there being projections on the confronting surface of said bottom plate to define with the helical rib on said rigid plate a tortuous path to prevent the escape of vapors from said bell and to receive the condensate therefrom.

JOHN O. WRENN.