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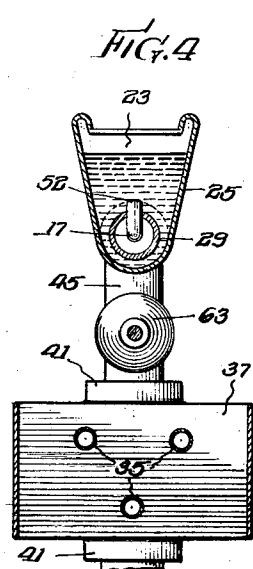
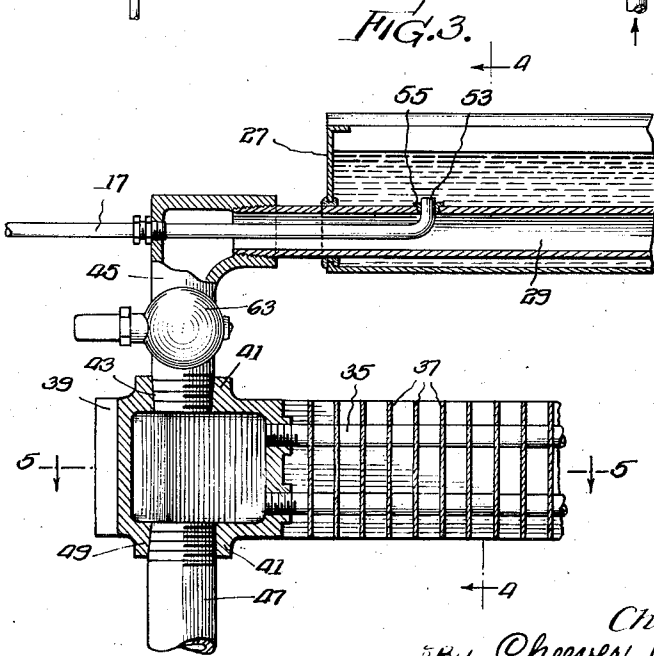
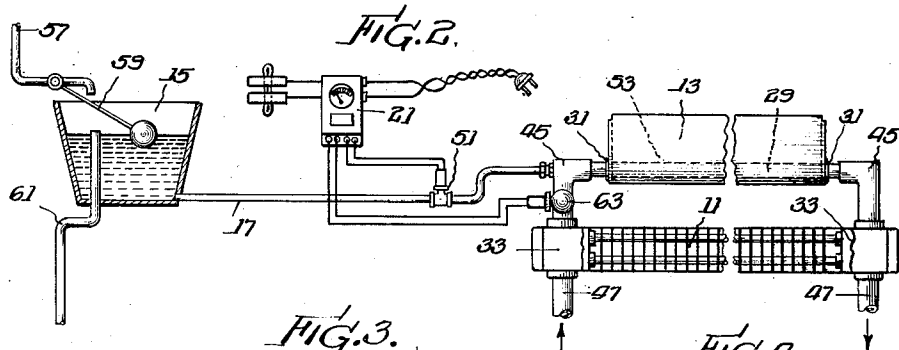
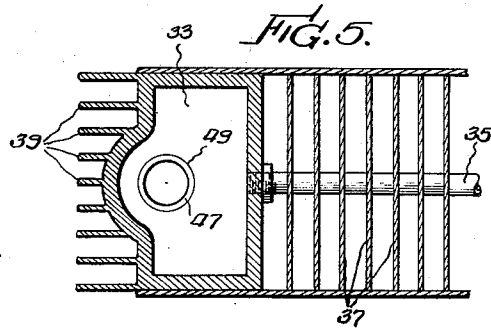
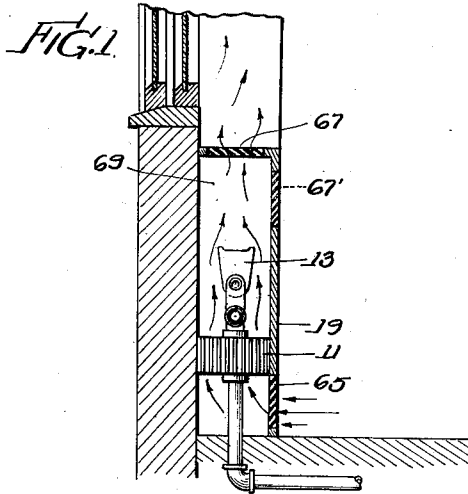
C. J. LEHN

2,031,220

HUMIDIFYING SYSTEM

Filed Aug. 15, 1931

2 Sheets-Sheet 1



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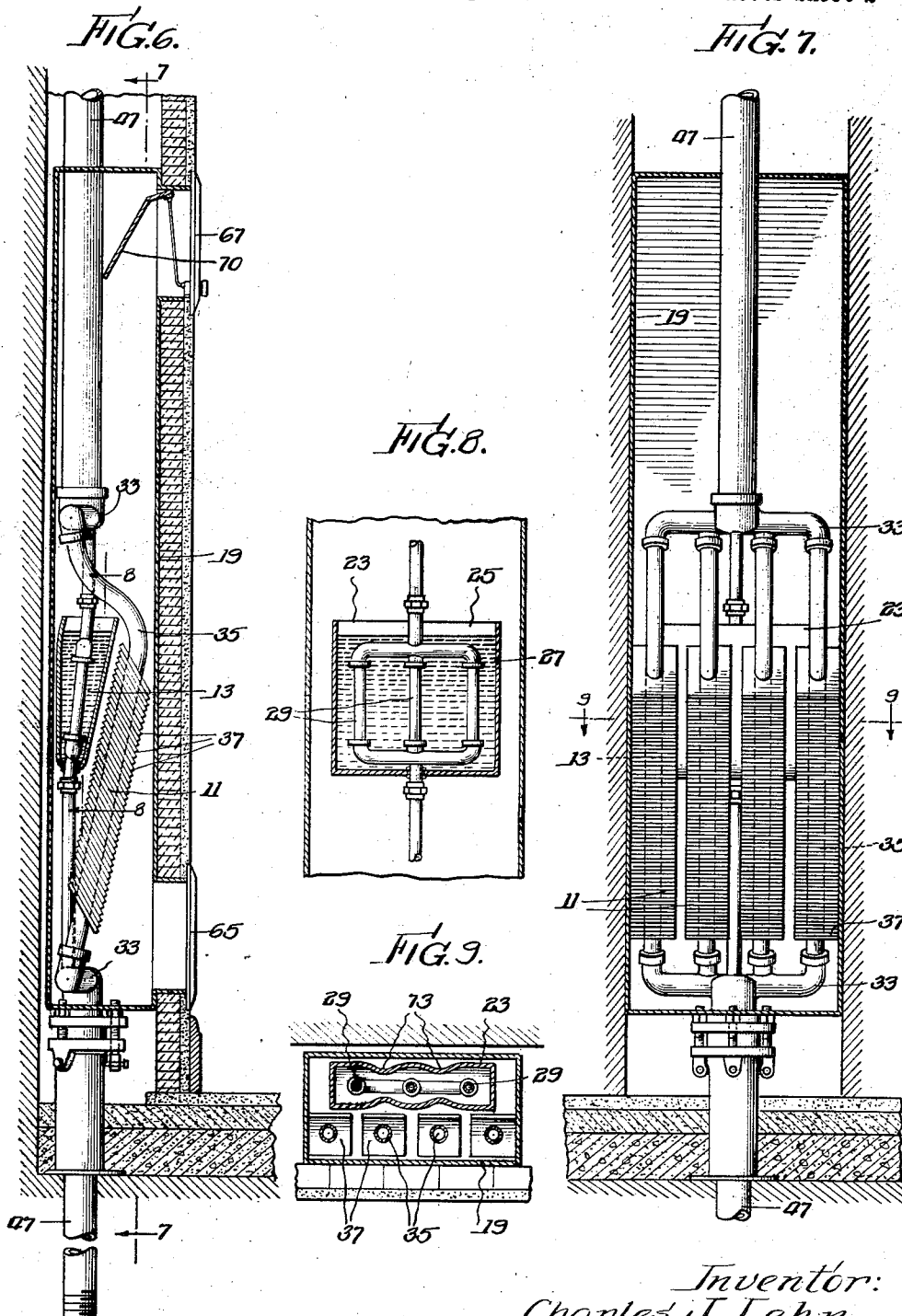
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HUMIDIFYING SYSTEM

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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HUMIDIFYING SYSTEM

Charles J. Lehn, Oak Park, Ill.

Application August 15, 1931, Serial No. 557,334

3 Claims. (Cl. 237—78)

My invention relates in general to humidity control and has more particular reference to a humidifying radiator construction adapted to provide for artificially increasing the moisture in the air up to a desired limit wherever the device is placed in operation.

Among the important objects of the invention is to provide a neat, attractive and compact construction of the class described which is inexpensive to manufacture and install and which lends itself readily for installation as a part of the recently developed "concealed radiator" type of construction; to provide an artistic and attractive humidifying radiator construction, and to provide a simple and therefore, inexpensive humidifying attachment which may be readily assembled on a variety of standard radiators without marring the appearance of the fixture, a simple, positively operating, readily controllable humidifying device adapted for continuous, automatic operation over long periods of service without supervision or repair.

These and numerous other objects and advantages of the invention will become apparent as the invention is more fully understood from the following description, which, taken with accompanying drawings, discloses a preferred embodiment of the invention.

Referring to the drawings:

Figure 1 is a vertical section taken through a built-in humidifying radiator construction embodying my invention;

Figure 2 is a diagrammatic illustration of a heating and humidifying system embodying my invention;

Figure 3 is an enlarged view, partially sectioned, of a part of the apparatus shown in Figure 2;

Figures 4 and 5 are sectional views, respectively, taken substantially along the lines 4—4 and 5—5 in Figure 3;

Figure 6 is a vertical section taken through a built-in humidifying radiator or modified construction embodying my invention; and

Figures 7, 8 and 9 are sectional views, respectively, taken substantially along the lines 7—7 and 8—8 in Figure 6 and 9—9 in Figure 7.

To illustrate my invention I have shown on the drawings a humidifying radiator system including a heater or radiator 11, a humidifying attachment 13, means, including a cistern 15 and supply mains 17 to furnish a humidifying medium, preferably water, to the attachment, means to heat the water in the attachment to create humidity which is then entrained by the

ascending hot air currents created by the radiator and discharged through a conduit or chute 19 which is or may be formed around the humidifying radiator to enclose it and create a stack effect or draught, the humidifying attachment being mounted in position to discharge its water vapor into the hot air stream created by the operation of the heater. Hygrometric control means 21 also is provided to regulate the operation of the humidifying attachment in accordance with the existing atmospheric conditions, either by regulating the flow of water to the attachment or the flow of water evaporating heat or both.

The humidifying attachment comprises a preferably sheet metal cistern 23 formed of an elongated strip of material folded to form a trough 25 of substantially V-shaped cross-sectional configuration and triangular end pieces 27 fitted into the ends of the trough and seamed along their side edges, in any suitable manner, as for instance, by welding or brazing, to the end edges of the trough to form a water tight cistern.

The end pieces, also, are or may be perforated to permit a conductor 29 for a suitable heating medium to extend into the cistern. In the illustrated embodiment the conductor is a pipe and is secured as by the annular weld 31 in the perforated portion of the end pieces.

The radiator 11 may be of any suitable construction comprising end fittings 33 comprising hollow cast members providing junction points for the heating medium. The end fittings are connected by suitable heating medium conductors 35 having heat radiating means 37 connected thereto. In the embodiments illustrated herein these conductors 35 comprise preferably iron pipes having heat radiating fins mounted thereon.

The fittings 33, also, may be provided with heat-emitting means comprising the ridges or flute 39 in surfaces other than those to which the conductors 35 are connected.

Each fitting 33 is or may be provided with threaded apertures 43 and the pipe 29 is connected at each end to a fitting as by means of an elbow connector 45. The radiator, also, is connected by suitable conductors to a remote source of a suitable heating medium and this is preferably accomplished by means of pipes 47 engaging in threaded apertures 49 formed in the fittings 33 and leading one to the riser and the other to the return main of a heating system. If a single pipe system is involved, the aperture 43 which otherwise would be connected to the return main in a two-pipe system, is plugged.

The perforations 43 and 49 of each fitting may be formed in any convenient or preferred position, but I prefer, as a matter of economy and to simplify assembly operations, to form each fitting as a symmetrical piece with the perforations on opposite upper and lower surfaces and in substantial alignment and the piece may be provided with bosses 41 at and around the perforations.

The humidifying attachment thus has a heating circuit, comprising the pipe 29 in shunt with the radiator so that whenever the heating medium is supplied to the radiator, heat is also delivered to the humidifying attachment.

The humidifying attachment 13 may be supplied with water in any convenient manner, but I have devised a neat, compact inlet arrangement comprising the pipe 17, leading from the supply cistern 15 preferably through a valve 51 and having a tip or nozzle 53 opening into the cistern 13, the end portion of the pipe 17 entering one of the elbows 45 at the end of the pipe 29, thence through the pipe 29, the nozzle 53 being bent and extending through the side of the pipe 29 and being welded or otherwise secured in place as shown at 55. The cistern 15 acts as a master water storage for a number of the humidifying radiators, all of which should be arranged at substantially the same level since the level of water in the main cistern 15 determines the level of the water in the individual cisterns 13 of the several radiators. The cistern 15 is supplied with water from a main 57 and the fluid level is limited by the float valve 59, which closes the water main 57 when the elevation of the water level in the cistern reaches a predetermined maximum, and by the overflow drain 61 which operates to drain off the excess water in case the float valve fails to operate.

In order to regulate the humidity produced and distributed into the surrounding atmosphere by the humidifying radiator, I provide means to close the pipe 29 off from its supply of heat. This is or may be accomplished by a valve 63, which may be arranged in either or both of the elbows 45 or elsewhere in the connecting means whereby the pipe 29 is attached to the source of heat. Additionally or alternatively, the valve 51 may be used to shut off the supply of the humidifying medium from the cistern 15. The valves 51 and 63 may be of any suitable or convenient type, although I prefer to employ pneumatically or electrically operated valves so that the same may be actuated from a remote control point, such, for instance, as by the master control hygrometer 21.

The radiator and humidifying attachment are preferably housed in the casing 19, which may be of sheet metal or other suitable construction, having an air inlet opening 65 at its lower end below the radiator and an outlet 67 at its upper end substantially above the radiator. The casing is preferably sized to snugly receive the radiator so that all of the air drawn into the casing through the inlet 65 has to pass in close proximity to the heat discharging fins 37.

The casing 19 may be formed as a separate cabinet or may be simply a depression or niche 69 formed in a suitable spot in the room wall to receive the radiator and covered with a suitable screen having the inlet and outlet openings. The openings 67 may be formed in the top of the casing as an upwardly opening aperture, or it can be formed in the front wall of the casing as a lateral opening as indicated at 67' in Figure 1

of the drawings, and both openings may be formed with ornamental grilles if desired. It is desirable, also, that the effective area of the discharge opening be at least as large, preferably larger, than the area of the inlet opening and the effective area of the air passageways past the radiator in the casing, so that the outlet will not be restricted. This is necessary because of the increase in volume of the air as it is heated in passing the radiator.

In operation the radiator heats the air in the casing. The air rises. More air enters the inlet. The humidifying attachment discharges water vapor in the path of the ascending air which entrains the humidity and carries it out of the outlet into the atmosphere to be heated and humidified.

In Figures 6, 7, 8 and 9 I have shown a modified construction particularly well adapted for use in "single-pipe systems" and in which the radiator 11 comprises one or more substantially vertically extending pipes 35, connected between spaced fittings 33 and having obliquely arranged fins 37.

The vertical arrangement of the pipes renders the radiator of extremely compact width. In order to permit the humidifier 13 to be mounted on the radiator the upper ends of the pipes are sloped forwardly in the casing 19 and the humidifier is mounted in the space behind the upper ends of the radiator pipes.

The humidifier comprises a relatively deep trough in order to hold sufficient water in spite of its restricted width and the heater comprises vertical pipes 29 connected within the trough to terminal fittings similar to the spreader fittings 33 of the radiator. These terminal fittings are connected by means of suitable conductors or pipes to the spreader fittings of the radiator, the conductors passing through openings in the trough and being brazed or welded to the trough as at 31.

In this modification, also, I have shown how the upper or air outlet opening 67' may be provided with a shutter 71 so that the heat and humidity may be held in the casing 19 and prevented from entering the room.

The arrangement shown in Figures 6-9, also, may be provided with a reservoir 15 and humidity control mechanism, such as is shown in Figure 2, and the trough may have its sides inset as at 73 to increase the effective area of the air paths in the casing. The operation of the device of Figures 6-9 is otherwise quite similar to that of the preferred modification shown in Figures 1-5.

It is thought that the invention and its numerous objects and advantages will be fully understood from the foregoing description, and it is obvious that numerous changes may be made in the form, construction, and arrangement of the several parts without departing from the spirit or scope of the invention, or sacrificing any of its attendant advantages.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is as follows:

1. The combination with a radiator comprising a pair of spaced identical castings forming chambers and having each an opening to receive a connection with a source of fluid heating medium and radiator pipes mounted between the castings and communicating between said chambers, said castings having each a second opening, of a humidifier carried by and extending between said castings, said humidifier comprising an elongated

cistern having an open top, a pipe in said cistern, means connecting said pipe with the second named openings in said castings, said cistern being supported on and carried by said pipe, a feed
5 water pipe extending within the humidifier pipe and connected with a remote water supply, said feed water pipe extending through the side of the humidifier pipe in position to discharge into said cistern.

10 2. A humidifier comprising an elongated cistern having an open top, a heating pipe in said cistern and extending out of a wall thereof, a feed water pipe extending within the heating pipe at its point of penetration of the cistern
5 wall, said feed water pipe being adapted for connection with a remote water supply and discharging through the side of the heater pipe into said cistern.

3. A humidifier adapted for attachment on a
10 radiator and comprising a sheet metal cistern, V-shaped in cross-section, heating means com-

prising a pipe extending in said cistern for evaporating a humidifying medium therein, said pipe having a portion within the cistern extending longitudinally of the cistern and in close proximity to the bottom thereof in position to be entirely surrounded by a thin layer of the humidifying medium therein, said pipe having an end
5 extending out through a wall of the cistern and formed for connection with a radiator, with which the cistern is operatively associated so that the cistern may be supported entirely by the radiator
10 solely through said pipe and whereby the pipe may receive a heating medium from the radiator, and means formed on said cistern and arranged for connection with a remote constant level reservoir of a suitable fluid humidifying medium by
15 means of a conduit connecting the reservoir and cistern whereby the level of the fluid medium in the cistern is determined by the fluid level in the reservoir.

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