April 14, 1931. J. P. SAMELS 1,801,057

HUMIDIFIER

Filed March 26, 1928

Fig. 1

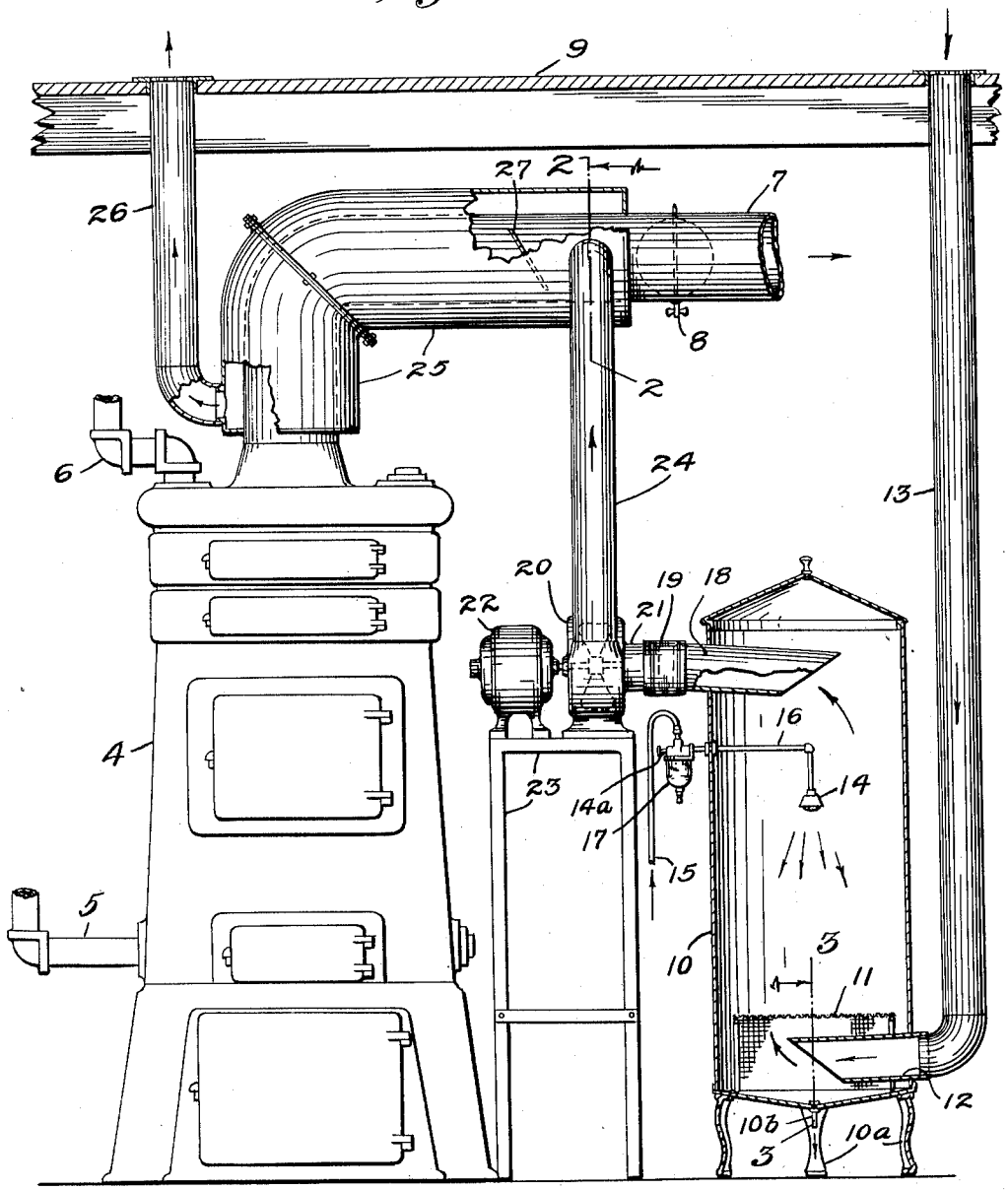


Fig. 2

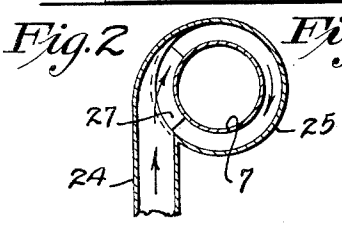
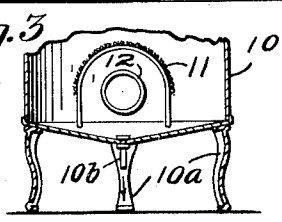


Fig. 3



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UNITED STATES PATENT OFFICE

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HUMIDIFIER

Application filed March 26, 1928. Serial No. 264,780.

My invention has for its object to provide an improved humidifier, especially well adapted for use in connection with heating and ventilating apparatus; and, to this end, my invention consists of the novel devices and combinations of devices hereinafter described and pointed out in the claim.

In the accompanying drawings, I have illustrated my improved humidifier as it would appear when constituting a part of an improved heating and ventilating apparatus, wherein a water heating furnace is employed. In said drawings, like notations referring to like parts, throughout the several views:—

Fig. 1 is a view chiefly in front elevation, but with the humidifying receptacle shown in vertical section, and some portions of the various parts of the apparatus broken away;

Fig. 2 is a detail in vertical cross section on the line 2—2 of Fig. 1, and

Fig. 3 is a detail in vertical cross section on the line 3—3 of Fig. 1.

The numeral 4 represents a water heating furnace of a standard or any suitable form, and the numerals 5 and 6 represent respectively, the water inlet and water outlet pipes from the furnace and which, in practice, extend to the water radiators (not shown) in the rooms to be heated. The numeral 7 represents the smoke pipe from the furnace provided with the customary damper 8. The numeral 9 represents the floor of one of the rooms to be heated, from the water furnace 4, through a radiator or radiators not shown.

The numeral 10 represents a humidifying receptacle which has, resting on its bottom, a U-shaped screen 11 which separates off the space within the screen from the remaining space on the interior of the receptacle 10. One end of this screen 11 is provided with an air intake nipple or pipe section 12 which extends outward through the adjacent wall of the receptacle 10 and is jointed to the air supply pipe 13, the upper end of which terminates on the face of the floor 9 of the room to be ventilated.

Within the interior of the receptacle 10, at a suitable distance above the screen 11, is located a water sprayer 14 shown as supported from one of the walls of said receptacle. In the supply connections 15 and 16, for this sprayer 14, is located a cleaning filter 17 of a standard or any suitable construction adapted to clean the water from foreign materials held in suspension therein.

As a point above the sprayer 14, the humidifying receptacle 10 is provided with a moistened air outlet nipple or pipe section 18, which projects outward through the adjacent wall of said receptacle and by a coupling 19 of flexible material is joined to the inlet nipple 21 of a fan 20, which may be driven in any suitable way, such as by an electric motor 22. The fan and the motor are shown as supported at the proper height by a stand 23. The discharging end of the fan case is connected by pipe 24 to an air heating drum 25 mounted on the smoke pipe 7 of the furnace 4, and the discharging end of this drum 25 is connected by delivery pipe 26 with the room to be ventilated. The pipe 24, which leads from the fan to the heating drum 25, taps the drum on tangential lines to concentric circles as clearly shown in Fig. 2 of the drawings, and the interior of the drum contains deflecting blades 27, one of which is clearly shown in Fig. 1, set at an angle to the axes of the drum and smoke pipe. In view of these two pecularities of structure, the air supply to the drum 25 from the pipe 24, under the action of the fan 20, will travel a spiral path around the pipe while moving lengthwise of the drum, thus rendering the heating action from the pipe highly efficient. The sprayer 14 is provided with a controlling valve 14*a*.

The humidifying receptacle 10 is shown as provided with legs 10*a* and a drain cock 10*b*. The wiring for the motor 22 has not been shown, but will, of course, be of the standard well known kind.

Operation

Let it be assumed that the water furnace 4 is in action, that the motor driven fan 20 is running and that the sprayer valve 14 is open. Then, the operation of the illustrated apparatus may be briefly stated as follows:—

Under the suction from the fan, the rela-

tively cold unmoistened air, from the room space above the floor 9, will be drawn downward through the pipe 13 and screen nipple 12 and be delivered into the humidifier below the screen 11, or into the space cut off from the interior by the said screen 11. Then under the continued action of the fan, the air will pass upward through the said screen 11 whereon it will meet the water thrown down onto the screen by the sprayer 14; and as the water strikes the screen, it will be further sub-divided at the time it meets and commingles with the upwardly moving air, and thereby the air will be thoroughly moistened, and washed in a uniform manner. As the air continues to move upward, through the falling spray of water within the receptacle 10, it is, of course, further moistened and commingled, until it finally reaches the outlet nipple 18, at a point above the sprayer, and passes onward to the fan and through the pipe 24 into the heating drum 25. In this drum, the moistened air is heated, while it travels through said drum, and, under the action of the fan will be forced through the delivery pipe 26 into the space of the room above the floor 9. After the hot moistened air reaches the room to be ventilated, it will gradually lose its moisture and heat, and, along with cold air reaching the room through the crevices about the doors and windows, or openings therein, will fall toward the floor and be drawn by the fan down again through the pipe 13 into the humidifying receptacle. This action may be continued indefinitely.

Because of the presence of the screen 11 within the humidifying receptacle 10 and the introduction of the unmoistened air below the said screen and because of the fact that the sprayer 14 is so positioned as to throw the sprayed water on the face of the screen, there is no noise from the spraying action. This is a great advantage and source of comfort to the occupants of the building where such an apparatus is employed. The fact that the coupling 19 between the outlet nipple 18 of the receptacle 10, and the intake nipple 21 of the fan 20 is made of flexible material, prevents the motion from the fan imparting any jarring action to the humidifying receptacle.

It may also be noted that the said air outlet nipple 18 of the humidifier is set on a slight incline downward and inward, and this is done so that, if any condensation occurs in the passage of the air through the pipe 18, the water will run backward into the interior of the receptacle 10.

Of course, it will be understood, that the humidifier and the air heater of the moistened air herein disclosed could be used with any other form of heating furnace. It must also be understood that the humidifier disclosed could be employed with any other form of air heater. It must be further understood that the humidifier and any suitable air heater might be employed for ventilating the room, or rooms, whether any other means for heating the rooms was available or not.

My invention herein disclosed has been thoroughly tested out, in actual practice, and has been found to work with complete success and entire satisfaction.

It will, of course, be understood that my invention is not only serviceable for use in inhabited buildings, but in buildings or cellars used for other purposes such as green houses, tobacco storing houses, fruit ripening buildings and fruit storage cellars. It might also be used with formaldehyde for disinfecting buildings.

What is claimed is:

In a ventilating apparatus, the combination with a heating device, of a humidifying receptacle, a water sprayer mounted in said receptacle, a heating casing surrounding a portion of said heating device, and means forcing a draft of air first into the bottom of said humidifying receptacle, thence upwardly against the action of said sprayer to substantially saturate the air with water, thence outwardly from adjacent the top of said humidifying receptacle into said heating casing to heat the air to a point where it is not fully saturated, and thence to its point of delivery.

In testimony whereof I affix my signature.

JOHN P. SAMELS.