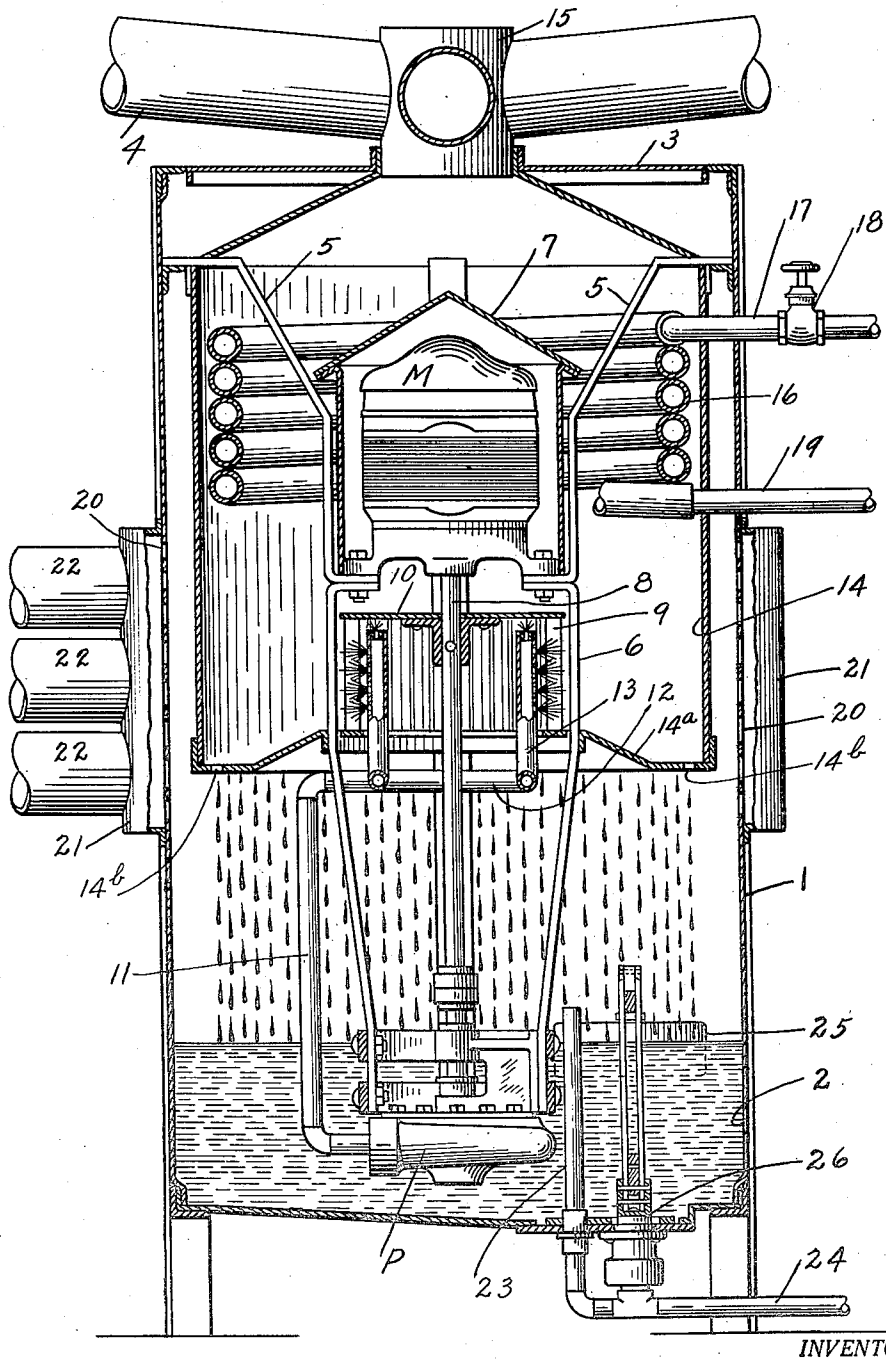
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AIR WASHER AND HUMIDIFIER

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## AIR WASHER AND HUMIDIFIER

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2 Claims. (Cl. 261—29)

This invention relates to improvements in domestic hot air heating systems and more particularly to a system of this type in which the air is washed and humidified before it is heated and distributed.

It is an object of this invention to provide a means in a domestic hot air heating system in which the air is circulated through the rooms to be heated and after the heat has been dissipated, to return the cooler air to the heater whereby the cooled air is washed and humidified before being again heated and recirculated.

With these and other objects in view, reference is made to the accompanying sheet of drawing which illustrates a preferred form of this invention, with the understanding that minor detail changes may be made therein without departing from the scope thereof.

The figure of the drawing is a view in central vertical section of a preferred form of this invention with parts shown in front elevation.

The combined air washer, humidifier and heater includes preferably a rectangular casing 1, the lower portion of which provides a water storage tank 2 and an upper closure 3 communicating with the hot air distribution ducts 4 of the heating system.

A motor M is mounted in the vertical axis of the upper portion of the casing 1 upon hangers 5 resting upon suitable supports attached to the interior of the upper portion of the casing. A centrifugal pump P is mounted below the motor M in the water tank compartment upon hangers 6 engaging the hangers 5. The motor M is provided with a casing 7 surrounding its sides and top and is mounted with its driving shaft 8 in the vertical axis of the casing and connected with the rotor of the pump P. A centrifugal fan 9 preferably of the multiblade type having spaced apart vertical blades and an upper closure plate 10 is mounted on the motor shaft 8 adjacent the motor and within the hangers 6 of the pump P. The discharge side of the pump P is connected by the vertical pipe 11 to connect with the interior of a horizontal hollow ring 12 positioned within the hangers 6 and adjacent the underside of the fan 9 which ring 12 is provided with a plurality of vertical discharge pipes 13 extending thereabove within the blades of the fan 9, adjacent thereto, and terminating adjacent the cover plate 10, which pipes 13 are each provided with discharge orifices in the direction of the fan blades and cover plate 10.

The upper portion of the casing above the horizontal ring 12 is provided with a water collecting and heating chamber 14 spaced apart from the walls of the casing and communicating at its upper end with a distributing chamber 15 which in turn communicates to the hot air ducts 4 of the heating system. The bottom $14^a$ of the chamber is provided with a central orifice surrounding the lower end of the fan 9 preferably secured upon the outer sides of the pump hangers 6 which bottom slopes toward the bottom of the side walls of the chamber 14 and is provided with a plurality of discharge orifices $14^b$ adjacent said walls. A heating coil 16 is located within the chamber 14 spaced apart from its bottom and preferably surrounding the motor, as shown. The upper convolution of the coil 16 is preferably connected by the pipe 17 to a source of hot water or steam, the entrance of which into the coil is controlled by the valve 18 while the lower convolution of the coil 16 is connected by the pipe 19 to return the water or steam to the source.

The walls of the casing 1 are provided with a plurality of air intake openings 20 preferably extending in both a vertical and horizontal direction admitting air to the space between the casing and walls of the chamber 14 and also preferably for a slight distance therebelow. A continuous chamber is formed about the intake openings 20 by the casing 21 secured to the exterior of the casing 1 which chamber communicates with the return air ducts 22 of the heating system. While the heating ducts 22 are shown as entering the chamber formed by the casing 21 on one side only, the ducts may be connected where most convenient or most desirable.

The operation of the device is as follows: Valve 18 admits a heating medium such as steam or hot water to circulate through the heating coil 16 and the motor circuit is closed and the motor which is adapted to be connected to the commercial electric lighting system is started to operate by closing the said circuit. Thereafter the fan 9 and pump 10 will simultaneously operate to force water from the tank 2 in the form of a spray through the discharge openings in pipes 13 causing the spray to pass between the rotating blades of the fan 9 which at the same time draws air from the chamber formed by the casing 21 through the openings 20 and central openings in the bottom of the heating and cooling chamber 14 which passes through the blades 9 with the water spray. The sprayed water collects in the bottom and passes through the orifice $14^b$ in the form of a thin water wall in returning to the water tank so that the air drawn

by the fan from the air return ducts 22 is caused to pass through this descending water wall and is washed thereby, removing all dust or other impurities. The air discharged by the fan through the water spray is humidified before it is forced upward over the heating coil 16 so that the air entering the collecting chamber 15 is first washed, humidified, and then heated before it is distributed through the ducts 4 to the various rooms to be heated.

In a device of this character, the washing of the air results in the bottom of the water tank becoming coated with an accumulation of the impurities washed from the air and, if desired, the water tank may be automatically flushed and the water replaced in the manner disclosed in this applicant's prior application Serial No. 656,817, filed February 15, 1933, and as this forms no part of this particular invention, it is thought only necessary to state that the pipe 23 is an overflow pipe for the water tank 2 which leads into a discharge pipe 24 and the float 25 actuates the float operated valve 26 in the bottom of the water tank 2 opening into the discharge pipe 24 for automatically flushing the tank.

What I claim is:

1. In a domestic circulating hot air heating system, a casing, a collecting and heating chamber spaced apart from the walls of the casing secured in the upper portion thereof communicating with the hot air ducts of the system, a water tank formed by the bottom walls of the casing, a return air chamber surrounding the casing, said casing provided with a plurality of air inlet apertures in the walls thereof within the air return chamber, said air return chamber communicating with the air return ducts of the system, an electric motor mounted in the upper portion of the collecting and heating chamber, a centrifugal fan mounted upon the driving shaft of the motor within the chamber, a centrifugal pump within the water tank adapted to be operated by the motor to discharge water in the form of a spray through the centrifugal fan, the bottom of said chamber having a plurality of discharge orifices about its periphery and a central opening under the fan whereby operation of the motor sprays water through the fan into the chamber which collects in the bottom and passes therethrough in the form of a wall of water and air drawn by the fan from the air return chamber is washed in passing through the water wall and is humidified in passing through the fan blower in association with the water spray, and means within the chamber for heating the air passed therethrough by the fan.

2. In a domestic circulating hot air heating system, a casing, a collecting and heating chamber spaced apart from the walls of the casing secured in the upper portion thereof communicating with the hot air ducts of the system, a water tank formed by the bottom walls of the casing, a return air chamber surrounding the casing, said casing provided with a plurality of air inlet apertures in the walls thereof within the air return chamber, said air return chamber communicating with the air return ducts of the system, an electric motor mounted in the upper portion of the collecting and heating chamber, a centrifugal fan mounted upon the driving shaft of the motor within the chamber, a centrifugal pump within the water tank adapted to be operated by the motor to discharge water in the form of a spray through the centrifugal fan, the bottom of said chamber having a plurality of discharge orifices about its periphery and a central opening under the fan whereby operation of the motor sprays water through the fan into the chamber which collects in the bottom and passes therethrough in the form of a wall of water and air drawn by the fan from the air return chamber is washed in passing through the water wall and is humidified in passing through the fan blower in association with the water spray, and means within the chamber for heating the air passed therethrough by the fan, including a coil of pipe within the chamber and about the motor connected with a heating medium for circulating a heated fluid through said coil.

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