Sept. 23, 1941. R. C. SABINS 2,256,991

HUMIDIFIER CONSTRUCTION

Filed March 5, 1941 4 Sheets-Sheet 1

Fig. 1.

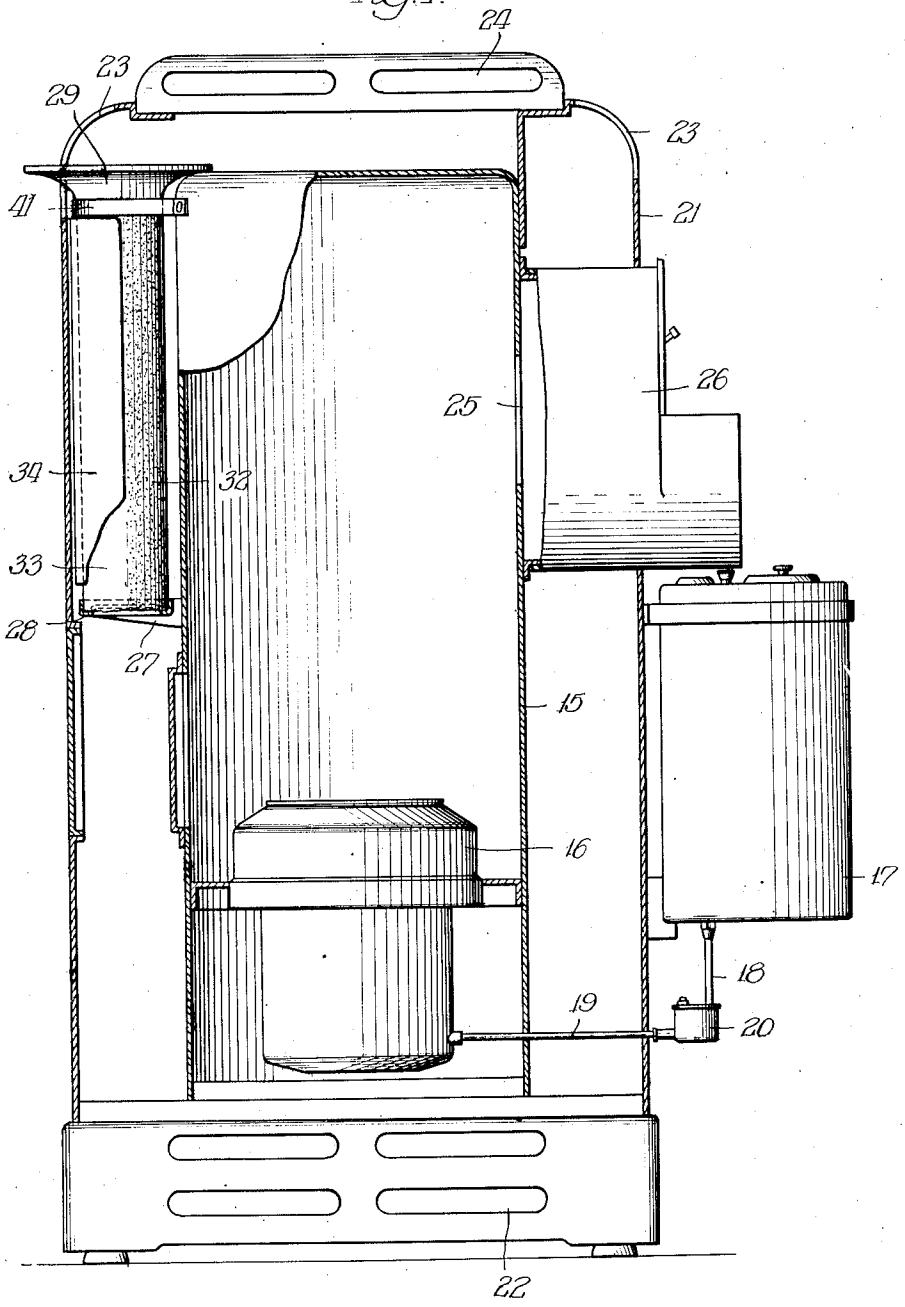

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Fig. 2

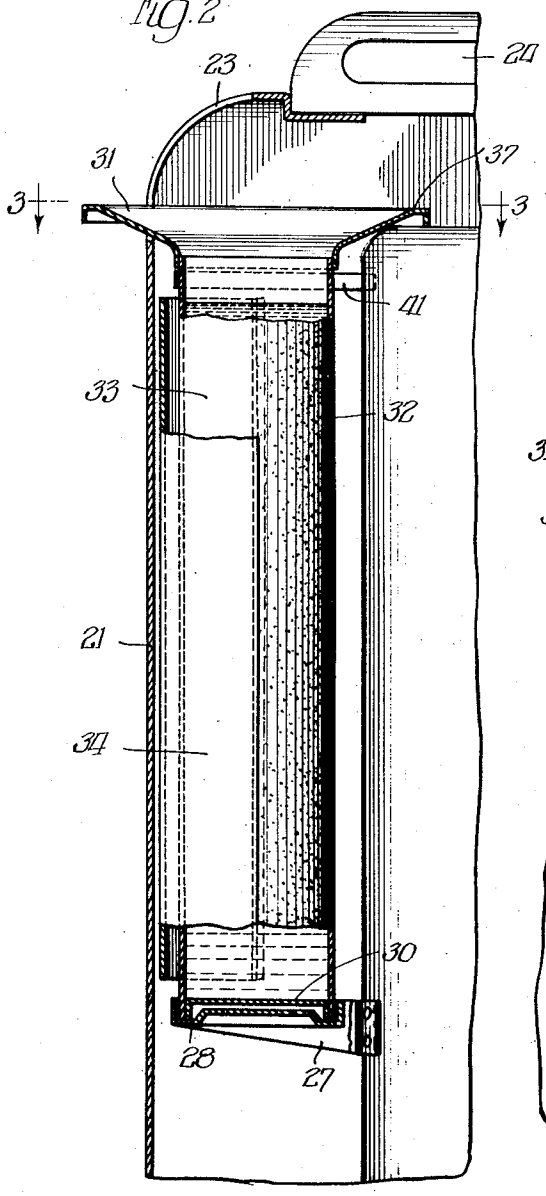

Fig. 3

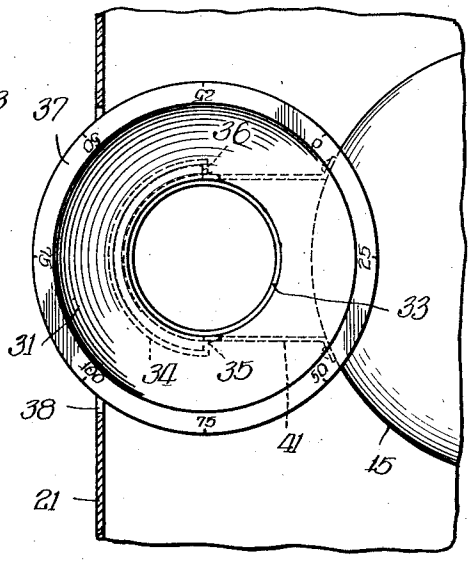

Fig. 4

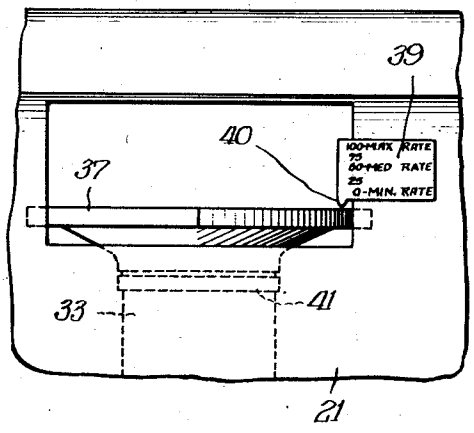

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Fig. 5.

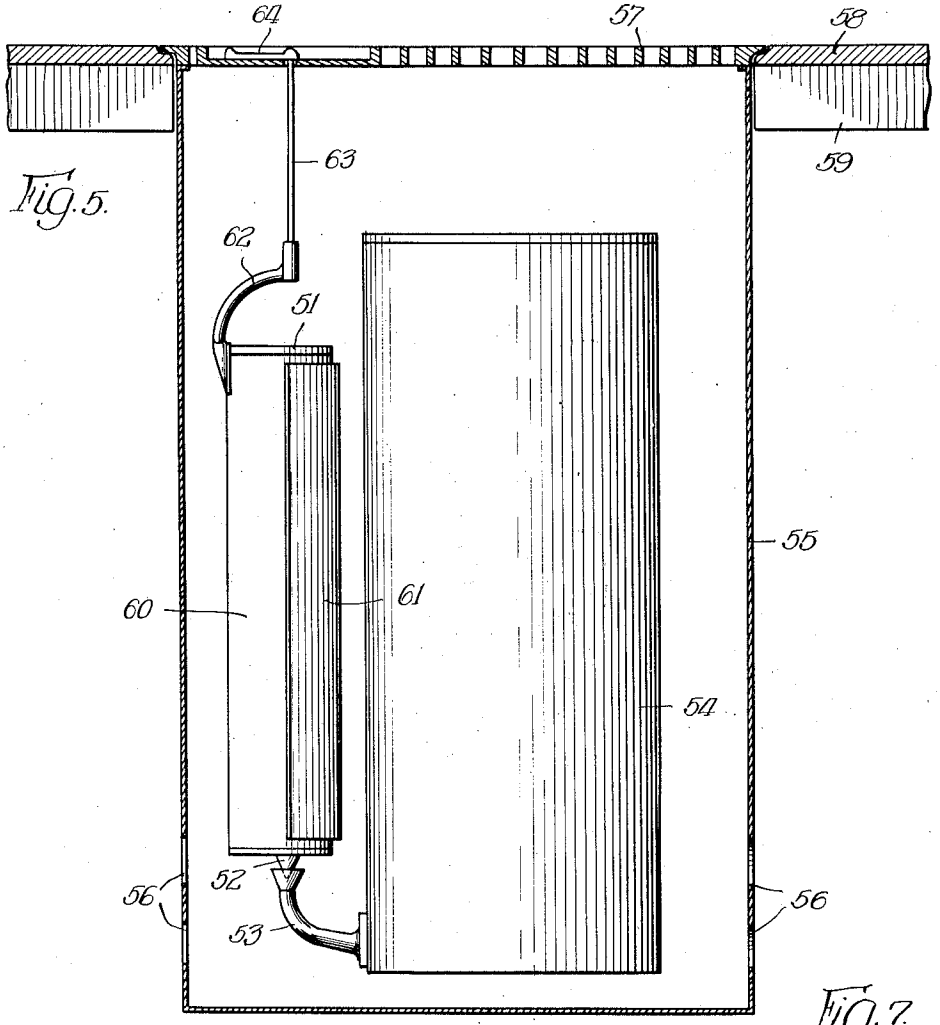

Fig. 6.

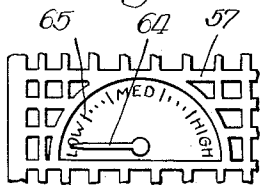

Fig. 7.

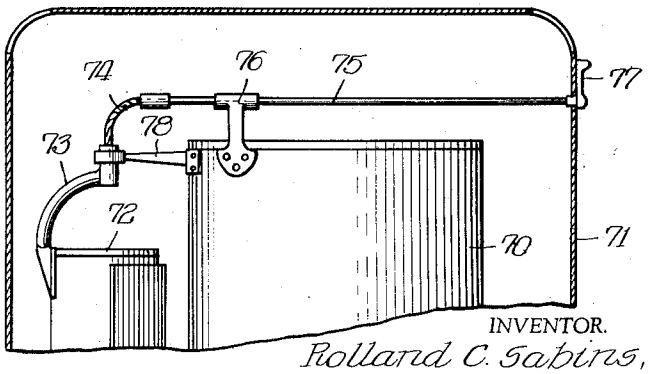

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Fig. 9.

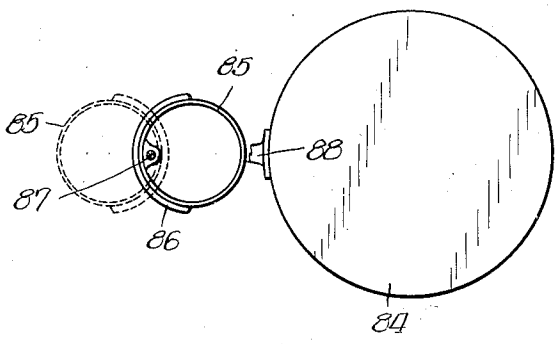


Fig. 11.

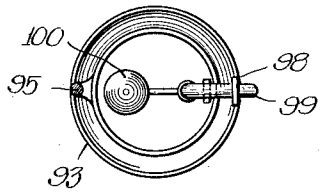


Fig. 8.

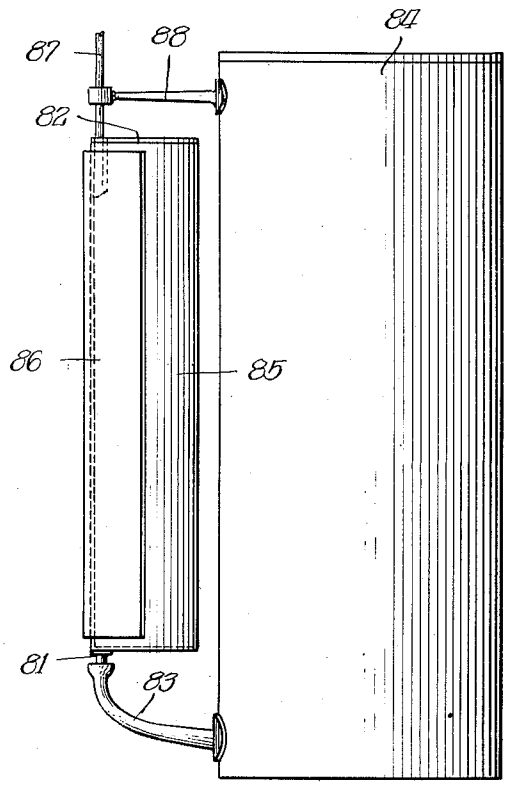
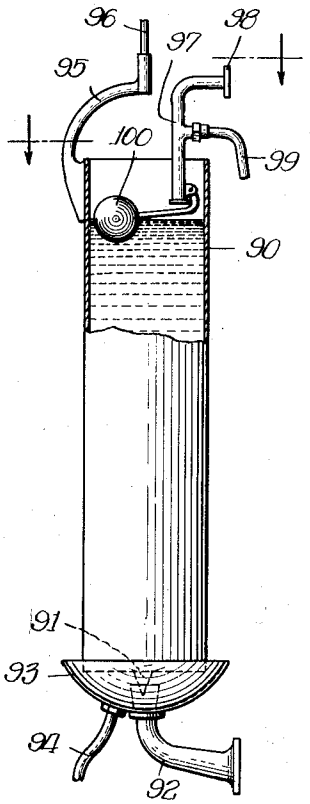


Fig. 10.



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UNITED STATES PATENT OFFICE

2,256,991

HUMIDIFIER CONSTRUCTION

Rolland C. Sabins, Cincinnati, Ohio

Application March 5, 1941, Serial No. 381,826

9 Claims. (Cl. 126—113)

This invention relates to a new and improved humidifier construction, and more particularly to a construction of humidifier for use in connection with heating stoves or furnaces.

It has become customary to provide heaters or stoves with pans or tanks for holding water to be evaporated by heat derived from the combustion in the stove or space heater. Such provision is particularly desirable in connection with hot air heaters of the circulating type, whether the air is circulated by natural or forced draft, since the air can be humidified as it is heated. Certain attempts have been made to provide means whereby the amount of water evaporated may be varied, as is desirable because of normal fluctuations in the humidity of the atmosphere. In general, such attempts have included fans or blowers for forcing controlled amounts of air over the surface of the water in the humidifier. Such forms of apparatus add to the initial expense as well as the operating cost. They also cannot be used where electricity is not available, which is true of many localities where hot air heaters are widely used.

It is an object of the present invention to provide a new and improved humidifier construction for use with heaters.

It is an additional object to provide a humidifier which is readily adjustable to provide varying rates of evaporation of water.

It is a further object to provide apparatus of this character in which the adjustment may be made by mechanical means without the use of fans or blowers.

It is also an object to provide a humidifier which may be adjusted to vary the heat absorption by the water from the heating unit.

It is another object to provide such apparatus operating with the humidifier tank located a substantially constant distance from the heat radiating walls during adjustment and operation.

It is an additional object to provide a humidifier construction which may be used with different types of heaters, stoves or furnaces regardless of the type of fuel used.

Other and further objects will appear as the description proceeds.

I have shown certain preferred embodiments of my invention in the accompanying drawings, in which—

Figure 1 is an elevation, partly broken away and partly in section, showing one form of humidifier used upon an oil heater having a pot type burner;

Figure 2 is a fragmentary view showing the humidifier and associated parts of Figure 1 on an enlarged scale;

Figure 3 is a transverse section taken on line 3—3 of Figure 1;

Figure 4 is a fragmentary elevation showing the upper portion of Figure 2 as seen from the left;

Figure 5 is an elevation, partly in section, showing a modified form of humidifier applied to a pipeless hot air furnace;

Figure 6 is a fragmentary plan view showing the control panel of the construction of Figure 5;

Figure 7 is a fragmentary section showing a form of construction similar to that of Figure 5 applied to a space heater;

Figure 8 is a somewhat diagrammatic elevation of a modified form of construction;

Figure 9 is a plan view of the construction of Figure 8;

Figure 10 is an elevation, partly in section, of a further modified construction; and

Figure 11 is a transverse section taken on line 11—11 of Figure 10.

Referring first to the form of construction shown in Figures 1 to 4, inclusive, the heater is shown as comprising a heating drum 15 carrying a pot type burner 16, fed with fuel from tank 17 by pipe lines 18 and 19 and control valve 20. The heating drum 15 is enclosed in a housing 21 having lower air intake openings 22 and upper openings 23 and 24 for delivery of heated air to the space to be heated. The heating drum is provided with the flue opening 25 for the products of combustion, and the damper and control chamber 26. The particular form of construction of the heater comprises no part of the present invention and has been disclosed generally for the purpose of showing the application of the humidifier of the present invention to heaters of this character.

The supporting bracket 27 is shown as secured to the heating drum 15, and has a cup-shaped portion 28 adapted to receive the lower edge of the humidifier 29. This humidifier 29 is in the form of a cylindrical tank having a closed bottom 30 and a flaring funnel-like upper portion 31. For 180° of its outer surface, the cylindrical portion of the member 29 is coated, as shown at 32, with a heat absorbing paint or similar material, such, for example, as a dull black, non-reflecting pigment in a suitable vehicle. The remaining 180° of the circumference, as shown at 33, is coated with a heat reflecting material such, for example, as an aluminum paint. It may, how-

ever, be tinned or coated with bright nickel or chromium or with any other material which has heat reflecting qualities. In addition, in order further to prevent absorption of heat by the reflecting section 33 of the humidifier tank, it is shown as provided with a jacket 34 which has its body portion spaced from the humidifier proper and has its vertically extending edges 35 and 36 turned inwardly and secured to the humidifier 29, as best shown in Figure 3. Both the jacket 34 and the adjacent tank surface may be given a heat reflecting surface.

As a means for advising the user or operator of the heater and humidifier of the relative location of the two areas, indicating marks may be placed around the upper edge 37 of the flaring portion 31 of the humidifier. As shown in the drawings, this flaring edge extends outwardly through a slot 38 in the wall of the housing 21 of the heater. The indicating plate 39 may be placed on the outer wall 21 with an indicating pointer 40 extending downwardly adjacent the rim 37 of the humidifier. The rim then may be so calibrated that the figures adjacent the pointer 40 will indicate the relative percentage of water evaporation which will take place at that particular adjustment. In other words, with the heat absorbing surface 32 directed towards the heating drum 15, the number 100 should be adjacent the pointer 40. With the humidifier turned to 180°, so that the heat reflecting section of the humidifier is adjacent the heating drum 15, the number 0 should appear opposite the pointer 40. It will be noted that the humidifier may be turned in either direction, since the controlling factor is the relative proportions of the two areas directed toward the heating drum.

The upper portion of the cylindrical water container 29 is shown as supported by a strap 41, also secured to the heating drum 15. The flaring funnel-like rim portion 31 of the humidifier also serves the purpose of guiding liquid into the humidifier when it is being filled. Water may be poured into whatever portion 31 of the humidifier happens to extend through the slot 38 in the housing 21, and this water will be directed into the cylindrical body of the humidifier.

The form of construction shown in Figures 5 and 6 differs from that just described, in that the humidifier tank 51 is provided with a central pivot point 52 on its bottom which rests in a conical seat in a supporting bracket 53 secured to the heating drum 54. The heater construction as shown in Figures 5 and 6 indicates diagrammatically a pipeless furnace having a housing 55 which has lower air intake openings 56 and an upper air discharge grille 57. This grille 57 is shown set flush with a floor 58 supported on joists 59. The humidifier 51 is shown having a heat absorbing side 60 and a heat reflecting side 61. The upper bracket 62 secured to the humidifier extends inwardly to a point above the pivot 52, where it is connected to a control shaft 63. This shaft extends upwardly through grille 57 and has its upper end connected to a control handle 64 which operates in connection with indicia 65, as shown in Figure 6.

The construction of Figure 5 may be used in connection with a space heater, such as shown in Figure 1, with a control in the front of the heater. Such a construction has been shown diagrammatically in Figure 7, where the heating drum 70 is enclosed in housing 71. The humidifier tank 72 is provided with an upper bracket 73 similar to bracket 62 of Figure 5. This bracket 73 is supported in bearing 78 and is connected by the flexible shaft section 74 to the rigid shaft 75 which is supported in the bearing 76 carried by the heating drum 70. The end of shaft 75 extends through the front of the housing 71 and carries a control lever 77, adjacent which may be placed indicia similar to those of Figure 6.

The form of construction of Figures 8 and 9 is generally similar to that of Figures 5 to 7. The main point of difference is that the pivot 81 on the bottom of the water tank 82 is located adjacent one edge rather than centrally of the tank. This pivot 81 is supported in the bracket 83 from the heating drum 84. The tank 82 is provided with a heat absorbing side 85 and heat reflecting side 86. The operating lever 87 extends upwardly from the tank 82 and is supported in bracket 88. The upper end of the lever 87 may be provided with any desired form of operating handle. Rotation of this handle not only serves to turn the heat absorbing and heat reflecting sides of the tank toward or away from the heating drum 84, but also changes the spacing between the humidifier tank 82 and the heating drum 84.

As shown in Figure 9 in full lines, when the tank is turned with its heat absorbing side 85 adjacent the drum 84, this side is closely adjacent the drum. On the other hand, when the heat reflecting side 86 is turned toward the heating drum 84, as shown in broken lines in Figure 7, it is spaced a substantial distance away from the heating drum. This form of construction, therefore, affords an even wider control of variation in evaporation of water and humidifying effect than the constructions of Figures 1 to 8. It will be understood, of course, that this construction also may be adjusted at intermediate points to provide any desired humidifying effect.

The form of construction of Figures 10 and 11 is generally similar to that of Figure 5. Here, however, the humidifier tank 90 is carried on pivot 91 in a bracket 92, the bracket having an overflow receiving pan 93 and an overflow pipe or tube 94. The upper portion of the humidifier tank 90 carries the bracket 95 and operating lever 96. The water valve 97 is supported by bracket 98 from any adjacent structure and receives water from the pipe 99. The valve 97 is provided with a float control 100 which rests on the water in the humidifier tank 90 when the tank is full. When this float drops under, the valve is opened and water is introduced into the tank 90 until the float is again raised to the full position, when the valve is closed. The overflow pan 93 is provided merely as a safety factor in case the valve should fail to function and the water overflow. This form of construction is particularly adaptable for use in fixed installations, such as floor furnaces or large permanent heaters, and eliminates all necessity for periodic filling of the humidifier tank.

Tanks of the character disclosed herein, with one side coated with heat absorbing material and the other side protected or coated with heat reflecting material, have been found to offer a very wide variation in the amount of water evaporated during a given period. The various rates of evaporation will, of course, depend upon the heat delivered from the particular heating drum, which in the case of an oil burner, will depend upon the valve setting and consequently the rate of fuel flow to the heater. It is possible with such a construction, however, to have a varia-

tion on the order of 100 degrees Fahrenheit in water temperature between the maximum adjustment of the humidifier and the minimum adjustment. This makes a very large difference in the amount of water evaporated, and consequently the humidifying effect of the apparatus. The adjustment is simple and may be varied as desired, and set at any point between the maximum and minimum setting. The construction is simple and may be readily added to existing types of heaters or furnaces without substantial alteration thereon. It may not only be added to oil heaters, but to any stoves or furnaces or in fact to any heat radiating apparatus. The humidifier may be enclosed within the housing of the stove or furnace, or where the heater or other heating apparatus is not provided with a housing, the humidifier may be externally attached thereto in heat absorbing relationship.

The forms of construction shown are to be understood to be illustrative only, as the apparatus is capable of variation to meet differing conditions and requirements, and I contemplate such modifications as come within the spirit and scope of the appended claims.

What is claimed is:

1. A humidifier for use adjacent a source of heat which comprises, a tank for containing water, the tank having an opening above the water surface, a portion only of the exterior surface of the tank being provided with heat absorbing means, the remaining portion of the surface being substantially less heat absorbing, a support for the tank, and means for moving the tank upon the support to move the two portions of the surface of the tank alternately toward or away from the source of heat.

2. A humidifier for use adjacent a source of heat which comprises, a tank for containing water, the tank having an opening above the water surface, a portion of the exterior surface of the tank being provided with a heat reflecting shield, a support for the tank, and means for moving the tank upon the support to move the shielded surface of the tank toward or away from the source of heat.

3. A humidifier for use adjacent a source of heat which comprises, a vertically extending cylindrical tank, a pivotal support for the tank, means for rotating the tank on the pivotal support, an exterior portion of the tank being provided with a heat absorbing surface, and a second portion of the tank surface being protected against heat absorption.

4. A humidifier for use adjacent a source of heat which comprises, a vertically extending cylindrical tank, an eccentrically located pivotal support for the tank, and means for rotating the tank about the support to vary its distance from the source of heat.

5. A humidifier for use adjacent a source of heat which comprises, a vertically extending cylindrical tank, a pivotal support for the tank, means for rotating the tank on the pivotal support, an exterior portion of the tank being provided with a heat absorbing surface, and a second portion of the tank having a heat protective shield spaced from the adjacent tank surface.

6. In a heater construction, a heating chamber, a housing for said chamber located in spaced relation about said chamber, a vertically extending cylindrical water tank located within the housing adjacent the chamber, a pivotal support for said tank, a vertically extending portion of the wall of said tank being treated to increase heat absorption thereby, another vertically extending portion of the wall being protected against heat absorption, and means for rotating the tank.

7. In a heater construction, a heating chamber, a housing for said chamber located in spaced relation about said chamber, a vertically extending cylindrical water tank located within the housing adjacent the chamber, a pivotal support for said tank, a vertically extending portion of the wall of said tank being treated to increase heat absorption thereby, another vertically extending portion of the wall being protected against heat absorption by a second outer wall secured to the tank and spaced therefrom, and means for rotating the tank.

8. A humidifier for use adjacent a source of heat which comprises, a tank for containing water, the tank having wall portions of varying heat absorptive properties, the tank having an opening above the water surface, a source of water supply extending to the tank, a float controlled valve for said water having a float resting on the water surface, a support for the tank, and means for moving the tank upon the support to a limited extent to vary the relationship of the heat absorptive wall relative to the source of heat to vary the heat absorbed by the tank from the source of heat, the float valve having a float so located as to remain in operative position throughout the range of tank movement.

9. A humidifier for use adjacent a source of heat, which comprises a tank for containing water, the tank having an opening above the water surface, a portion of the exterior surface of the tank being provided with heat absorbing means, a second portion of the exterior surface of the tank being provided with a heat reflecting shield, a support for the tank, and means for moving the tank upon the support to move the heat absorbing surface and shielded surface alternately toward or away from the source of heat.

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