

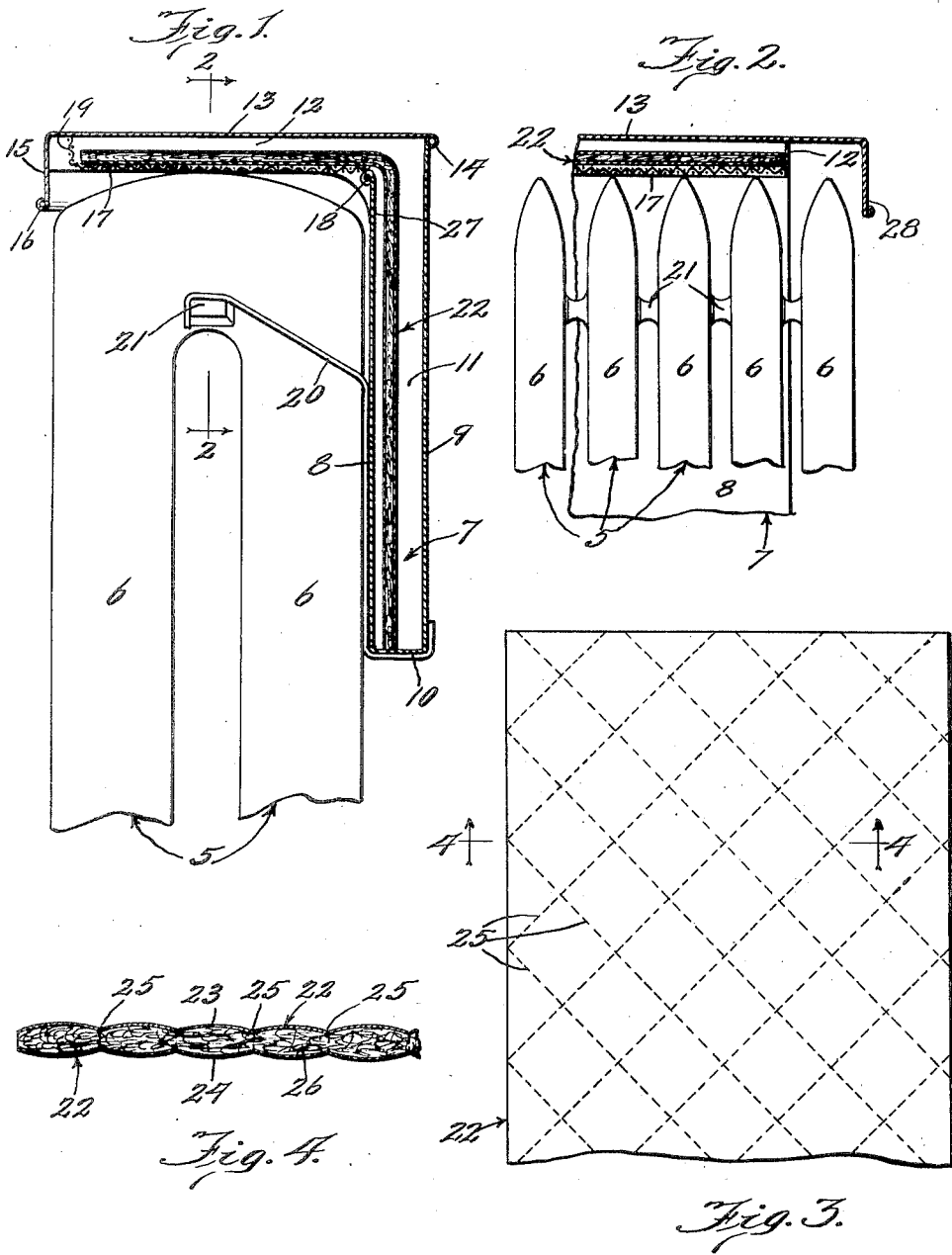
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HUMIDIFIER AND THE LIKE

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HUMIDIFIER AND THE LIKE

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This invention has to do with improvements in humidifiers and the like. The humidifiers to which the present invention particularly relates are especially intended for conditioning the air in rooms; and said humidifiers are especially intended for use in connection with radiators. Furthermore, the humidifiers of the present invention are especially intended for conditioning air as it is delivered from the radiator in the room, and especially for the conditioning of air coming from open top radiators of familiar form and construction.

In devices of this type, use is frequently made of constructions in which there is provided a water bath or pan, into which reaches a wick. In such constructions the wick projects from the water in the pan and the projecting portion of the wick is subjected to the influence of the air in the room and especially the current of air rising from the radiator. In devices of this kind, it is the intention that the wick serves to carry the water from the pan upwards by capillary attraction to a point where the water can be evaporated from the projecting portion of the wick.

The efficiency or air conditioning ability of such devices has in the past been considerably hampered and restricted by reason of the fact that the water raising capacity of the wick has not been properly proportioned or related to the water evaporating capacity thereof. It has almost invariably happened that the ability to evaporate the water from the projecting portion of the wick has been much greater than the ability of the wick to raise the water from the pan by capillary attraction. Consequently, the water is fully evaporated and removed from the projecting portion of the wick within a relatively small distance of the point where said projecting portion receives the water raised from the bath, and the remainder of the projecting portion of the wick has been totally ineffective and useless as far as any humidifying and air conditioning ability is concerned.

One reason for the above difficulty has been that the air coming up through the radiator or other heating agent is necessarily very dry and has a very large evaporating capac-

ity. In addition to the above, said air is very hot so that it is doubly capable of removing the moisture from the wick. The result is that in humidifier constructions in which the wick extends upwardly from the bath and then projects over the air current rising from the radiator, the moisture is removed from the wick during the first fractional portion of the length of wick which is subject to the hot air current. In many cases the moisture is entirely removed during the first one-third or one-half of the projecting portion of the wick. All wick projection beyond such point is totally ineffective and does not actually receive any moisture and is therefore unable to transfer moisture to the air current.

The main object of the present invention is to provide a wick for devices of this kind in which the capillary moisture raising ability is properly related to the evaporative ability and capacity of the projecting portion of the wick so that these two factors are properly balanced with respect to each other. The result is that the entire projecting portion of the wick is made usefully effective and will be found to be damp and therefore beneficial for humidifying purposes even when the maximum heating and moisture removing capacity of the humidifier is being exerted. This balance of conditions is established by providing a sufficient capillary capacity throughout the moisture conducting or transferring portions of the wick, in comparison to the evaporative capacity of that portion of the wick which is subjected to the drying influence of the air current.

More specifically, the invention relates to the provision of a wick for this purpose in which the capillary attraction conductive capacity is established by a sufficient thickness of fibrous material having a proper degree of capillary conductive ability so that the total thickness thereof is able to raise and transfer the necessary amount of water for subsequent evaporation to meet the entire demands of the portion of the wick which is exposed to the drying influence of the air current. This result is accomplished by the fact that the thickness of this wick having the capillary conducting ability is properly

related to the exposed area surface thereof to accomplish the desired end.

Still more specifically, the invention consists in the use of a wick for this purpose which wick is composed of cotton batting or the like retained between the two protecting surfaces of muslin or the like, the entire thickness being stitched together by criss-cross lines of stitching after the fashion of what is known as "quilting", the lines of stitching serving to retain the component parts firmly and properly together without, however, crushing the cotton batting sufficiently to seriously interfere with its capillary conductive ability.

Still more specifically, the invention relates to a wick of the foregoing type in which the normal thickness of the cotton batting is approximately one-fourth inch except where the lines of stitching occur, at which points only the thickness is momentarily decreased to approximately one-eighth inch. This material, I find has the necessary capillary conductive capacity, combined with the necessary evaporative area to give the desired balance of conditions.

Another feature of the invention relates to the provision of an improved construction of device which is provided with a hinged cover, together with a hinged support for a projecting portion of the wick, both of said parts being so arranged that the device can be readily folded up into a substantially flat package for merchandising purposes; and at the same time the hinged form of the cover makes it possible to raise the same for ready access to the projecting portion of the wick.

In connection with the foregoing, a further feature relates to the provision of an improved mechanical construction embodying the features and which construction is such as to give a large degree of mechanical stiffness and strength combined with lightness and cheapness of manufacture.

A further feature relates to the provision of a construction which can be readily attached to the radiators without the need of using special tools for that purpose, and which when so attached is of sufficient strength and security to meet the needs of such a device.

Other objects and uses of the invention will appear from a detailed description of the same, which consists in the features of construction and combinations of parts hereinafter described and claimed.

In the drawings:

Figure 1 shows a cross sectional view through a device embodying the features of the present invention, the cover and other parts being in their working position, the device being mounted upon a radiator of familiar form;

Figure 2 shows a fragmentary section on

the line 2—2 of Figure 1, looking in the direction of the arrows;

Figure 3 shows a face view of a section of wick embodying the features of the present invention; and

Figure 4 shows a fragmentary section on the line 4—4 of Figure 3, looking in the direction of the arrows.

In the drawings the radiator is designated in its entirety by the numeral 5. It includes the coils 6 of familiar form.

The humidifier illustrated includes a water pan or tank 7 composed of front and rear walls 8 and 9, bottom 10, and end walls 11. The front and rear walls and the bottom are conveniently made from a single sheet of metal folded into the proper form. Each of the end walls 11 preferably has its upper portion 12 carried forwardly in the form of a bracket which may overlie the upper portion of the radiator and constitute a support for the cover as well as establishing a finish for the end of the structure.

The cover 13 has its rear edge hinged to the upper edge of the rear wall 9 by a hinge pin 14. This pin may be readily withdrawn so as to disconnect the cover if desired, in order to permit the parts to be nested for shipment, but in normal operation the pin will effectively remain in place and perform its hinging function.

The front edge 15 of the cover is turned down to provide a front flange, and the lower edge 16 thereof is beaded or rolled around a reinforcing wire so as to stiffen the same.

A wire mesh screen 17 of relatively coarse weave and fairly stiff wires has its rear edge 18 hinged to the upper edge of the front wall 8. This screen normally rests on the tops of the radiator coils by means of which it is supported. The front edge 19 of the screen is turned up to a proper height to be contacted by the cover 13 when the same is lowered, and thereby act as a supplemental support for the cover.

The body portion of the device is preferably provided with one or more wires 20 by means of which it may be connected to and suspended from the radiator. Each of these wires extends down along the face of the front wall 8 and is hooked under the bottom 10 as indicated in Figure 1. The upper ends of the wires may be twisted or hooked over the lugs 21 which extend between the radiator coils in the well understood manner.

With the device in the above position on the radiator, the weight of the pan is largely supported by the wire or wires 20. For this purpose said wires are connected to the front wall 8 at such a point that said wires slant down on a proper angle to insure the desired amount of supporting action. Under these circumstances, the screen 17 will merely rest on the tops of the radiator coils and will not

be called upon to perform any sustaining function for the pan itself.

The wick is designated in its entirety by the numeral 22. As already explained, it is composed essentially of cotton batting faced with the muslin facings 23 and 24, and quilted by the criss-cross lines of stitching 25. This material is of sufficient thickness so that the cotton 26 thereof is amply capable of carrying up the entire necessary body of water by capillary attraction, which body of water is then carried over into the portion of the wick above the water line 27 in the pan.

The wick extends up through the pan and then overlies the horizontal screen 17, and extends forward substantially to the upturned forward portion 19 of the screen. The entire horizontal portion of the wick is therefore subjected to the evaporative and drying influences of the current of hot air arising between and around the radiator coils. The entire area projecting portion of the wick which is subject to the drying influences of the air current is maintained damp by the body of moisture arising through the body portion of the wick since as already explained, the thickness is sufficient to give a very large body of capillary capacity. Therefore, experience has demonstrated that the horizontal portion of the wick will remain moist and effective clear over to the front edge portion of the screen 17.

It will be observed that in the particular construction illustrated, the cover 13 is unperforated. Experience has shown that the air arising against the horizontal portion of the wick will be deflected forwards by the wick itself and will find its way into the room beneath the flange 15, carrying with it the evaporated moisture from the wick. The perforating of the cover 13 is therefore unnecessary, although in some cases it may be perforated.

It will also be noticed that the cover 13 is effectively supported not only along its rear edge, but also by both of the forwardly extending bracket arms 12 at the two ends of the device; and by reenforcing the front edge of the cover 13 by the downwardly extending flange 15, additional stiffness and support is provided at that point.

In the particular construction shown, the cover 13 is of greater length than the length of the pan 7, so that the cover projects beyond the brackets 12. In some cases the cover will be shortened to equal the length of the pan 7.

Ordinarily the portion of wick exposed to the drying influence of the current of air has a length of substantially 6—7 inches; that is to say, the amount of wick projecting beyond the water bath and exposed to the drying influence of the current of air is substantially 6—7 inches in the case of a humidifier for an ordinary radiator. Experience demonstrates

that the capillary conductive capacity of a wick one-fourth inches thick, made of material herein disclosed, is capable of transferring sufficient moisture from the water bath to keep this amount of wick thoroughly moist or wet across the entire body of the current of air being humidified in the case of an ordinary radiator. It is thus evident that the ratio of thickness to length measured in this manner is substantially one to twenty-eight.

If desired each end of the cover 13 may be provided with a downwardly extending flange 28. These end flanges will serve to give the cover additional stiffness and also to provide a more sightly and attractive appearance at the ends of the cover. This will be particularly desirable in those cases in which the cover is of greater length than the water pan or tank 7 as shown in Figure 2.

It will also be noted that the hinging of the cover along its rear edge 14 makes it possible to raise the same conveniently for the purpose of filling the pan or tank 7 as well as for giving access to the wick and other parts.

While I have herein shown and described only a single embodiment of the features of my present invention, still I do not intend to limit myself to the same except as I may do so in the claims.

I claim:

1. In a humidifier of the class described, the combination of a water bath, a horizontally extending screen located at one side of and adjacent to the upper end of said water bath, said screen extending across the path of a current of warm air to be humidified, and a wick having one end located in the water bath and said wick projecting from the water bath and extending across said screen and being subject to the influences of the current of air aforesaid, said wick comprising cotton batting faced on both sides with muslin and joined together by criss-cross lines of stitching extending through the facings aforesaid and through the body of the cotton batting, said wick having a thickness of substantially one-fourth inch, whereby the capillary conductive capacity of the wick for transfer of water from the bath to the wick portion subject to the influence of the current of air is substantially equal to or greater than the evaporative capacity of the wick surface exposed to said current of air, substantially as described.

2. In a humidifier of the class described, the combination of a water bath open at its upper end, a horizontally extending foraminous wick support adjacent to said upper end and located in the path of a current of warm air to be humidified, and a wick having one end located in the water bath and the other end located on and supported by the wick support, said wick comprising a sheet of cotton batting suitably protected and faced on its outer surfaces and having a thickness of

substantially one-fourth inch, whereby said wick has a capillary conductive capacity for transfer of water from the water bath substantially equal to or greater than the surface evaporative capacity of the wick subject to the influence of said current of air, substantially as described.

3. In a humidifier of the class described, the combination of a water bath open at its upper end, a wick support adjacent to said upper end, and a wick extending into the water bath and projecting therefrom and supported by said wick support, said wick comprising cotton batting suitably protected on its faces, and having a thickness of substantially at least one twenty-eighth of the length of wick exposed to the drying influence at the position of the wick support, whereby said wick has a capillary conductive capacity for water substantially at least as great as the evaporative capacity exposed to the drying influence of an air current at the position of the wick support, substantially as described.

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