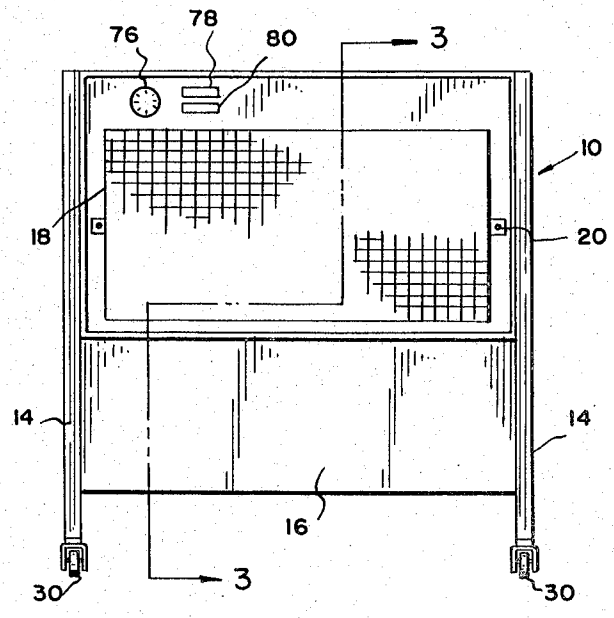
March 7, 1967 J. PERLMAN 3,307,835

PORTABLE HUMIDIFIER

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FIG. 1



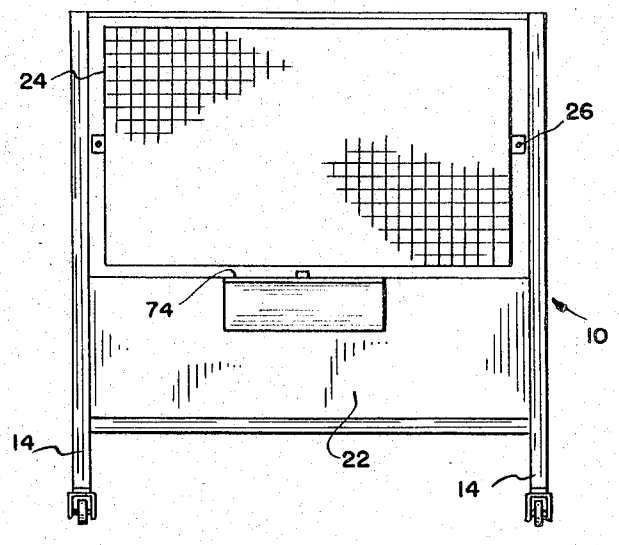


FIG. 2

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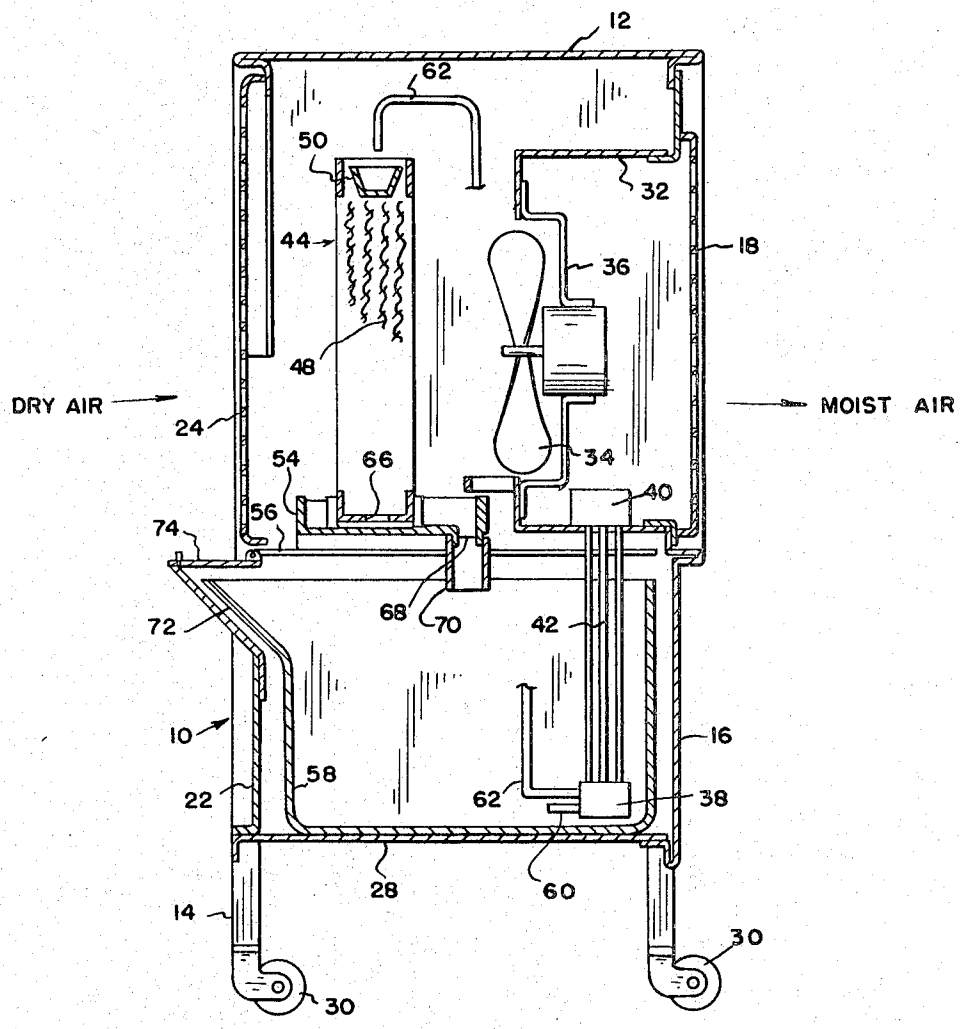
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PORTABLE HUMIDIFIER

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FIG. 3



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FIG. 4

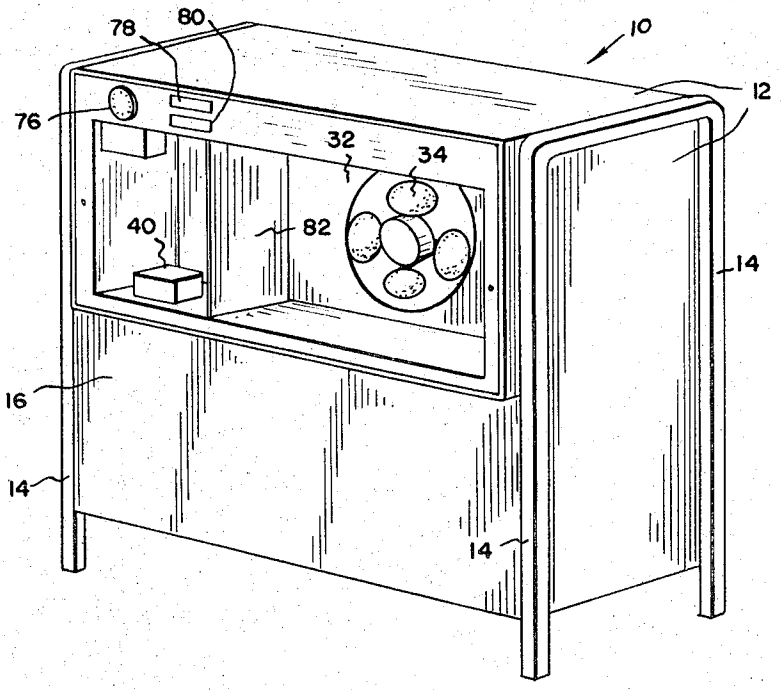
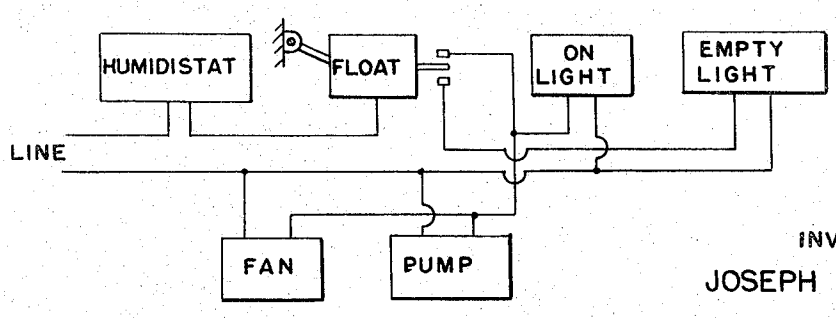


FIG. 5



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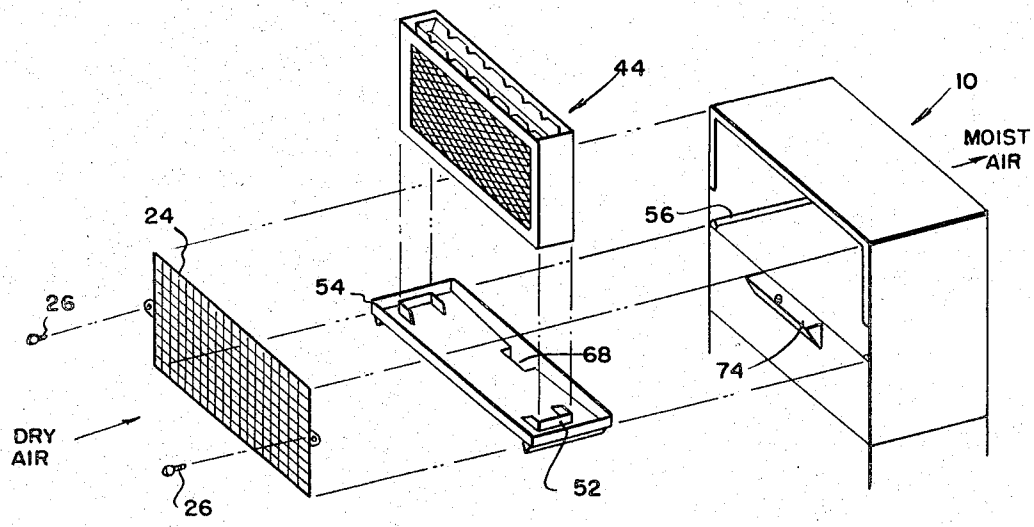
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March 7, 1967 J. PERLMAN 3,307,835

PORTABLE HUMIDIFIER

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FIG. 6



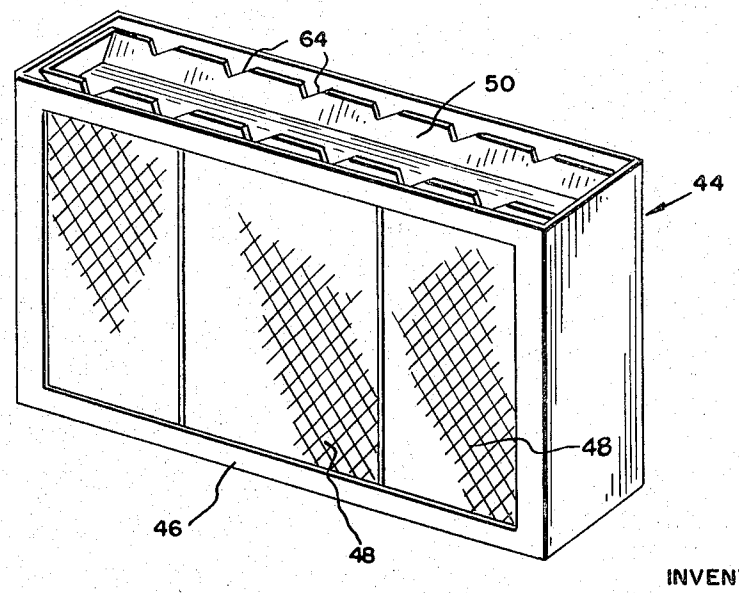


FIG. 7

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3,307,835

PORTABLE HUMIDIFIER

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Filed Aug. 2, 1965, Ser. No. 476,257
4 Claims. (Cl. 261—27)

This invention relates generally to humidifiers, and more particularly to cabinet type portable type humidifiers.

Basically, a humidifier comprises an evaporator element capable of absorbing or retaining water while simultaneously being porous to the flow of air, means for supplying a quantity of water to the water absorbing element, and a fan for establishing a flow of air through the water absorbing element.

The water which is supplied to the water absorbing evaporator element ordinarily contains minerals and other types of impurities. Over a period of extended use of the humidifier, the evaporation of water from the evaporator element leaves behind deposits on the element. The element gradually becomes clogged with such impurities and loses its porosity to the flow of air. Hence, it becomes necessary to periodically replace the evaporator element. A humidifier unit which permits convenient servicing of the evaporator element is therefore desirable.

An effective humidifier must also provide for the efficient transfer of moisture from the evaporator element to the air to be humidified. To achieve such operation, it is necessary that the supply of water be uniformly distributed over the surface of the evaporator element.

Accordingly, it is an object of this invention to provide a portable humidifier having a construction which facilitates rapid and easy access to the various components which require periodic servicing.

It is a further object of this invention to provide a humidifier wherein the supply of water is efficiently and uniformly distributed over the entire surface of the evaporator element.

Other objects, advantages and novel features of this invention will become apparent from the following detailed description of the invention when considered in accordance with the drawings, wherein:

FIG. 1 is a front elevation of the portable humidifier of this invention.

FIG. 2 is a rear elevation of the humidifier shown in FIG. 1.

FIG. 3 is a cross-sectional elevation taken along line 3—3 of FIG. 1.

FIG. 4 is a perspective view of the front of the humidifier of this invention, with the front grille panel removed.

FIG. 5 is a schematic diagram of the control circuit for the humidifier of this invention.

FIG. 6 is an exploded perspective view of the rear portion of the humidifier of this invention, showing the rear grille panel, drip tray, and evaporator element removed from the humidifier cabinet, and

FIG. 7 is a perspective view of the evaporator element of this invention.

Referring now to FIGS. 1 to 4 of the drawings, the portable humidifier **10** of this invention is housed within a sheet metal cabinet. A one-piece top and side panel **12** is fastened by sheet metal screws (not illustrated) to a pair of U-shaped legs **14**. The lower front portion of the cabinet is enclosed by a front panel **16**, while the upper front portion of the cabinet has an open grille **18** which is detachably mounted by means of screws **20** to the front of the cabinet.

The lower rear portion of the humidifier is enclosed by rear panel **22**, while the upper rear portion is covered by

means of an open grille **24** which is detachably mounted to the cabinet by means of screws **26**. Bottom panel **28** completes the enclosure of the humidifier.

To facilitate movement of the humidifier within or between the rooms of a building, a set of casters **30** is mounted on the lower end of legs **14**.

A mounting plate **32** extends transversely across the upper portion of the humidifier cabinet, and serves as a mounting surface for fan **34** and the pump-motor unit **38**, **40**. The fan is secured to plate **32** by means of brackets **36**. Pump **38** in the lower portion of the humidifier cabinet is driven by means of pump motor **40** through drive shaft **42**. Mounting plate **32** also serves as a partition between the upper front portion of the cabinet, containing the electrical components, and the remainder of the humidifier unit.

Referring now to FIGS. 3, 6 and 7, the evaporator pad assembly **44** comprises a sheet metal frame **46** which supports the evaporator element **48**. The evaporator element may be any well known type of water retaining or absorbing material which is made porous to the flow of air. Such a material might be a plurality of thin expanded metal sheets. A U-shaped distribution trough **50** runs the length of the upper portion of the evaporator pad assembly **44** and is fixed at its respective end to the pad frame **46**. The entire pad assembly **44** is supported by mounting brackets **52** which form a part of the drip tray **54**. Drip tray **54** is slidably supported upon flanges **56** which are secured to the inner face of the side panel **12** of the humidifier cabinet.

Water to be used for humidifying the air processed by the humidifier is stored in tank **58** in the lower portion of the cabinet. This water is supplied to the air in the following manner. Water is transmitted from pump intake **60** through pump **38** and water line **62** (shown only in part) to the top of evaporator pad assembly **44**. The water collects in the U-shaped distribution channel or trough **50**, and when the level of water in trough **50** reaches the lower portion of notches **64** cut in the side walls of trough **50**, the water will overflow at each of these notches and trickle downward through the evaporator element **48**. When the water reaches the lower portion of the evaporator pad assembly **44**, it passes through holes **66** in the bottom portion of evaporator pad frame **46** into the drip tray **54**. The bottom of tray **54** slopes toward a drain hole **68**, so that the water will flow out of tray **54** down the walls of tube **70** and thereby return to water tank **58**.

The novel construction of the evaporator pad assembly has several advantages. In addition to providing uniform water distribution, the unitary trough and frame reduces the overall height of the assembly, or alternatively permits greater evaporative area for a given height.

To refill the water tank **58** when the water level becomes low, tank **58** is supplied with a filler neck **72** which extends through the rear panel **22** of the cabinet. Access may be had to this filler neck by lifting the filler door **74** on the back portion of the cabinet. This convenient filler door eliminates the need for disassembly of the cabinet when refilling the tank.

The controls for the humidifier are illustrated in FIGS. 4 and 5. The primary control switch **76** is located on the upper front portion of the cabinet. In addition to providing an on-off control for the humidifier, this switch permits pre-selection of a desired relative humidity. The operation of this switch will be explained further below.

Also located on the upper front portion of the cabinet is an "on" light, indicating when the humidifier is operating, and an "empty" light, which indicates when the humidifier has shut itself off due to a low water level condition.

In operation, let it be assumed that it is desired to raise the level of the ambient relative humidity. Control switch 76 is turned on. If there is sufficient water in tank 58 to supply the pump 38, the float switch, illustrated in FIG. 5, will close the circuit so that electric current is supplied to the "on" light, the pump and the fan.

If a humidity level of 60% is desired, for example, control switch 76 is turned to that setting. The humidifier will then continue to operate until the humidistat, which forms a part of primary control switch 76, senses that the room air has reached this pre-selected level of humidity. When this selected humidity level has been attained, the humidistat switch opens the circuit, thus shutting off the "on" light, the pump and the fan. Should the level of relative humidity within the room decrease during the time that the humidifier is thus shut off, the humidistat will sense this condition and turn the unit on once again. When the supply of water within the tank reaches such a level that there is no longer an adequate supply for pump 38, the float switch will open the circuit to the "on" light, the pump, and the fan, and will close the circuit to the "empty" light. In this way, the machine is safely turned off, and the low water condition is indicated on the front of the cabinet.

As water is transferred from the evaporator element 48 to the air flowing therethrough, various impurities and minerals are deposited upon the suface of the evaporator material. As these deposits accumulate, the porosity of the evaporator element to the flow of air is reduced, until finally the capacity of air which can be processed by the humidifier is substantially reduced. When this point is reached, it is desirable to replace the pad assembly 44.

Servicing of the pad assembly is greatly facilitated by the novel construction of the portable humidifier of this invention. To remove the evaporator assembly, the rear grille panel 24 is unscrewed from the back of the cabinet, and the drip tray 54 is slidably removed through this open upper rear portion of the cabinet. Once the tray is out of the cabinet, the pad assembly 44 may be readily lifted upwardly out of the pad supporting brackets 52 and may be then replaced by a new evaporator unit.

Also for the purpose of facilitating service of the humidifier is the mounting arrangement of the various components. The fan and pump and electrical controls are all readily accessible on the front face of mounting plate 32, by merely removing the front grille panel 18.

To prevent the electrical units and controls from becoming subject to the highly humidified air processed by the humidifier, a barrier plate 82 is utilized to isolate the left hand control section from the right hand fan section. Barrier plate 82 and mounting plate 32 thus combine to provide a maximum degree of insulation while permitting accessibility for servicing.

Thus the novel humidifier illustrated and described herein promotes efficient transfer of water from the evaporator element to the air, while also permitting convenient and rapid servicing of the various components.

This invention may be further developed within the scope of the following claims. Accordingly, it is desired that the above description be read as merely illustrative of a single embodiment of the invention, and not in a strictly limited sense.

I now claim:

1. A portable cabinet type humidifier comprising:
a cabinet fully enclosing the humidifier except for the upper front and upper rear portions thereof;
front and rear grilles removably mounted in the open front and rear portions, respectively, of said cabinet;
a water tank in the lower portion of said cabinet;
a horizontally disposed drip tray supported by said cabinet directly above said tank;
an evaporator element vertically disposed across the upper rear portion of said cabinet and having its lower edge resting in and supported by said drip tray;
mounting plate means secured to said cabinet, said mounting plate means forming a partition between the upper front portion of said cabinet and the remainder of said cabinet;
a fan secured to the front face of said mounting plate means, said front and rear grilles and said evaporator element and said fan being horizontally and transversely aligned within said cabinet;
a water pump secured to the front face of said mounting plate means;
fan and water pump controls secured to the front face of said mounting plate means;
conduit means establishing a water flow path from said pump to said evaporator element;
water distributing means unitary with said evaporator element for distributing water from said conduit means uniformly over the upper length of said evaporator element;
and means providing access to said water tank from the exterior of said cabinet, whereby said tank may be filled with water without the necessity of disassembling any portion of said cabinet.

2. The humidifier of claim 1 wherein said pump means comprises a pump device in the lower portion of said water tank, and a pump motor in the upper portion of said cabinet.

3. The humidifier of claim 2 wherein said cabinet includes means for shielding said pump motor and said controls from said water tank and from the flow of humidified air processed by said humidifier.

4. A cabinet type portable type humidifier comprising:
a cabinet fully enclosing the humidifier except for the upper front and upper rear portions thereof;
front and rear grilles removably mounted in the open front and rear portions, respectively, of said cabinet;
a water tank in the lower portion of said cabinet;
guide means removably supporting a horizontally disposed drip tray for rearward sliding movement in said cabinet directly above said tank;
an evaporator element separate and independent of the tray and vertically disposed across the upper rear portion of said cabinet and having its lower edge resting in and removably supported on and by said removable drip tray;
said evaporator element and said drip tray being readily removable for servicing of both of them by first removing said rear grille, then sliding said drip tray and said evaporator element then mounted thereon out through the open upper rear portion of said cabinet, and finally removing the element from the tray to separate and expose both of them for servicing; with the element and tray being returnable as a unit to their place in the cabinet above the tank after being serviced, with the tray carrying the element during removal and return of both of them.

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