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**STABILIZING EVAPORATOR PLATE HOLDER**  
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 5 Claims. (Cl. 261—104)

This invention relates to humidifiers and, in particular, to holders for evaporator plates or sheets in such humidifiers.

Hitherto, humidifier plates or sheets of porous material have been mounted in humidifier pans inserted in furnaces or in furnace ducts. Such plates or sheets have been held in inverted V-shaped slotted racks resting in the pan, or suspended from overhead by resting upon the opposite edges of the pan. Such racks have usually been made of aluminum and the pans of soft steel enameled, but since aluminum is higher in the electromotive force series, electrolytic action in which the rack acts as the anode causes small holes to corrode through the pan at the point where the rack contacts the pan. On the other hand, when T-shaped porcelain evaporator plates have been suspended from overhead on the opposite edges of the pan, such plates, being brittle, require some form of protection at their lower edges where the plates have contact with the edge of the pan. Such protection is also needed to prevent a drip-creating contact at the point of suspension, which would otherwise cause water to run over the edge of the pan by capillarity. When the plates have been formed of fabric sheets reinforced by screen or thin aluminum sheet metal as a stiffener, they tend to tilt forward or backward around their contact points with the opposite edges of the pan, and corrosion attacks such a stiffener and causes the sheet to collapse inwardly. Asbestos evaporator sheets or heavy fiber glass fabric sheets also suffer from this tendency to collapse by drooping or crumpling downward within the pan, and these also cause a drip-creating contact at the edges of the pan.

The present invention solves these problems and overcomes these disadvantages by providing a stabilizing evaporator plate holder having laterally-spaced inwardly and downwardly-inclined drain channel end portions which hold the evaporator plates or sheets in a constantly upright position so as to prevent edge drip at the points of contact with the opposite edges of the pan and having a central bridge portion interconnecting the end portions to prevent relative motion therebetween and thus strengthen the evaporator plate or sheet from collapsing, drooping or warping by providing a plate holder structure which is substantially rigid in a vertical direction and which reinforces the plates for strength in a horizontal direction and at the same time prevents chipping of the plates at their lower edges where they otherwise would be in contact with the pan edges and would consequently result in dripping over the edges.

Other objects and advantages of the invention will become apparent during the course of the following description of the accompanying drawing, wherein:

FIGURE 1 is a fragmentary perspective view, partly in vertical section, showing three of the stabilizing evaporator plate holders of the present invention carrying evaporator plates and mounted in a humidifier pan;

FIGURE 2 is an enlarged front elevation of a humidifier plate or sheet mounted in a stabilizing holder, as shown in FIGURE 1;

FIGURE 3 is a top plan view of the stabilizing evaporator plate holder of FIGURE 2 with the evaporator plate removed;

FIGURE 4 is an inclined almost vertical cross-section taken along the line 4—4 in FIGURE 2; and

FIGURE 5 is an inclined almost vertical cross-section taken along the line 5—5 in FIGURE 2.

Referring to the drawing in detail, FIGURE 1 shows three stabilizing evaporator plate holders, generally designated 10, according to one form of the invention as holding evaporator plates 12 of porous capillary material in notches 14 in the upper edges 16 of the opposite side walls 18 of an evaporator pan 20. The evaporator pan 20 has opposite end walls 22, only one of which is shown, and contains water W regulated to be maintained at a constant level L by suitable conventional means, such as a float valve (not shown). Such float valves are well known to those skilled in the humidifier art and their details are beyond the scope of the present invention.

The evaporator plates 12 are shown as consisting of approximately T-shaped plates or sheets of porous capillary material, such as kiln-fired porcelain, asbestos sheets, fiber glass sheets or other porous capillary material in sheet or plate form. Such sheets and plates are likewise well known to those skilled in the humidifier art and it will be understood that the term "plate" as herein used also includes reinforced sheets of fiber glass or other suitable material. Each plate 12 is provided with a generally horizontal upper portion 24 wider than the width of the evaporator pan 20 between its opposite walls 18 and having a narrower vertical portion 26 depending from the center of the horizontal portion 24. The opposite lower edges 28 of the evaporator plate horizontal portion 24 are inclined downwardly toward their junctions 30 with the vertical portion 26, the latter extending downwardly into the water W.

The stabilizing evaporator plate holder 10 (FIGURES 2, 3 and 4) is preferably of copper or other corrosion-resisting material, and is of truncated shallow V-shaped form in front elevation (FIGURE 2). It has laterally-spaced downwardly-inclined opposite channel end portions 32 and 33 interconnected by a horizontal bottomless bridge portion 34. The channel portion 32 (FIGURE 4) has a slightly rounded bottom wall 37 and upwardly-converging opposite side walls 35 with outwardly-bent upper edge portions 37 bent toward one another by means of pliers, so as to clamp one end of the evaporator plate or sheet 12 between them. The channel portion 33 has parallel vertical side walls 36 (FIGURE 5) interconnected by a wider flat bottom wall 38 which preferably rests in the flat-bottomed plate-spacing notches 14 in the upper edges 16 of the humidifier pan side walls 18 or directly upon unnotched upper edges thereof, thereby preventing tilting. The bottom walls 37 and 38 of the channel portions 32 and 33 are inclined downwardly and inwardly at slightly less angles than the bottom edges 28 of the plates 12, so as to make contact therewith adjacent the downwardly-bent inner ends 40 (FIGURE 2) at the rounded corners between the horizontal and vertical portions 24 and 26 of the evaporator plate or sheet 12. The parallel opposite side walls 44 of the bridge portion 34 are closer to one another than the channel portion side walls 35 and 36 so as to hold the evaporator plate between them (FIGURES 1 and 3) and between them is an elongated approximately rectangular opening 42 receiving the vertical portion 26 of the plate or sheet 12.

In the operation of the invention, the vertical portions 26 of the evaporator plates or sheets 12 are inserted through the openings 42 in the bridge portions 34 and the channel portions 32 and 33 thereof lowered into the notches 14 in the opposite side walls 18 of the humidifier pan 20.

Since the bridge portion 34 of the holder 10 lies below the level of a line interconnecting the flat bottom edges of the notches 14 in the evaporator pan side walls 18, an underslung effect is provided which lowers the centers of gravity of the evaporator plates 12 relatively to the evaporator plate holders 10. This condition, assisted by the

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flat bottom wall 38 of the channel portion 33 resting upon the flat bottom edges of the notches 14 maintains the evaporator plates 12 in vertical planes. The water W is drawn upward through the vertical portions 26 by capillarity into the horizontal portion 24 which are exposed to the flow of heated air, so that the air becomes effectively humidified by drawing off the moisture from the upper portions 24 of the plates 12. As rapidly as this moisture is drawn off, it is replenished by other water passing upward from the pan 20 into the horizontal portion 24 by capillarity.

Dripping over the upper edges 16 of the pan side walls 18 is effectively prevented since the lower edges 28 of the horizontal portions 24 of the plates 12 rest in the downwardly and inwardly-inclined channel portions 32, so that any water falling into the channel portions 32 and 33 flows downward toward and over the downwardly-bent inner ends 40 of the bottom walls 38. Corrosion is prevented because there are no racks resting upon the bottom of the pan. The channel portions 32 and 33 and bridge portions 34 also serve as longitudinal stiffeners and reinforcing elements for the evaporator plates or sheets 12 so as to maintain them without drooping, a matter especially important when these are made of fabric.

What I claim is:

1. A stabilizing holder for approximately T-shaped evaporator plates or sheets, comprising  
 a pair of laterally-spaced plate rest end portions of approximately channel cross-section inclined downwardly toward one another,  
 and a central bridge portion interconnecting the inner ends of said end portions,

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said bridge portion having an elongated central opening therein for the passage of the vertical portion of the evaporator plate or sheet.

2. A stabilizing evaporator plate holder, according to claim 1, wherein said end portions have laterally-spaced side walls and said central bridge portion has laterally-spaced side walls disposed closer to one another than the side walls of said end portions.

3. A stabilizing evaporator plate holder, according to claim 1, wherein said central bridge portion is substantially horizontal.

4. A stabilizing evaporator plate holder, according to claim 1, wherein said central bridge portion includes opposite side walls disposed in spaced parallel relationship.

5. A stabilizing evaporator plate holder, according to claim 4, wherein said central bridge portion side walls are disposed in substantially vertical planes and wherein said bridge portion is substantially horizontal.

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