July 17, 1962 L. T. MART 3,044,237

ONE PIECE SPLASH UNIT FOR THE FILL SECTION OF LIQUID COOLING TOWERS

Filed April 28, 1958 2 Sheets-Sheet 1

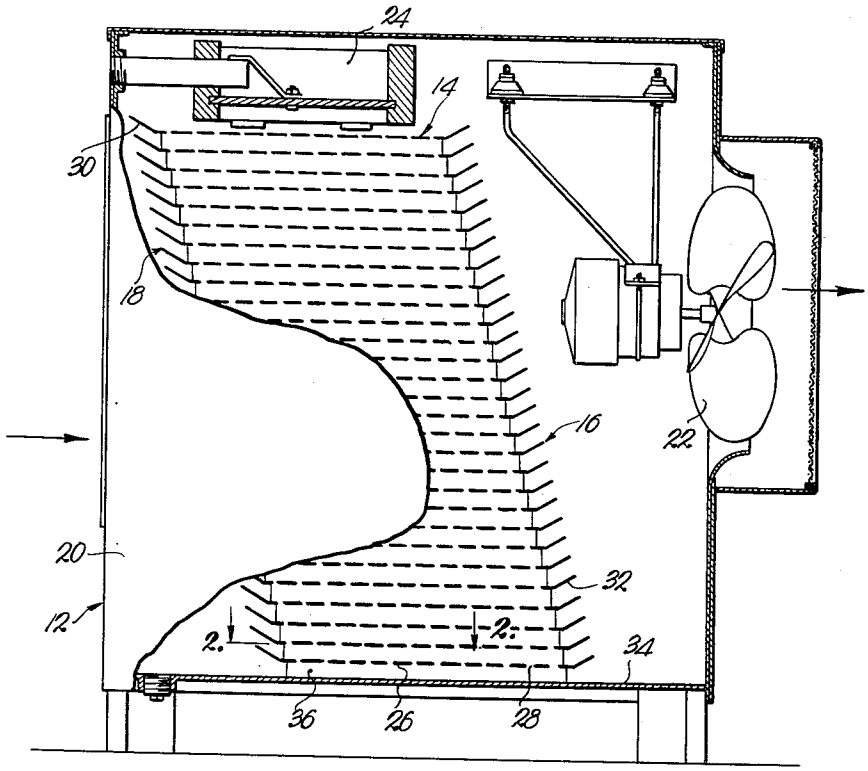

Fig. 1.

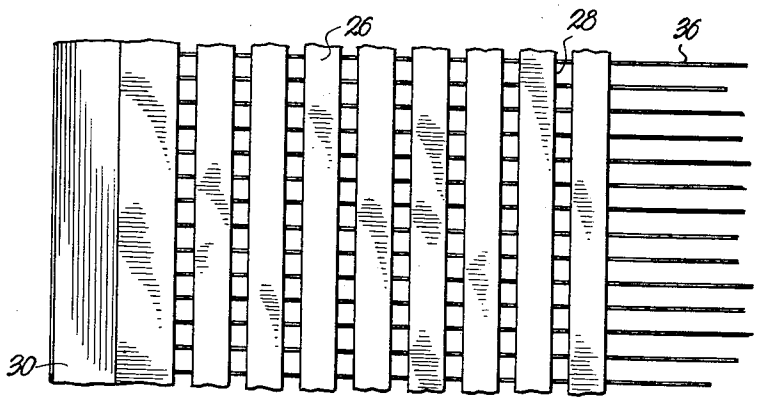

Fig. 2.

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Filed April 28, 1958 2 Sheets-Sheet 2

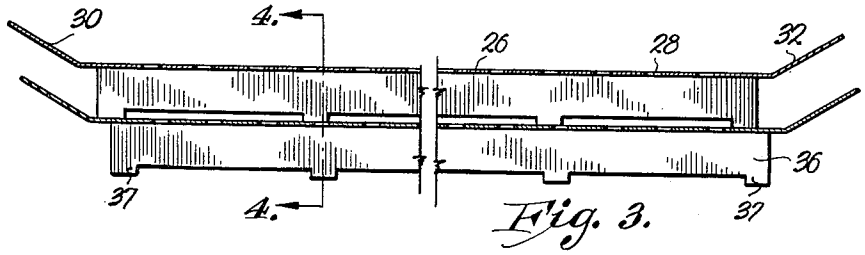

Fig. 3.

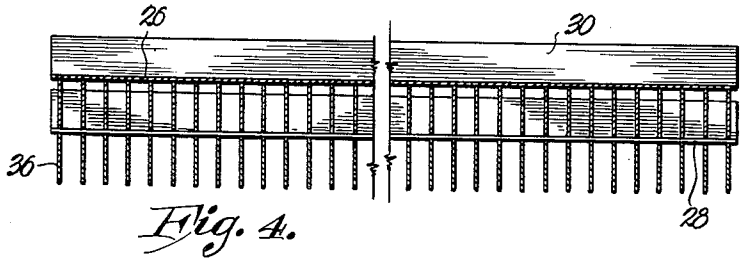

Fig. 4.

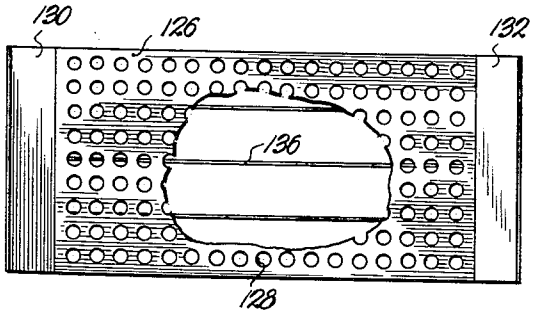

Fig. 5.

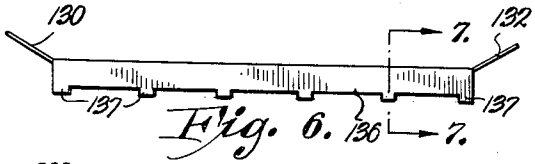

Fig. 6.

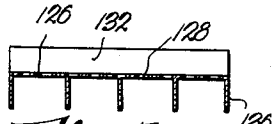

Fig. 7.

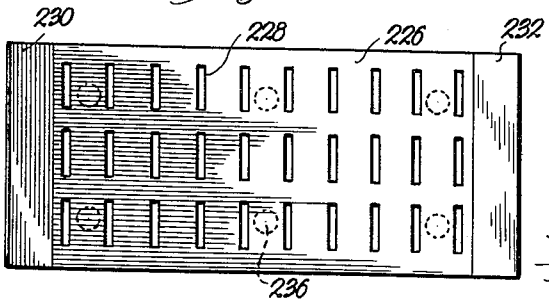

Fig. 8.

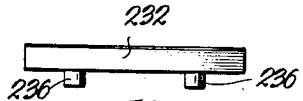

Fig. 10.

Fig. 9.

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3,044,237

ONE PIECE SPLASH UNIT FOR THE FILL SECTION OF LIQUID COOLING TOWERS

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1 Claim. (Cl. 55—257)

This invention relates to improvements in structures for cooling water, and more particularly to improvements in the working area of a water cooling tower wherein air and water are caused to move, such area including not only the fill assembly, but the drift eliminator at the air outlet side of the assembly and the louvered face of the air inlet side of the fill assembly.

It has been the universal practice to fill the working area of a water cooling tower with redwood or treated fir splash bars, supported on notched stringers to provide the necessary wetted area and air space. These "decks" have been rather cumbersome and difficult to assemble since the inlet louvers and the outlet eliminator bars have been nailed to the ends of the stringers requiring the use of many small pieces of lath added to the fill assembly.

It is the most important object of the present invention, therefore, to provide a working area structure that eliminates the hazards and other difficulties incident to wood decay; that reduces the number of separate pieces to be handled during assembly; that decreases the overall weight of the tower itself; that permits easy removal of dirt and scale which collects in the fill area; and that is generally less expensive than conventional assemblies.

Another important object of the present invention is to provide a working area for water cooling towers wherein the fill assembly, the inlet louvers and the drift eliminators are combined in a single unit through use of a flat panel and a pair of opposed blades integral with the panels at the ends thereof and transversely inclined whereby to form the drift eliminator, as well as the louvered air inlet face of the fill assembly when the panels are disposed in stacked relationship within the tower casing.

Another important object of the present invention is to render the panels and, therefore, the blades at the ends thereof, self-supporting through the medium of spacers integral with the lower faces of the panels and functioning not only to maintain such panels in parallelism, but to support the same by resting upon the upper face of the proximal panel therebelow.

Still another important object of the present invention is to provide spacer supports integral with the lowermost faces of the panels formed to also present vertical film surfaces so as to obtain good water distribution over the entire planar area of the tower with the lowest possible resistance to air flow therethrough, and at the same time attaining the greatest possible exposed wetted surface.

In the drawings:

FIG. 1 is a side elevational view of the water cooling tower, parts being broken away and in section to reveal the one piece splash unit for the fill section thereof made pursuant to one form of the present invention.

FIG. 2 is an enlarged, fragmentary, detailed cross-sectional view taken on line 2—2 of FIG. 1.

FIG. 3 is a cross-sectional view showing a pair of fill units of the kind illustrated in FIGS. 1 and 2.

FIG. 4 is a detailed, cross-sectional view taken on line 4—4 of FIG. 3.

FIG. 5 is a plan view of a modified form of splash unit.

FIG. 6 is an edge elevational view of the unit shown in FIG. 5.

FIG. 7 is a cross-sectional view taken on line 7—7 of FIG. 6.

FIG. 8 is a plan view of still another embodiment of the instant invention.

FIG. 9 is an edge elevational view of the form shown in FIG. 8; and

FIG. 10 is an end elevational view of the embodiment of FIGS. 8 and 9.

In the form of my invention shown in FIGS. 1 to 4 inclusive, the working area of tower 12 chosen for illustration, includes a fill assembly broadly designated by the numeral 14, having a drift eliminator 16 at its air outlet side, and a louvered air inlet face 18 in opposed relationship to the drift eliminator 16. Such working area is entirely housed within a casing 20 provided with an air inlet (not shown) for flow of air in the direction indicated by arrows in FIG. 1. Such air flow is induced through use of a fan 22 to cause cooling of the water as the latter gravitates through the fill assembly 14 from a hot water basin 24.

The fill assembly 14 includes a stack of separate, flat, vertically spaced, panels 26 that are in parallel, superimposed relationship. Each panel 26 is provided with water flow passages which, in the form of my invention shown in FIGS. 1 to 4 inclusive, consist of a plurality of continuous, parallel slots 28 throughout the length of panel 26.

Each panel 26 is additionally provided with a pair of elongated, transversely inclined blades 30 and 32 at the ends thereof, which are likewise coextensive in length with the panels 26. Blades 30 and 32 slope outwardly and upwardly and are integral with the panels 26. Thus, when the panels 26 are stacked in the manner shown in FIG. 1 of the drawings, blades 32 present the drift eliminator 16 and the blades 30 form the louvered air inlet face 18 of the assembly 14.

The entire assembly 14 including its drift eliminator 16 and louvers 18, is supported by bottom 34 of the case 20, the latter of which also presents the cold water collection basin of the tower.

Panels 26 are additionally rendered self-supporting and held in spaced, parallel relationship through the medium of a series of elongated spacer bars 36 integral with the lowermost faces thereof and depending therefrom. FIGS. 1, 3 and 4 illustrate clearly the way in which the rectangular bars 36 rest upon the uppermost surfaces of the proximal panels 26 therebelow, thereby not only supporting the panels 26, but holding the latter in proper spaced, parallel relationship. While the panels 26 are all horizontal in FIG. 1, it is manifest that the bars 36 will serve the same purpose even if it is desired to cant the panels 26 in either or both directions out of horizontal.

Bars 36 are preferably disposed in parallel relationship to the path of travel of the air flowing through the fill assembly 14 and, therefore, have their longitudinal axes extending across the water flow passages 28 in perpendicular relationship thereto. Consequently, bars 36 serve the added important function of presenting surfaces along which the water emanating from the panels 26 tends to film, such filming obviously enhancing the cooling effect of the air on the gravitating water. Bars 36 are relieved at their bottom edges to provide feet 37 to allow water to flow over the surfaces of the panels and thereby assure even distribution.

In FIGS. 5 to 7 inclusive, each panel 126 has a pair of blades 130 and 132, as well as a plurality of spacer bars 136 integral therewith, but in lieu of elongated slots forming water flow passages through the panels 126, there is provided a plurality of relatively small holes 128 which may either align with the bars 136, partially align therewith, or be disposed remote therefrom as il-

lustrated in FIGS. 5 and 6. Bars **136** are relieved at their bottom edges to provide feet **137** for the same purpose as above set forth.

In FIGS. 8 to 10 inclusive, there is illustrated a form of the instant invention which includes a flat panel **226** having end blades **230** and **232** integral therewith. Water flow passages through the panel **226** take the form of a series of spaced, elongated slots **228**. The means for supporting the panels **226** in stacked relationship in the manner illustrated by FIG. 1 of the drawings, takes the form of a plurality of feet **236** integral with the lower faces of the panels **226** and resting on panels **226** therebelow when disposed in operative stacked relationship.

It is now clear that all of the objects and advantages of the instant invention as initially set down hereinabove, may be accomplished through use of the three forms of the present invention shown in the drawings, but it is to be understood that the tower **12** shown in FIG. 1, is for illustrative purposes only, and that, therefore, the working area which constitutes the subject matter of the instant invention may be used with similar good results in other types of water cooling structures.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

In a water cooling tower having a fill assembly through which water to be cooled is adapted to gravitate and air is adapted to flow to cool the water, a drift eliminator at the air outlet side of the assembly, and a louvered air inlet face in opposed relationship to said drift eliminator, said fill assembly including a stack of separate, flat, vertically spaced, superimposed, parallel panels having water flow passages therethrough, and each provided with a pair of opposed, parallel end edges and a pair of side edges, each panel having an elongated blade transversely inclined upwardly and outwardly, integral with each and edge, and spanning the distance between said side edges, the blades at one end of the panels being parallel and forming the drift eliminator and the blades at the opposite end of the panels being parallel and forming said louvered air inlet face; and elongated bars, perpendicular to and integral with the lower face of each panel respectively and resting on the upper face of the proximal panel therebelow, thereby serving as supports for the panels, said bars having opposed, vertical surfaces for collecting films of water substantially spanning the distance between said end edges in approximately parallel relationship to said side edges and to the path of travel of air through the assembly, the lower margins of said bars in engagement with the panel next therebelow being relieved to permit water to flow over the entire surfaces of the panels and thereby assuring even distribution of such water.

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