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H. A. SHRYOCK

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INLET STRUCTURE FOR COOLING TOWERS

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2 Sheets-Sheet 1

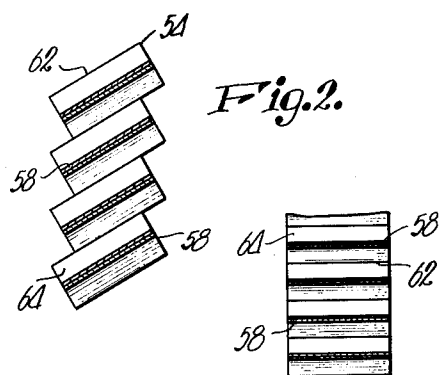
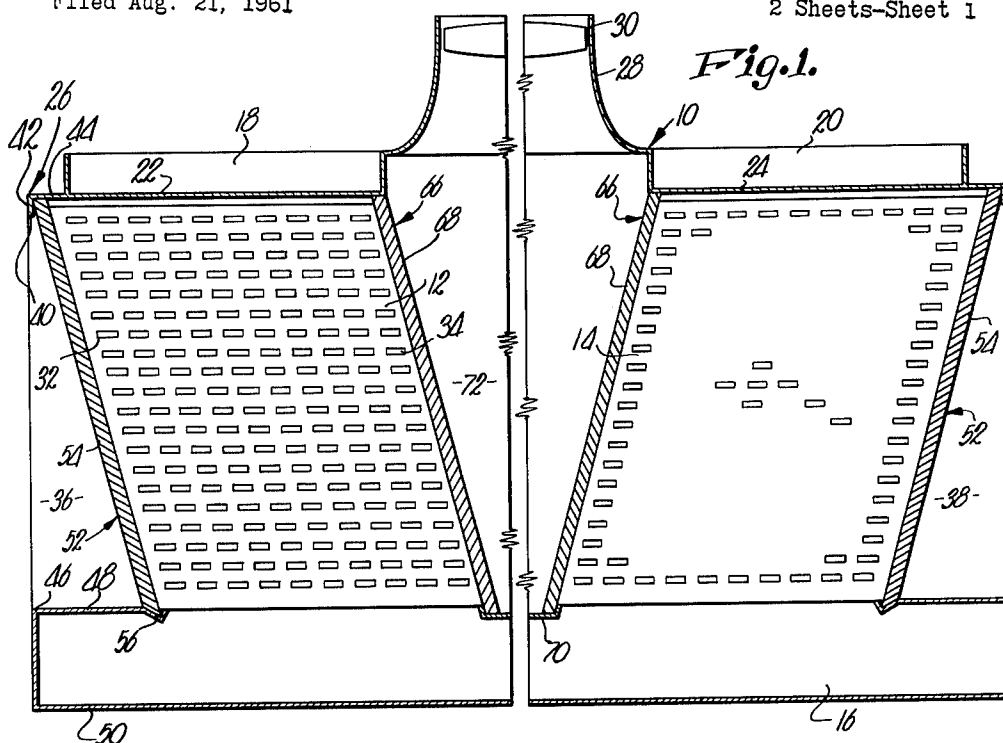


Fig. 2.

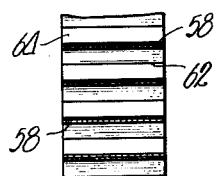


Fig. 5.

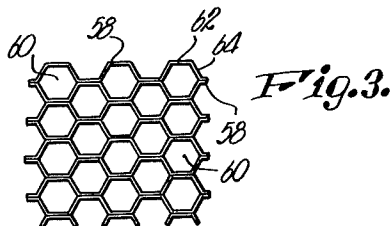


Fig. 3.

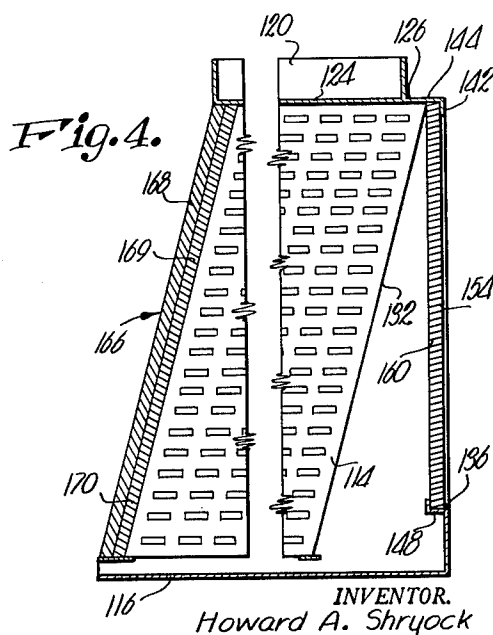


Fig. 4.

INVENTOR.
Howard A. Shryock
BY

Hoey, Schmidt, Johnson & Hoey.
ATTORNEYS.

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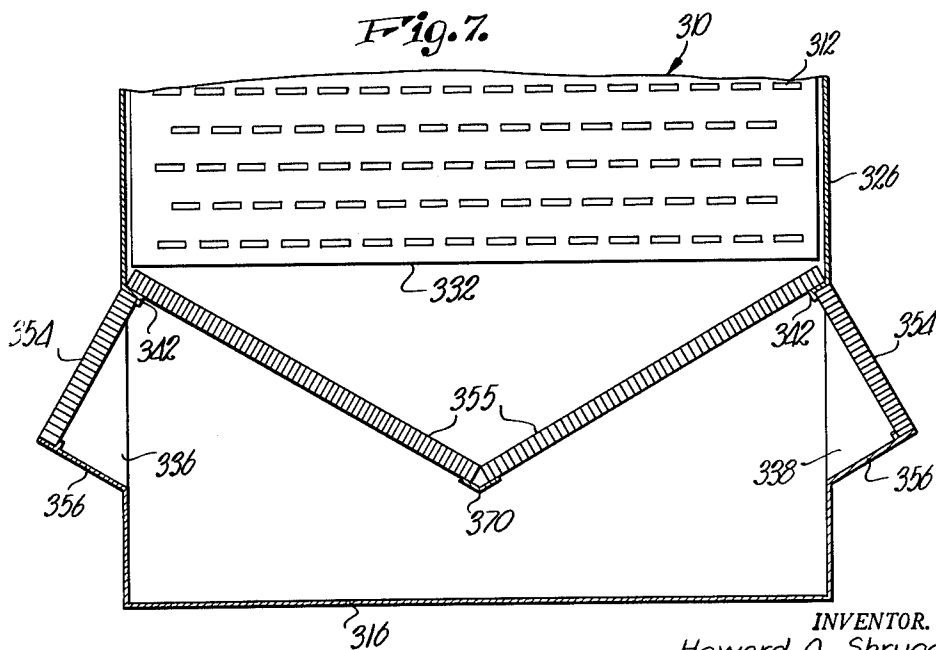
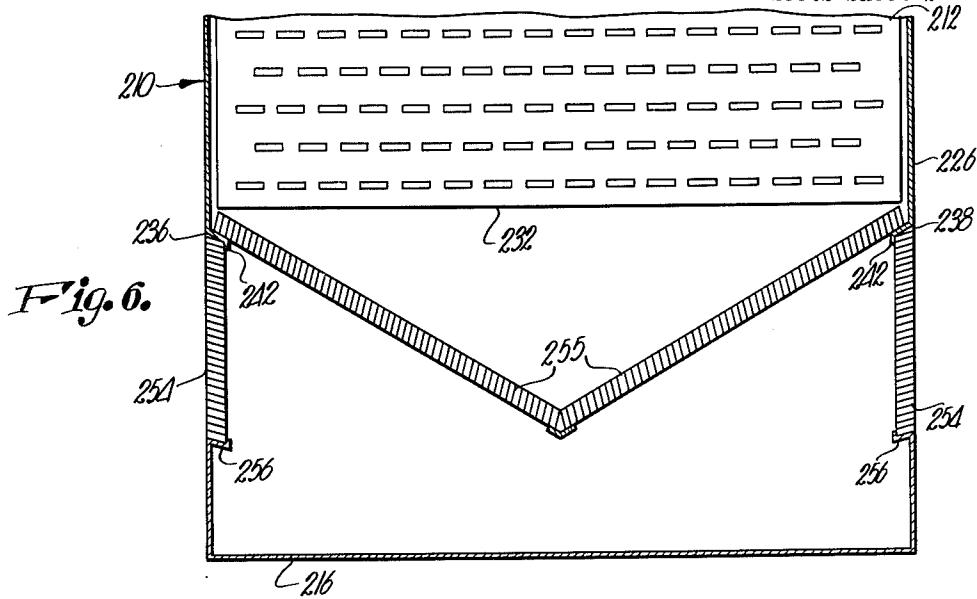
H. A. SHRYOCK

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2 Sheets-Sheet 2



INVENTOR.
Howard A. Shryock
BY

Hoey, Schmidt, Johnson & Hoey
ATTORNEYS.

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INLET STRUCTURE FOR COOLING TOWERS
Howard A. Shryock, Shawnee Mission, Kans., assignor to
The Marley Company, Kansas City, Mo., a corporation
of Delaware

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16 Claims. (Cl. 261—24)

This invention relates to water cooling towers wherein heat is removed from the water by causing the latter to gravitate through a fill assembly in intersecting relationship to currents of relatively cool air, whereby the temperature of the water is lowered by surface evaporation with the cooled water thereby being returned to equipment employing the water for various thermal interchange functions.

Cooling towers of the type referred to above have a casing enclosing the fill assembly, as well as hot water distribution basin overlying the fill and a cold water basin directly beneath the fill assembly. Crossflow, as well as counterflow towers are conventional in this field, with a power driven fan being mounted within the casing in suitable disposition to cause air to be drawn in through the air inlet of the casing, passed through the fill assembly in either crossflow or counterflow relationship to the water gravitating through the fill and then ultimately discharged through the air outlet of the casing.

Because of the tendency of the water to pass outwardly through the air outlet of the casing with the rapidly moving air stream, eliminator louvers are normally provided adjacent the discharge face of the fill assembly to minimize water loss from the casing through the discharge opening therein. It has also been found to be necessary to provide inlet louvers at the air inlet of the casing in order to prevent water from being blown out through the air inlet of the casing when the fan is not operating and air moves in a direction counter to the normal flow thereof, or in crossflow towers from the inlet side of the fill when an inclined unit is employed. In this respect, it is to be noted that inclined fill assemblies are utilized in crossflow towers to minimize the tendency of the water to gravitate toward the discharge outlet of the casing caused by the rapidly moving air currents passing through the fill assembly in intersecting relationship to the droplets of water gravitating downwardly therethrough. Thus, it can be seen that the water from the upper portion of the inclined fill assembly tends to gravitate out of the casing of the cooling tower unless inlet louvers or the like are employed to redirect the water toward the cold water basin of the cooling tower.

Problems have arisen with respect to provision of suitable inlet louvers in the air inlet of a cooling tower as described, because of the tendency of the inlet louvers to materially restrict the air flow through the fill assembly of the cooling tower if the louvers are disposed at a sufficient angle to preclude loss of substantial amounts of water from the casing through the air inlet as outlined previously. Prior efforts have included the provision of relatively wide louvers which are in substantial vertical, spaced relationship, but even this structure has not been entirely satisfactory because the angularity of the louvers, when of relatively wide construction, must be disposed at a steep angle in order to preclude loss of water from the casing, and with the louvers being in overlapping relationship to effectively preclude loss of water through the air inlet of the water cooling tower.

It is, therefore, the primary object of the present in-

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vention to provide inlet structures for water cooling towers of the type set forth above and comprising a cellular wall member adapted to be mounted in the casing across the air inlet thereof and presenting a plurality of individual air passages positioned to preclude splashing of water out of the casing from the fill assembly and cold water basin without substantially interfering with flow of air into the casing through the air inlet of the tower.

A further important object of the invention is to provide a cellular wall member as described which is of honeycomb configuration presenting a plurality of individual, parallel, elongated passages of generally uniform cross-sectional configuration, and which effectively preclude splashing of water out of the casing through the air inlet of the tower without the necessity of disposing the honeycomb at a sufficient angle to substantially interfere with flow of cool air into the casing for passage through the fill assembly of the tower.

Another important object of the invention is to provide air inlet structure of the cellular wall type which is adaptable for use in either crossflow or counterflow type towers to effectively preclude loss of water from the towers through the air inlets thereof while minimizing the pressure drop in the air across the air inlet of the water cooling units.

A still further important object of the invention is to provide air inlet structure for cooling towers comprising a cellular wall member adapted to be mounted across the air inlet of the tower in disposition to not only preclude loss of water from the tower, but also serve as means for providing uniform distribution of air over the fill assembly of the tower. This has been found to be especially useful in counterflow type towers wherein one cellular wall member may be utilized to preclude loss of water from the tower through the air inlet, and with a second cellular wall member being employed to effect uniform distribution of air over the adjacent face of the fill assembly within the cooling tower casing.

An additional important object of the invention is to provide air inlet structure for cooling towers as described, comprising a cellular wall member which may be made of either synthetic resin impregnated paper or metallic material to thereby produce a relatively low cost air inlet unit capable of precluding loss of significant amounts of water from the casing through the air inlet without impeding air flow into the cooling tower, and with the air inlet structure presenting a pleasing appearance while also discouraging birds from flying into the tower as has been a problem in the past.

Other objects and details of construction of the present air inlet structure will become obvious or be explained in greater detail as the following specification progresses.

In the drawings:

FIGURE 1 is a schematic representation of a crossflow type water cooling tower showing the same in vertical cross section and embodying cellular air inlet structure as contemplated by the present invention;

FIG. 2 is an enlarged, fragmentary, cross-sectional view of one form of cellular inlet structure embodying the instant invention;

FIG. 3 is a fragmentary plan view of the cellular inlet structure as shown in FIG. 2;

FIG. 4 is a fragmentary, schematic representation of another type of crossflow cooling tower similar to that shown in FIG. 1 and with the cellular air inlet structure being illustrated in a different location within the air inlet of the cooling tower casing;

FIG. 5 is a view of cellular inlet structure similar to that illustrated in FIG. 2, but with the axes of the pas-

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sages therethrough being in generally perpendicular relationship to the major faces of the cellular structure;

FIG. 6 is a fragmentary, schematic representation of a counterflow type of cooling tower shown in vertical cross section and with cellular air inlet structure and cellular air distribution means being shown in the air inlet of the cooling tower; and

FIG. 7 is a fragmentary representation of another type of counterflow cooling tower similar to that shown in FIG. 6 but illustrating another form of the air inlet structure within the air inlet of the cooling tower casing.

The crossflow cooling tower illustrated schematically in FIG. 1 is broadly denoted by the numeral 10 and is provided with a pair of conventional, inclined fill assemblies 12 and 14, a cold water basin 16 disposed below assemblies 12 and 14 in a position to receive water gravitating therefrom, and a pair of open top hot water distribution decks 18 and 20 positioned directly above respective fill assemblies 12 and 14 in locations to permit water to gravitate from corresponding decks 18 and 20 directly onto the upper extremities of fill assemblies 12 and 14. A casing, broadly designated 26, encloses assemblies 12 and 14, as well as cold water basin 16 and hot water distribution decks 18 and 20, with the latter being supported by casing 26 on opposite sides of the central plenum chamber between opposed inner faces of fill assemblies 12 and 14. Suitable pump structure (not shown) is operably coupled to basin 16 and the decks 18 and 20 for removing cold water from basin 16, delivering the same to equipment requiring water for cooling purposes and to return the hot water to corresponding decks 18 and 20.

A vertical, generally parabolic stack 28 is secured to the central portion of the horizontal top face of casing 26 and extends above decks 18 and 20 terminating in vertically spaced relationship to the latter. Fan means 30 located within stack 28 and adapted to be operably coupled to a suitable source of power for actuation of the latter, causes currents of air to be forced upwardly through stack 28 from the interior of casing 26 for discharge through the upper extremity of stack 28.

Each of the fill assemblies 12 and 14 is provided with a pair of opposed, inclined faces 32 and 34, causing respective fill assemblies to assume the configuration of a parallelogram when viewed in upright, transverse cross section as shown in FIG. 1. By virtue of this configuration, compensation is provided for the action of currents of air created by fan means 30 on the water gravitating through fill assemblies 12 and 14 and causing the water to be forced toward the central portion of casing 26.

Casing 26, which is also of generally polygonal configuration, has a pair of air inlet openings 36 and 38 on opposed sides thereof. Each of the openings 36 and 38 is defined by the lowermost marginal edge 40 of a flange 42 depending from the top wall 44 of casing 26 and the uppermost marginal edge 46 of basin 16. Support platform 48 is secured to edge 46 of basin 16 adjacent openings 36 and 38 and extends toward the central portion of casing 26 in partial overlying relationship to the bottom 50 of basin 16.

As in apparent from FIG. 1, openings 36 and 38 present air inlets for cooling tower 10 to permit air to travel toward fill assemblies 12 and 14 and toward stack 28 under the action of fan means 30 with the currents of air being in generally intersecting relationship to the droplets of water gravitating through fill assemblies 12 and 14 from the decks 18 and 20 to the basin 16.

The air inlet structure which forms the subject of the present invention is broadly denoted by the numeral 52 and is positioned in spanning relationship to inlets 36 and 38 in both the vertical and horizontal dimensions thereof, so that air entering casing 26 must first pass through structure 52 prior to passage through corresponding fill assemblies 12 and 14.

Structure 52 within each opening 36 and 38, com-

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prises a cellular wall member 54 secured to the casing 26 at corresponding sections of the lowermost margin thereof within a sill 56 positioned at the innermost extremity of a respective platform 48, as well as being located in abutting relationship at the uppermost margin thereof to the inner surfaces of corresponding flanges 42, as well as top wall 44. The side margins of each wall member 54 are in abutting relationship to opposed sides of casing 26 and may be secured thereto in any suitable manner if desired, to render each wall member 54 relatively rigid with respect to casing 26. The upright axis of each wall member 54 is inclined relative to the vertical and is substantially parallel with the upright, inclined outer face of a respective fill assembly 12 and 14, it being clear that wall members 54 associated with assemblies 12 and 14, are substantially identical with the exception of the angularity of the latter with respect to corresponding outer faces of the fill assemblies.

Each wall member 54 is formed from a plurality of elongated, corrugated strips of material 58 in the manner shown in FIG. 3 to form a number of individual, transversely hexagonal, horizontally and vertically spaced, parallel cells 60 presenting air passages through wall member 54. Wall member 54 is thereby of honeycomb construction with the cells 60 having axes which are inclined relative to the planes passing through opposed outer faces thereof.

Each of the strips 58 utilized to form the honeycomb unit shown in FIG. 3, is preferably of kraft paper impregnated with a water-impervious, phenolic synthetic resin and folded at certain spaced lines transversely thereof and longitudinally spaced along the length of corresponding strips to present a plurality of first segments 62 integral with a plurality of second segments 64 adjacent thereto. Segments 62 of the adjacent strips 58 are interconnected to form one side of a cell 60, and the segments 64 form a pair of sides of a cell 60, and together with the associated segment 62, form one-half of the cell 60, the latter being of a generally transversely, hexagonal configuration. In the preferred wall member 54, each cell has a transverse dimension substantially one-half the distance between opposed major faces of the wall member 54, i.e., the thickness of the wall member 54. In lieu of the kraft paper construction referred to above, the wall member 54 may be made up of strips of aluminum suitably interconnected to present the hexagonal honeycomb configuration illustrated in FIG. 3.

Wall member 54 is positioned across a corresponding inlet 36 or 38 of casing 26 and is located at a predetermined angle relative to the vertical as illustrated in the drawings. In the preferred form, each of the wall members 54 is disposed at an angle of approximately 15° relative to the vertical. The axes of the cells of each wall member 54, in the preferred construction, make an angle of 45° with respect to the major planes of the faces of each wall member 54 to thereby cause the axes of cells 60 to be located at an angle of 30° with respect to the horizontal when wall member 54 is mounted across a corresponding inlet 36 or 38. It is, therefore, clear that the air passes downwardly to a certain extent toward the opposed face of a respective fill assembly 12 and 14 during operation of fan means 30.

Eliminator structure broadly designated 66, is provided for each fill assembly 12 and 14 and comprises a wall unit 68 of honeycomb construction formed in the same manner as wall member 54. Wall unit 68 is inclined relative to the vertical and has an upright axis which is substantially parallel with the upright axis of the proximal face 34 of the respective fill assembly 12 or 14.

Wall unit 68 is provided with an uppermost margin which is secured in any suitable manner to the lower surface of the bottom of the corresponding deck thereabove, and is further provided with a lowermost margin secured in any suitable manner to structure 70 spanning the distance between opposed sides of casing 26 directly above

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basin 16. Wall unit 68 is provided with cells which present air passages for directing air outwardly from the associated fill assembly, and to this end, the air passages are disposed at an angle inclined relative to the vertical. In the preferred form, the upright axis of each wall unit 68 is disposed at an angle of 15° to the vertical, and the air passages through the wall unit 68 are at angles of 45° relative to the planes of the faces of wall unit 68. Therefore, air issues from wall unit 68 at an angle of 60° with respect to the vertical.

Wall units 68 provide means for removing water from water-laden air passing out of the associated fill assembly so as to scrub the air and remove the moisture therefrom. Air then rises toward and into stack 28 of casing 26 under the action of fan means 30 substantially free of moisture.

In operation, fan means 30 is energized so as to create upward currents of air through stack 28 which pass through fan means 30 and out of the open top of stack 28. By virtue of the action of fan means 30, regions of reduced pressure are created in the vicinity 72 between wall units 68 within fill assemblies 12 and 14, and at the openings 36 and 38. Air is thus caused to flow into openings 36 and 38, through wall members 54, assemblies 12 and 14, and wall units 68 into vicinity 72 from whence it is carried upwardly through stack 28 and fan means 30.

Notwithstanding the inclination of fill assemblies 12 and 14 with respect to the vertical, the wall members 54 operate to preclude splashing of water out of the casing 26 through the air inlets 36 and 38 without substantially interfering with passage of air into the casing under the action of fan means 30. Although it has been necessary in prior units to incline the inlet louvers at an angle of about 40° with respect to the horizontal in order to preclude excessive losses of water from the casing through the air inlets thereof, it has been found that honeycomb structure as defined herein, when employed in the air inlets of the water cooling tower, may be disposed at an angle of about 30° with equally effective prevention of loss of water from the casing 26. Thus, less resistance is offered to the air as the same passes into the casing 26 and pressure drop through the air inlet is minimized. The relatively narrow cells 60 operate to preclude splash-out of water from the fill assemblies 12 and 14, as well as the cold water basin 16, and furthermore, prevent debris from entering the casing 26 through the air inlets 36 and 38. An additional important feature of the instant construction is the fact that birds are discouraged from entering the tower through the air inlets and which has heretofore been a problem because it is normally impossible for the birds to find their way out of the tower and a cleaning problem is presented, particularly in cold weather when the birds seek a warm atmosphere.

The honeycomb air inlet members 54 also serve the secondary function of uniformly distributing the air over the opposed proximal faces of the fill assemblies 12 and 14, this being particularly significant when the wind velocity is relatively high and blowing at an angle with respect to the inlet openings of the tower 10.

With respect to prevention of splash-out of water from the fill assemblies 12 and 14, it is to be noted in FIG. 1 that water gravitating downwardly from the upper portions of the outer sections of fill assemblies 12 and 14, falls against the inner portions of the cells 60 and thereby flows downwardly along the wall member 54 into the basin 16 for collection therein. Additionally, any droplets which strike portions of the fill assemblies 12 and 14 and then bounce outwardly toward the air inlets 36 and 38, engage the inner surfaces of cells 60 and thereby are precluded from passing out through the air inlets of casing 26.

In FIG. 4, a modified form of the air inlet structure is illustrated and comprises a wall member 154 adjacent a fill assembly 114 and disposed above a cold water basin

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116. Wall member 154 may be utilized with tower 10 shown in FIG. 1, and fill assembly 114 is identical to fill assembly 14 in all respects.

It is noted that wall member 154 has an upright axis which is substantially vertical and thereby, at an angle of 15° with respect to the proximal face 132 of fill assembly 114. Wall member 154 is formed by interconnecting a plurality of strips of kraft paper identical to the strips 58 forming wall member 54 to thereby form cells presenting air passages through wall member 154 for air passing toward and into fill assembly 114. In the configuration of FIG. 4, the axes of the cells of wall member 154 are at angles of 15° relative to the horizontal and, thereby, air impinges on the face 132 of fill assembly 114 at an angle of 15° with respect to the horizontal.

Wall member 154 is secured at the lowermost margin to a platform 148 secured to the upper extremity of basin 116, and wall member 154 is in engagement with the top wall 144 and a flange 142 forming a part of the casing 126 of which fill assembly 114 is a part.

Eliminator structure, broadly denoted by the numeral 166, is provided for the outlet face of fill assembly 114 includes a pair of superimposed wall units 168 and 169 secured at the lowermost margins thereof to suitable structure 170 and at the uppermost margins thereof to the lower surface of the bottom 124 of a hot water deck 120 disposed above fill assembly 114.

Wall units 168 and 169 are of a honeycomb construction in the same manner as wall member 154 with the exception that wall unit 168 is provided with air passages therethrough which are at an angle of 45° relative to the planes of the faces thereof, whereas the air passages in wall member 154 and wall unit 169 are at angles of 15° relative to the planes of the faces thereof. Thus, the air is scrubbed of water as the air passes through wall units 168 and 169 to a greater degree by virtue of the superposition of the units 168 and 169.

The downward inclination of the cells 160 of members 154 is important not only to preclude passage of water out of the casing 126, but also in this application, serves to direct the air passing inwardly through the inlet 136 to a sufficient extent to cause uniform distribution of air across the entire outer face of a respective fill assembly such as 114.

In FIG. 6, a counterflow cooling tower 210 is illustrated which is provided with a casing 226 and a fill assembly 212 disposed within casing 226 above a pair of opposed openings 236 and 238 providing inlets for casing 226. Fan means (not shown) is operably coupled with casing 226 adjacent the outlet face of fill assembly 212, the latter having an let face 232 disposed directly above the plane interconnecting the uppermost margins of openings 236 and 238.

Air inlet structure is provided for each of the openings 236 and 238 and comprises a wall member 254 of honeycomb construction in the same manner as wall 54, illustrated in FIG. 1. Wall member 254 is mounted at the lowermost margin thereof on a sill 256 and is secured at the uppermost margin thereof to a flange 242. The side margins of wall member 254 are mounted on the sides of casing 226 in any suitable manner to make wall member 254 rigid relative to casing 226.

Wall member 254 is constructed by the interconnection of strips in the nature of the strips 58 used for constructing wall member 54. To this end, a plurality of cells are formed which present air passages through wall member 254 to permit air to flow into the lowermost region of casing 226 above the cold water basin 226 thereof. The cells are positioned in wall member 254 so that the air passages formed thereby are at an angle of approximately 15° relative to the horizontal.

A pair of wall elements 255 are interconnected at proximal ends thereof adjacent the central part of casing 226 and are further secured to the flanges 242 at the margins thereof remote from the zone of interconnection at the

central part of casing 226. Wall elements 255 form a V-shaped structure which substantially spans the distance across face 232 of fill assembly 212. Each wall element 255 is formed of a honeycomb construction in the same manner as is wall member 254. The air passages formed therein are at an angle of 15° to the vertical so that the angle between the direction of air passing through wall member 254 and the direction of air passing through wall element 255 is a 90° angle.

In operation, air enters the wall members 254 through the air passages formed thereby and the air is directed toward basin 216 therebelow. By virtue of the suction action of the fan means associated with fill assembly 212, the air is gradually bent upwardly and flows through the air passages of wall elements 255 and issues from the latter along paths which direct the air uniformly across the face 232 of fill assembly 212. Air thereupon continue uniformly through fill assembly 212 where the water gravitating toward basin 216, contacts the air for cooling purposes.

The cellular members 254 serve to prevent substantial amounts of water from splashing or otherwise passing out of casing 226 through the air inlets 236 and 238, while the wall members 255 operate primarily to uniformly distribute the incoming air over the lower face of fill assembly 232. During periods that the fan means is not operating, as for example when the ambient air temperature is relatively low and forced flow of air is not required, it can be appreciated that the aspirating effect of the water distribution nozzles overlying fill assembly 232, causes air to be drawn into casing 226 through the upwardly facing air discharge outlet whereby such air flows downwardly through the fill assembly 232 and thence outwardly through the air inlets 236 and 238. This downward movement of the air tends to cause droplets of water from the fill assembly 232 to be carried therewith, and thus effecting loss of water through the air inlets 236 and 238. As has been previously pointed out, passage of water outwardly through the air inlets of the cooling tower is undesirable, both from the standpoint of loss of water and also, causing wetting down of the areas adjacent the tower. The wall members 254 have been found to be especially effective in removing droplets of water from currents of air passing outwardly through air inlets 236 and 238 and without causing a substantial pressure drop in the air currents when the fan means is in operation, and thereby causing air to be pulled inwardly through the inlets 236 and 238. Although the wall members 255 serve primarily to effect even distribution of the air over the lower face of fill assembly 232 during operation of the fan means overlying the fill, it can be appreciated that these wall members also effect some removal of water from the air streams during reverse flow of the air as outlined above and while the fan means is rendered inactive. The relative angles of wall members 255 with respect to the horizontal are important to cause the air to be properly distributed over the entire face of the fill assembly 232 and preventing packing of the air against one portion of the lower surface of the fill.

FIG. 7 shows a counterflow cooling tower having air inlet structure of a modified form relative to that illustrated in FIG. 6. A casing 326 houses a fill assembly 312 above a cold water basin 316. Fan means (not shown) is operably coupled with casing 326 to direct currents of air upwardly through fill assembly 312 and outwardly from casing 326.

A pair of openings 336 and 338 are provided in casing 326 and present air inlets therefor. Outwardly extending sills 356 are secured to the uppermost margins of basin 316 and provide supports for mounting wall members 354 thereon, the latter being secured at the uppermost margins thereof to flanges 342 in any suitable manner. Wall members 354 are formed of a honeycomb construction in the same manner as wall members 254 of FIG. 6, except that the passages formed in wall members 354 are at right

angles to the planes of the faces of the respective wall members 354. As is shown in FIG. 7, the upright axis of each of wall members 354 is at an angle of approximately 30° to the vertical, so that the air passages therein direct the air downwardly along a path which is inclined approximately 30° to the horizontal.

A pair of wall elements 355 are interconnected at proximal margins thereof to structure 370 secured to opposed sides of casing 326. Wall elements 355 extend upwardly and outwardly from structure 370 and are secured at the uppermost margins thereof to flanges 342. Each wall element 355 is formed of a honeycomb construction in the same manner as is wall member 354 so that the air passages therethrough are at right angles to the planes forming the faces thereof. It is clear that the angle formed between the direction of air entering wall member 354 and the direction of the air passing through wall element 355, is a 90° angle, by virtue of the fact that the wall elements 355 are inclined at an angle of approximately 30° to the horizontal.

In operation, air is directed through wall members 354 toward basin 316 under the action of the fan means operably coupled to the casing 326 at the outlet side of fill assembly 312. By virtue of the suction action of the fan means, air is caused to bend upwardly and pass through the air passages of wall elements 355 toward the lowermost face 332 of fill assembly 312, at which face the air impinges on fill assembly 312 uniformly for uniform passage therethrough.

The wall members 354 in tower 310 also serve to effectively preclude passage of water out of the casing through inlets 336 and 338, and the angularity of the entire body of the wall members more effectively precludes splashing of water out of the casing through inlets 336 and 338.

It is to be understood that the transverse, cross-sectional dimensions of the cells, as well as the length of the passages defined thereby, will vary, depending upon the job to be accomplished, the amount of water handled by the cooling tower, and the velocity of the air drawn through the fill assembly by the fan means within the air discharge opening of the tower casing. These variables may be changed to give the best results and may most efficiently be determined through imperial methods.

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

1. A cooling tower comprising:
 - a casing having an air inlet and an air outlet spaced therefrom;
 - a fill assembly within the casing between said air inlet and the air outlet;
 - hot water distribution means overlying the fill assembly;
 - a cold water basin disposed in underlying relationship to said fill assembly;
 - fan means on the casing operable to force air through the fill assembly from said air inlet to the air outlet; and
 - a cellular wall member on the casing within said casing in full spanning relationship to said air inlet and provided with a pair of spaced, opposed major faces, said wall member being constructed of elongated, corrugated strips of material interconnected at zones causing the strips to define a multiplicity of individual, elongated, generally parallel, open end cells of greater longitudinal length than transverse width with the open ends of the cells lying in the planes of respective major faces of the wall member, the distance between said major faces of the wall member being substantially less than the width and length dimensions of the wall member, said strips being located at an angle transversely of the wall member causing the longitudinal axes of the cells to be inclined with respect to the horizontal in a direction disposing the open ends of the cells facing away from the fill assembly to be located above the opposite ends of respective cells, the angle of inclination of each

of the cells being sufficient to dispose the strips in the path of travel of water splashing from the interior of the casing toward the air inlet but without producing a substantial pressure drop in the air passing through the cells of said wall member.

2. Inlet structure as set forth in claim 1 wherein said strips are generally parallel and configured to present cells of generally uniform hexagonal shape throughout the entire area of the inlet structure.

3. Inlet structure as set forth in claim 2 wherein said strips are constructed of paper stock impregnated with a water impervious synthetic resin material.

4. Inlet structure as set forth in claim 3 wherein said stock is kraft paper impregnated with a phenolic resin.

5. A crossflow cooling tower comprising:

a casing having an air inlet and an air outlet spaced therefrom;

a fill assembly within said casing between the air inlet and said air outlet;

hot water distribution means overlying the fill assembly; a cold water basin disposed in underlying relationship to said fill assembly;

fan means on the casing and operable to force air horizontally through the fill assembly from said air inlet to said air outlet; and

air inlet structure comprising a generally upright cellular wall member mounted within the casing across said air inlet in full spanning relationship thereto, said wall members being constructed of elongated, corrugated strips of material interconnected at zones so as to form transversely narrow wall components presenting a plurality of individual, elongated, generally parallel, open end air cells of greater longitudinal length than transverse width and located in spaced relationship in both directions of the horizontal and vertical dimensions of said air inlet, said wall components being located at a sufficient angle to preclude splashing of water out of the casing through the air inlet from the fill assembly and cold water basin without impeding passage of air into the casing through said air inlet.

6. A cooling tower as set forth in claim 5 wherein said fill assembly is provided with an inclined face adjacent said air inlet in the casing, said wall member being mounted within the casing in an inclined position adjacent the face of the fill assembly proximal to said air inlet, the longitudinal axes of said cells being disposed at an angle downwardly toward the fill assembly to thereby preclude splashing of the water out of the casing without substantial interference of passage of air into the fill assembly from the air inlet.

7. A cooling tower as set forth in claim 6 wherein said wall components are disposed with the longitudinal axes thereof at substantially a 30° angle with respect to the horizontal.

8. A cooling tower as set forth in claim 7 wherein said fill assembly is provided with an inclined face adjacent said air inlet in the casing, and said wall member is mounted in the casing in a generally vertical position with the longitudinal axes of the cells being at a sufficient angle to cause the wall components to prevent a splashing of water out of the casing without interfering with passage of air into the fill assembly through said air inlet.

9. A cooling tower as set forth in claim 8 wherein the longitudinal axes of the cells are at substantially a 15° angle with respect to the horizontal.

10. A counterflow cooling tower comprising:

a casing having an air inlet at the lower end thereof and an air outlet at the upper extremity thereof;

a fill assembly within the casing between the air inlet and the air outlet;

hot water distribution means overlying the fill assembly;

a cold water basin disposed in underlying relationship to said fill assembly;

fan means on the casing and operable to force air verti-

cally through the fill assembly from said air inlet to said air outlet; and

air inlet structure comprising a cellular wall member mounted within the casing across said air inlet in full spanning relationship thereto, said wall members being constructed of elongated, corrugated strips of material interconnected at zones so as to form transversely narrow wall components presenting a plurality of individual, elongated, generally parallel, open end air cells of greater longitudinal length than transverse width and located in spaced relationship in both directions of the width and length of said air inlet, said wall components being located at a sufficient angle with respect to the normal path of travel of air through the fill assembly to prevent substantial quantities of water passing outwardly from the casing through said air inlet from the fill assembly and cold water basin when the fan means is not operating and air is flowing downwardly through the fill assembly and thence outwardly of the air inlet under the aspirating effect of the hot water discharged from the distribution means overlying the fill assembly.

11. A cooling tower as set forth in claim 10 wherein the air inlet is disposed in substantially an upright position and said inlet structure includes air distribution means mounted in underlying relationship to the fill assembly comprising a second cellular wall member having wall components presenting a plurality of individual, elongated, generally parallel, open end air passages, said wall components of the second wall member being located at an angle to substantially equally distribute the air entering the casing through said air inlet, over the lower face of the fill assembly during operation of said fan means.

12. A counterflow cooling tower comprising:

a casing provided with a fill assembly;

hot water distribution means overlying the fill assembly;

a cold water basin within the casing below the fill assembly, said casing being provided with a pair of generally upright, opposed air inlets below the lower extremity of the fill assembly, and an air outlet overlying the upper extremity of the fill assembly;

cellular first wall members mounted on the casing across respective air inlets in substantially upright, spanning relationship thereto and having elongated, transversely narrow wall components presenting a plurality of individual, elongated, generally parallel open end air passages of greater longitudinal length than transverse width, said wall components of the first wall members being located at an angle to substantially equally distribute the air entering the casing through said air inlet, over the lower face of the fill assembly during operation of said fan means; and

a pair of second cellular wall members mounted within the casing below the fill assembly and in full spanning relationship to the lower surface of the latter, said second cellular wall members having wall components presenting a plurality of individual, elongated, generally parallel open end air passages of greater longitudinal length than transverse width and disposed with the longitudinal axes thereof at a sufficient angle with respect to the normal flow path of the air through the fill assembly to effect substantially equal distribution of the air entering the lower portion of the casing through said air inlets, across the lower surface of the fill assembly.

13. A cooling tower as set forth in claim 12 wherein said first wall members are disposed at an angle of approximately 30° with respect to the vertical and the transverse axes of the passages defined by said wall components thereof are at an angle of approximately 30° with respect to the horizontal.

14. A cooling tower as set forth in claim 13 wherein the second wall members are at an angle of approxi-

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mately 30° with respect to the horizontal and the longitudinal axes of the passages defined by said wall components thereof are at an angle of approximately 30° with respect to the vertical.

15. A cooling tower as set forth in claim 12 wherein said first wall members are positioned in substantially vertical locations and the longitudinal axes of the passages defined by said wall components thereof are at an angle of approximately 15° with respect to the horizontal, said second wall members being at an angle of approximately 30° with respect to the horizontal and at an angle of approximately 120° with respect to each other, the longitudinal axes of the passages defined by the wall components of the second wall members being at an angle of approximately 15° with respect to the vertical.

16. A cooling tower as set forth in claim 15 wherein the upper extremities of the second wall members terminate adjacent the upper margins of corresponding adjacent first wall components and the lower margins of the second wall components lie in a plane passing through the lower margins of the first wall members.

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HARRY B. THORNTON, *Primary Examiner.*

HERBERT L. MARTIN, *Examiner.*