

Nov. 27, 1962

H. E. FORDYCE ETAL

3,065,587

ELIMINATOR STRUCTURE FOR COOLING TOWERS

Filed Sept. 19, 1960

3 Sheets-Sheet 1

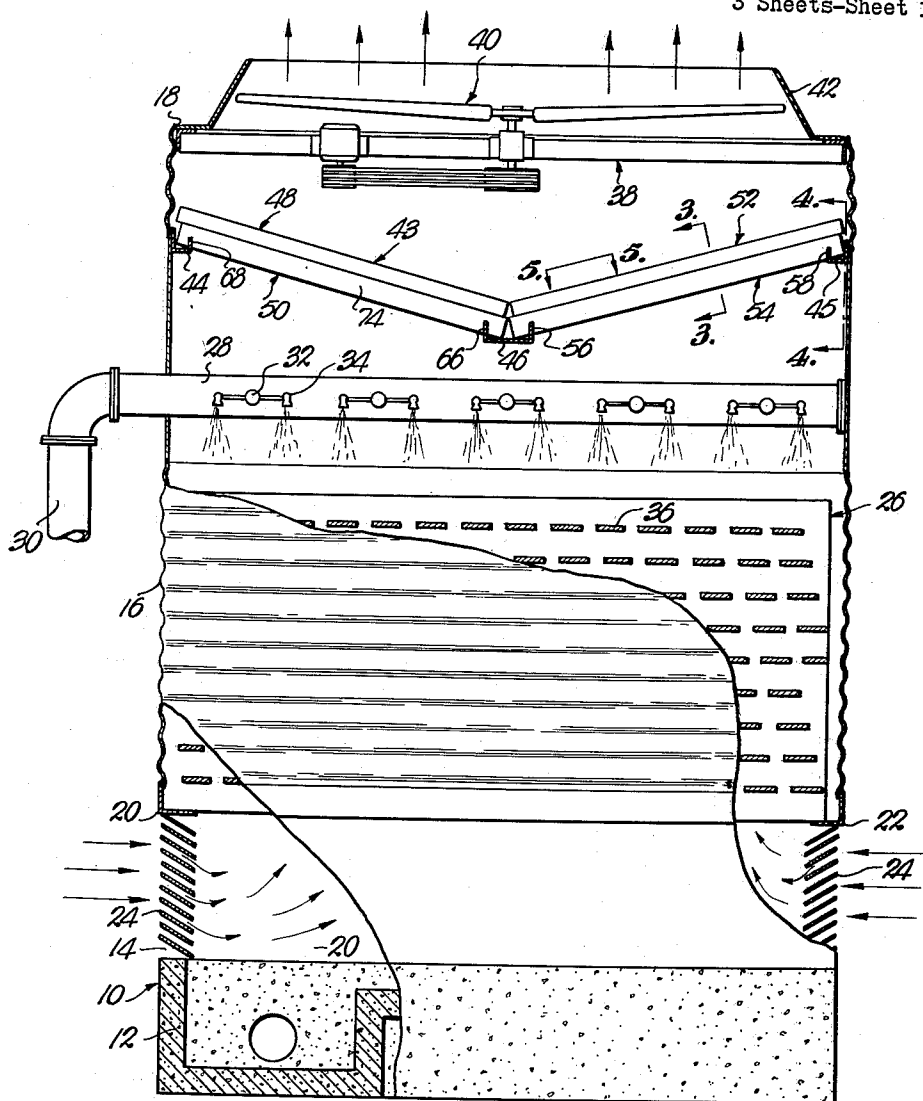


Fig. 1.

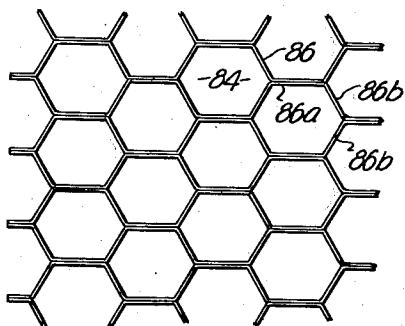


Fig. 5.

INVENTORS.
 Homer E. Fordyce
 Howard A. Shryock
 BY
 Hovey, Schmidt, Johnson & Hovey
 ATTORNEYS.

Nov. 27, 1962

H. E. FORDYCE ET AL

3,065,587

ELIMINATOR STRUCTURE FOR COOLING TOWERS

Filed Sept. 19, 1960

3 Sheets-Sheet 2

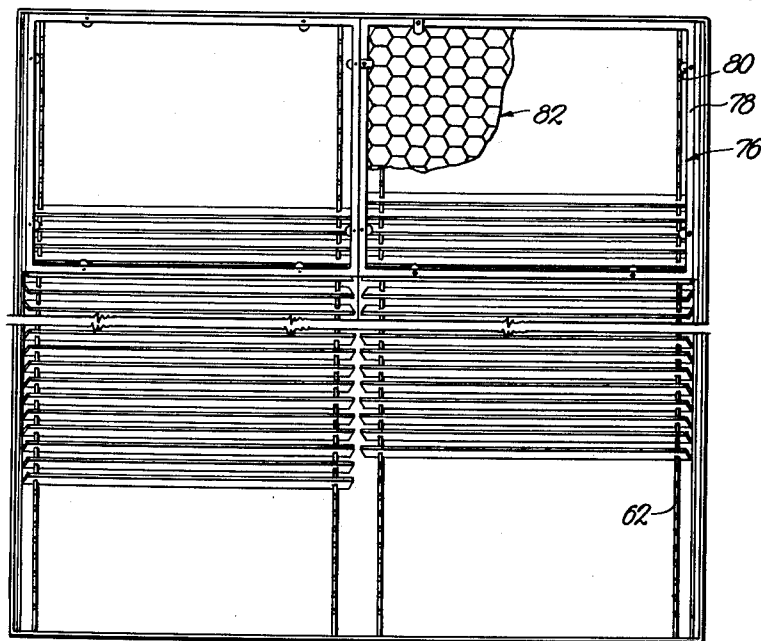


Fig. 2.

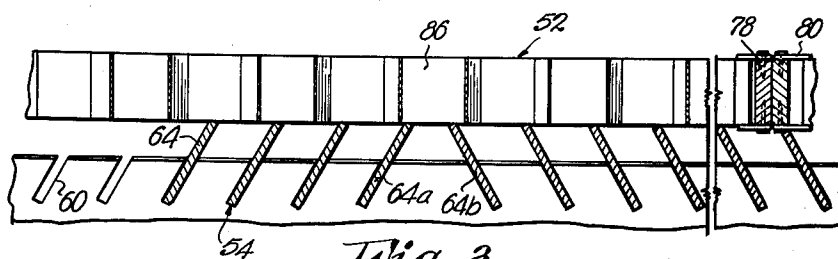


Fig. 3.

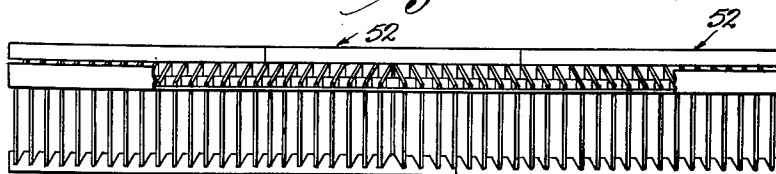


Fig. 4.

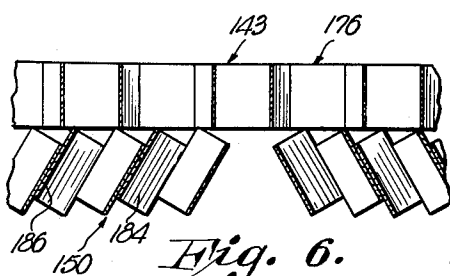


Fig. 6.

INVENTORS,
Homer E. Fordyce
Howard A. Shryock
BY
Honey Schmidt, Johnson & Honey
ATTORNEYS.

Nov. 27, 1962

H. E. FORDYCE ETAL

3,065,587

ELIMINATOR STRUCTURE FOR COOLING TOWERS

Filed Sept. 19, 1960

3 Sheets-Sheet 3

INVENTORS.
Homer E. Fordyce
Howard A. Shryock
Wm. H. Johnson & Hovey
ATTORNEYS.

1

3,065,587 ELIMINATOR STRUCTURE FOR COOLING TOWERS

Homer E. Fordyce, Gladstone, Mo., and Howard A. Shryock, Shawnee Mission, Kans., assignors to The Marley Company, Kansas City, Mo., a corporation of Delaware

Filed Sept. 19, 1960, Ser. No. 57,011
18 Claims. (Cl. 55-442)

This invention relates to water cooling towers wherein heat is removed from the water by causing the water to gravitate through a fill assembly in intersecting relationship to currents of cool air whereby the temperature of the water is lowered by surface evaporation, with the primary object of the invention to provide improved drift eliminator structure for towers of the type described which is effective in removing droplets of water entrained in the air emerging from the cooling tower fill assembly and with a minimum pressure drop in the air as the same is discharged from the tower.

In cooling towers wherein water is cooled by causing the same to gravitate through forced currents of air, a substantial amount of the water is entrained in the air in droplet form and thereby carried from the tower through the discharge outlet thereof unless means is provided within the path of travel of air emanating from the fill assembly of the cooling tower, to eliminate the droplets of water from the moist air and redirect the same downwardly to the intended point of collection within a water sump underlying the fill assembly.

It is therefore a still further important object of the invention to provide improved drift eliminator structure which is equally efficient for utilization in both cross-flow and counter-flow towers as are conventionally employed in this field.

Drift eliminator structure heretofore employed has primarily involved utilization of a number of elongated slats or vanes arranged in intersecting relationship to the currents of air emerging from the fill assembly of the tower, and most generally disposed so that the air strikes the vanes and is then deflected toward the discharge outlet of the cooling tower casing. This type of construction is relatively efficient, particularly if a large number of vanes in at least partial overlapping relationship are employed, but problems have been encountered with eliminator structure of this character because of the pressure drop caused by the same if the vanes are in substantial overlapping relationship, and also the relatively large amount of space required to house the eliminators and which do not in any way increase the cooling efficiency of the tower itself. The space problem is especially important in counter-flow type towers wherein it is desirable that the entire package be of minimum size for a rated cooling capacity and yet have adequate drift eliminator structure for preventing droplets of water entrained in the currents of air passing from the fill assembly, from being discharged into the surrounding atmosphere. The necessity of providing adequate drift eliminator structure for cooling towers is especially significant when the tower is to be employed in a metropolitan area or the like where strenuous objection is made by those in proximity to the tower if an excessive amount of moisture is carried from the tower to the surrounding areas during periods of operation of the cooling equipment.

Another important object of the invention is to provide a drift eliminator that is constructed of relatively inexpensive, commercially available components that effectively scrub the air to remove droplets of water therefrom, and yet is also capable of turning the air in the direction of the outlet opening of the cooling tower casing.

2

A still further important object of the instant invention is to provide an improved drift eliminator that is disposed to automatically redirect the water removed from the air into gravitating streams channeled along the eliminator structure to thereby prevent the streams of water from being directly reintroduced into the high velocity air streams which would ultimately result in a considerable proportion of the water again becoming entrained in the air prior to discharge thereof through the outlet of the tower.

It is also an important object of the invention to provide eliminator structure of the characteristics referred to above wherein the primary drift eliminator comprises a honeycomb unit made up of a plurality of individual, parallel cells presenting air passages therethrough and which are at an angle with respect to the air emerging from the fill assembly of the tower, whereby the moist air impinges upon the wall members presenting the cells to effect scrubbing of the air and thereby removal of droplets of water entrained therein. In this respect, it is a significant object of the invention to provide eliminator structure wherein the honeycomb unit is of commercially available phenolic impregnated kraft paper which is readily available at an economical price thereby substantially lowering the cost of the eliminator structure and presenting components which are resistant to deterioration notwithstanding the high humidity prevailing in the working area of the drift eliminators.

Also an important object of the invention is to provide an eliminator that gently turns the air in the direction of flow thereof from the tower through the outlet of the casing of the same, as gravity tends to increase the angle of impingement of the water on the surfaces of the eliminator structure, thereby increasing the effectiveness of the unit whether the same be employed in a cross flow or a counter flow type of tower.

An additional important aim of the invention is to provide drift eliminator structure wherein a honeycomb unit having a plurality of parallel air passages therethrough disposed at an angle with respect to the normal path of travel of the moist air emerging from the fill assembly, is utilized in conjunction with a number of elongated wooden vanes in abutting relationship to the honeycomb unit and positioned with the surfaces thereof at an angle with respect to the passages through the honeycomb unit to thereby cause the air to be gently turned toward the outlet of the cooling tower yet at the same time providing efficient removal of water from such air. It is also an important aim to provide eliminator structure which in certain circumstances may comprise a pair of the honeycomb units disposed in abutting relationship, with the air passages therethrough in intercommunication, but with the wall members of the unit presenting individual cells, being disposed at angles with respect to each other so that the air must follow a circuitous path in flowing through the eliminator structure to more effectively scrub such air and effect maximum removal of moisture therefrom.

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

In the drawing:

FIGURE 1 is an enlarged fragmentary side elevational view of a counter-flow cooling tower and illustrating one form of the present eliminator structure operably mounted in place therein, certain parts of the tower and the eliminator structure being shown in section to better illustrate details of construction thereof;

FIG. 2 is an enlarged plan view of the eliminator structure as shown in FIG. 1, with only a portion of the honeycomb units being illustrated, and with certain of such

honeycomb units removed to more clearly illustrate the wooden vanes positioned therebeneath;

FIGS. 3, 4 and 5 are enlarged fragmentary cross-sectional views taken on the lines 3—3, 4—4 and 5—5 respectively of FIG. 1, with FIG. 5 illustrating the honeycomb construction of the primary drift eliminator unit;

FIG. 6 is an enlarged fragmentary cross-sectional view similar to FIG. 3 but illustrating a modified form of the present invention wherein two layers of honeycomb units are employed;

FIG. 7 is an enlarged fragmentary side elevational view of a cross-flow cooling tower having another type of eliminator structure therein embodying the principal concepts of the present invention, certain parts of the structure and cooling tower being broken away and in section to reveal details of construction thereof;

FIG. 8 is an enlarged fragmentary vertical cross-sectional view through the eliminator structure illustrated in FIG. 7;

FIG. 9 is an enlarged fragmentary vertical cross-sectional view similar to FIG. 8 and showing a modified form of the eliminator structure wherein two layers of the honeycomb construction are utilized; and

FIG. 10 is an enlarged fragmentary view similar to FIG. 3 but showing further modified eliminator structure particularly adapted for use in counter-flow towers as shown in FIG. 1.

A counter-flow cooling tower of the type in which the present eliminator structure is adapted to be employed, is illustrated in FIG. 1 and designated generally by the numeral 10. Tower 10 includes a cold water sump 12 having support means on the upper margin thereof receiving a transversely rectangular casing 16 open at the top to present an air outlet 18, and having a pair of opposed, rectangular openings 20 and 22 at the lower end thereof immediately above sump 12 and presenting cool air inlets. A number of elongated, superimposed, vertically aligned, transversely inclined inlet louvers 24 are provided within each of the inlet openings 20 and 22.

A hot water conduit 28 extending across casing 16 above fill assembly 26 and communicating with a hot water supply pipe 30, has a number of laterally extending distribution pipes 32 extending outwardly therefrom and mounting a plurality of spray nozzles 34 directed downwardly to distribute hot water onto the horizontal slats 36 forming a part of fill assembly 26.

Framework 38 spanning upwardly opening air outlet 18, mounts a fan assembly 40 adapted to pull air inwardly through air inlets 20 and 22, and then direct such air upwardly through fill assembly 26 for ultimate discharge through the fan ring 42 carried by casing 16 in concentric relationship to air outlet 18.

The drift eliminator structure constituting the present invention is broadly designated by the numeral 43 and is carried by a pair of horizontal side rails 44 and 45 secured to the inner surfaces of opposed sides of casing 16, as well as by a horizontally disposed upwardly opening channel 46 parallel with side rails 44 and 45 and disposed below the latter as indicated in FIG. 1.

The eliminator structure 43 comprises a honeycomb unit 48 and a bank 50 of elongated, wooden vanes carried by side rails 44 and channel 46, as well as a honeycomb unit 52 and a bank of elongated wooden vanes 54 mounted on side rail 45 and channel 46 respectively. Since units 48 and 52 as well as banks 50 and 54 are substantially identical except for the angle of inclination thereof with respect to channel 46, only unit 52 and bank 54 have been illustrated in detail in FIGS. 3-5 inclusive.

The horizontal, upright rail 56 of channel 46 and the upright section 58 of side rail 45, are each provided with aligned, horizontally spaced notches 60 and 62 respectively therein for receiving individual elongated vanes 64 which are disposed at an angle with respect to the vertical transversely thereof as shown in FIG. 3, as well as being longitudinally inclined as indicated in FIG. 1. The angle

of inclination of each of the vanes 64 transversely thereof may be varied depending upon the particular type of tower, but assuming that the vanes 64 are 3 inches in width, the distance between adjacent lower margins thereof should be approximately 2 inches, with the angle thereof transversely of the same being 60° with respect to the vertical. Furthermore, it is to be preferred that the vanes 64 be inclined longitudinally thereof at an angle of approximately 15° with respect to the horizontal. It is also to be appreciated that rail 66 of channel 46 as well as side section 68 of side rail 44 are provided with notches 70 and 72 respectively for receiving corresponding vanes 74 of bank 50. Again, vanes 74 should be inclined longitudinally thereof at an angle of about 15° with respect to the horizontal and the individual vanes should be transversely inclined in the same manner as indicated with respect to vane 64.

Referring to FIG. 3, it is to be pointed out that one-half of the vanes 64 are inclined toward the center of bank 54, while the other half of such vanes are also inclined in the opposite direction and thus toward the center of such bank. Thus, the innermost vanes 64a and 64b are inclined toward each other while the remaining vanes on each side of the center line of bank 54 are in parallel relationship with corresponding vanes 64a and 64b. The vanes 74 of bank 50 are similarly inclined to effect direction of the air toward the central part of casing 16 and thereby the axis of fan means 40.

Honeycomb unit 52 is constructed of a number of individual cellular modules 76 which are of generally rectangular configuration and each carried by a rectangular wooden frame 78 having means such as cleats 80 extending inwardly from the margins thereof in overlying relationship to corresponding honeycomb components 82 to maintain the same within each of the frames 78. It is to be noted that the wooden members from which each of the frames 78 is constructed is of a width substantially complementary with the width of individual honeycomb components 82 and that cleats 80 are preferably recessed in the outer planar margins of honeycomb components 82 so that banks 50 and 54 may be placed in flush relationship to the lower surface of components 82.

Each of the honeycomb components 82 is constructed of a number of elongated strips of kraft paper impregnated with a water-impervious phenolic resin and interconnected at certain areas thereof as indicated in FIG. 5 to present individual, parallel, transversely hexagonal air passages 84. The strips or wall members 86 defining passages 84 are interconnected along zones 86a while the portions 86b thereof are at an angle with respect to adjacent sections 86a. In the preferred eliminator structure, air passages 84 have a transverse width between sections 86a of approximately $\frac{3}{4}$ of an inch, while the transverse width of each wall 86 and thereby the length of corresponding passages 84 is approximately 2 inches.

Modules 76 are placed in overlying relationship to corresponding banks 50 and 54 with the passages 84 there-through thereby being at an angle of approximately 15° with respect to the horizontal.

Although the dimensions referred to above have been found to be most satisfactory for effectively scrubbing the moist air without impairing flow of such air, it has been determined that the cells may be from $\frac{1}{4}$ inch in diameter up to several inches depending upon the width of wall members 86 forming passages 84. In any event, the depth of passages 84 and thereby the width of strips 86 should be approximately three times the diameter of the individual cells presented by wall members 86.

In operation of cooling tower 10, fan means 40 draws air inwardly through openings 20 and 22 and then pulls such air upwardly through fill assembly 26 for discharge through air outlet 18. However, the air emanating from the upper part of fill assembly 26 and containing droplets of water entrained therein, must pass through the banks 50 and 54 and thence through units 52 and 48 prior to

discharge. The transversely and longitudinally inclined vanes 64 remove a considerable quantity of the water from the moist air, with the water collecting on the outer surfaces of vanes 64 and 74 and thence running downwardly along the lower margins of the same for gravitation from channel 46, and furthermore, the direction of travel of the air is changed for passage through modules 76 forming units 48 and 52. The wall surfaces of components 82 further scrub the air and effectively remove a high percentage of the droplets of water entrained therein with such water flowing downwardly along wall members 86 to the lower margins thereof where such water is collected by vanes 64 and 74 respectively for gravitation onto the fill assembly 26 in a manner as indicated above.

It is to be noted that, although the eliminator structure 43 is extremely compact, the water droplets are efficiently removed from the moist air emanating from fill assembly 26 and that the air stream is directed toward the central part of the upper end of casing 16 for most efficient discharge of such air through fan ring 42 and without any substantial pressure drop in such air.

The utilization of transversely and longitudinally inclined vanes 64 and 74 in banks 54 and 50 respectively, besides serving to increase the efficiency of water removal, also enhances drainage of water from the lower margins of components 82 inasmuch as the water runs down wall members 86 and collects on the lower edges thereof.

Modified eliminator structure for counter-flow type cooling towers is illustrated in FIG. 6 and designated broadly by the numeral 143. The honeycomb modules 176 are identical in construction and disposition with modules 76, but banks 50 and 54 are replaced by honeycomb components 150 positioned beneath each of the modules 176. It is to be preferred that the wall members 186 of each of the banks 150 be interconnected so that the passages 184 therethrough are disposed at an angle of approximately 30° with respect to the horizontal. Also, one-half of the passages 184 should be inclined toward the center of the individual bank 150, while the other half of such passages should be inclined in the opposite direction as shown. In this manner, the air passing upwardly fill assembly 26 is directed towards the central part of casing 16.

The cross-flow type cooling tower illustrated in FIG. 7 and broadly numerated 210 includes a rectangular casing 216 having at least one open side presenting an air inlet 220. A hot water basin 228 in the upper part of casing 212 has a series of openings 230 in the bottom 232 thereof for permitting hot water to gravitate onto the upper end of a vertically inclined fill assembly 226 extending from beneath basin 228 to a point immediately above a cold water sump (not shown). The upper central part of casing 212 has a circular opening 218 therein presenting an air outlet between fill assembly 226 and another fill which is inclined at an angle opposite to the inclination of assembly 226. Fan assembly 240 carried by framework 238 within outlet opening 218, is concentric with an annular fan ring 242 coaxial with outlet opening 218, and is designed to pull air inwardly through opening 220, direct the same horizontally in generally intersecting relationship to the water gravitating through fill assembly 26, and then force the moist air outwardly in a substantially vertical direction through fan ring 242.

The eliminator structure 243 embodying the concepts previously discussed is shown to the right of fill assembly 226 and is preferably in complementary relationship to the outer adjacent face thereof. In the preferred construction, eliminator structure 243 is inclined at an angle of approximately 15° with respect to the vertical.

Means for carrying the components of eliminator structure 243 includes a number of inclined, parallel, upright, wooden supports 244 which have a plurality of inclined, upwardly opening notches 260 therein for receiving elongated, longitudinally and transversely inclined wooden vanes 246. Again it is to be pointed out that vanes 246

in the preferred construction are 3 inches in width and are inclined so that the same are at approximately 60° from the vertical and the longitudinally extending centers thereof spaced approximately 2 inches. The vanes 246 should also be inclined longitudinally thereof at an angle approximately 30° with respect to the horizontal.

The honeycomb modules 276 are identical with modules 76 with the exception of the angle of inclination of the wall members 286 thereof and thus the disposition of air passages with respect to the air emanating from fill assembly 226. In the preferred construction as shown in FIG. 7, the passages 284 are preferably at an angle of about 60° with respect to the horizontal to thereby direct the air upwardly toward the outlet opening 218.

In operation of cooling tower 210, fan means 240 pulls the air in through inlet opening 220 and directs the same horizontally through fill assembly 226 and in intersecting relationship to the water gravitating downwardly from basin 228. The moist air emanating from fill assembly 226 contacts vanes 246 whereby the air is partially scrubbed and is turned upwardly by the angle of inclination of such vanes. The water removed from the air runs down the inclined surfaces of individual vanes 246 and collects on the lower inclined margins thereof. Inasmuch as vanes 246 are longitudinally inclined, the water runs downwardly therealong and thence gravitates along supports 244 into the cold water basin underlying fill assembly 226.

After vanes 246 have partially turned the air upwardly, such air is directed into passages 284 where the air is further scrubbed by impingement thereof on the wall members 286 whereby the air is deflected upwardly and substantially all of the droplets entrained therein are removed prior to passage of the air into outlet opening 218 under the action of fan means 240. It is to be noted that the water collected on the surfaces of wall members 286 runs downwardly thereon and collects on the margins of the same proximal to vanes 246. The water then runs downwardly along the outer surfaces of vanes 246 and eventually into the sump in a manner as set forth above.

It should again be noted that the cells presented by wall members 286 are preferably of transverse hexagonal configuration and having a diameter of 3/4 of an inch with the width of modules 276 being approximately 2 inches. These dimensions may be changed as initially set forth although the defined ratio of three to one should be maintained.

In the modified construction illustrated in FIG. 9, a honeycomb module 250 is substituted for the vanes 246 with the air passages 288 of module 250 being disposed at an angle of 30° with respect to the horizontal and with the adjacent margins of modules 250 and 276 being in abutting relationship.

The embodiment of the instant invention as shown in FIG. 10 illustrates a pair of honeycomb units 350 disposed at angles with respect to each other transversely of the cooling tower casing, both in the direction illustrated in FIG. 1 and also in the transverse direction shown in FIG. 10. Thus the air passing through the eliminator structure is positively forced toward the central part of the fan means in adjacent relationship thereto. It is also to be pointed out that the vanes 364a and 364b are inclined at angles of 45° with respect to the vertical in the transverse direction illustrated in FIG. 10.

It is to be pointed out that in all forms of the invention the air is turned in a manner to effect maximum scrubbing thereof with minimum pressure drop and utilizing relatively inexpensive components that produce maximum efficiency. Although the honeycomb structures have been indicated as being constructed of synthetic resin-impregnated paper, it is to be recognized that the same may be constructed of other materials including aluminum and magnesium alloys, molded or extruded plastic ele-

ments, and other substantially water-impervious and corrosion-resistant substances.

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

1. In eliminator structure for a cooling tower having a casing housing a fill assembly and provided with an air inlet and an air outlet on opposite sides of said fill assembly, said structure including a unit adapted to be mounted on the casing in substantially spanning relationship to said outlet opening and provided with a number of interconnected wall members disposed to define a plurality of spaced, elongated, generally parallel, relatively narrow, individual, open end cells of greater longitudinal length than transverse width, said wall members being disposed at an angle with respect to the normal path of moist air from said fill assembly and entering corresponding cells, sufficient to deflect the entire amount of air passing through respective cells at an angle to effect removal of substantially all of the droplets of water entrained in the moist air leaving the fill assembly and as the same impinges upon said wall members and is directed through said cells.

2. Eliminator structure as set forth in claim 1 wherein said wall members are configured to present cells of generally uniform, hexagonal cross-sectional configuration.

3. Eliminator structure as set forth in claim 1 wherein said wall members are disposed to present a honeycomb configuration having cells of a transverse dimension approximately one-third the transverse width of the unit in the direction of air flow therethrough.

4. Eliminator structure as set forth in claim 1 wherein said wall members are formed of paper stock impregnated with a water impervious synthetic resin material.

5. Eliminator structure as set forth in claim 1 wherein said stock is kraft paper and said material is a phenolic resin.

6. Eliminator structure as set forth in claim 1 wherein is provided a pair of units disposed in adjacent relationship with said wall members thereof positioned to cause the cells presented thereby to be in substantially aligned, direct intercommunication, the wall members of one unit being positioned at an angle with respect to the wall members of the other unit.

7. Eliminator structure as set forth in claim 1 wherein the outer margins of said wall members defining said cells lie in spaced, generally parallel, imaginary planes at an angle with respect to the longitudinal axes of the cells.

8. Eliminator structure as set forth in claim 7 wherein said planes are at an angle with respect to the horizontal and to the normal direction of the moist air emerging from said fill assembly.

9. Eliminator structure as set forth in claim 1 wherein is provided air deflector means adapted to be mounted in the casing between said fill assembly and the unit, said deflector means including spaced, elongated, generally planar, substantially parallel elements having opposed, parallel surfaces at an angle with respect to the wall members and to the normal direction of said moist air emerging from said fill assembly, said surfaces being disposed at an angle with respect to the longitudinal axes of the cells to change the direction of movement of the moist air prior to passage of the same into the cells of said unit.

10. Eliminator structure as set forth in claim 9 wherein said elements of the deflector means comprise a number of elongated, relatively narrow vanes disposed in abutting relationship to the proximal margin of said unit.

11. Eliminator structure as set forth in claim 10 wherein said vanes are longitudinally inclined with respect to the horizontal.

12. In eliminator structure for a counterflow cooling tower having a casing housing a fill assembly and provided with an air inlet and an upwardly opening air outlet on opposite sides of said fill assembly, said air outlet overlying the fill assembly and there being fan means

adjacent said air outlet for pulling air in through said inlet, directing such air upwardly through the fill assembly and effecting vertical discharge of the moist air through said outlet, said structure comprising a unit adapted to be mounted on the casing in substantially spanning relationship to said outlet opening and provided with a number of interconnected wall members disposed to define a plurality of spaced, elongated, generally parallel, relatively narrow, individual, open end cells of greater longitudinal length than transverse width said wall members being disposed at a sufficient acute angle with respect to the vertical to thereby deflect the moist air passing into said unit and impinging upon said wall members whereby droplets of water entrained in the moist air emerging from said fill assembly are removed therefrom, certain of the wall members being inclined in one direction and other wall members being inclined in another direction to present passages having intersecting axes for directing the air toward the central part of said air outlet.

13. Eliminator structure as set forth in claim 12 wherein is provided air deflector means adapted to be mounted in the casing between said fill assembly and the unit, said deflector means including spaced, elongated, generally planar, elements having opposed, parallel surfaces at an angle with respect to the wall members and to the normal vertical direction of said moist air emerging from said fill assembly, the elements underlying said certain wall members being positioned to direct the air into said air passages presented by said certain wall members, and the elements underlying said other wall members being disposed to direct air into the passages presented by said other wall members at an angle with respect to the longitudinal axes of the cells defined by said certain members and by the cells defined by said other wall members respectively.

14. Eliminator structure as set forth in claim 13 wherein said certain wall members and said other wall members present individual modules, said modules being disposed at acute angles with respect to the horizontal to present substantially V-shaped eliminator structure with the apex thereof in alignment with the center of said air outlet.

15. Eliminator structure as set forth in claim 14 wherein said elements are longitudinally inclined and in parallel, abutting relationship to the underface of respective modules.

16. In eliminator structure for a crossflow cooling tower having a casing housing a fill assembly having parallel, vertically inclined, upright faces, said casing being provided with an air inlet in one side thereof and an upwardly opening air outlet with the air inlet and air outlet located on opposite sides of said fill assembly, said structure comprising a unit adapted to be mounted on the casing adjacent the air discharge side of said fill assembly and in substantially spanning relationship to the air outlet portion of said casing, said unit being provided with a number of interconnected wall members disposed to define a plurality of spaced, elongated, generally parallel, relatively narrow, individual, open end cells of greater longitudinal length than transverse width, said wall members being disposed at an acute angle with respect to the vertical in a direction to cause the passages to face toward said air outlet and with the axes of the cells being inclined sufficiently to cause all of the moist air from the fill assembly and entering the cells, to be deflected upwardly in respective cells at an angle to cause the droplets of water entrained in said moist air to collect on said wall members and thereby being removed from said air.

17. Eliminator structure as set forth in claim 16 wherein opposed, major faces of said unit are generally parallel to the proximal inclined face of the fill assembly adjacent said unit.

18. Eliminator structure as set forth in claim 16 wherein is provided air deflector means adapted to be mounted in the casing between said fill assembly and the unit, said deflector means including spaced, elongated, gen-

erally planar, substantially parallel elements having opposed, parallel surfaces at an angle with respect to the horizontal and to the wall members, said elements being disposed to direct the moist air from the fill assembly, upwardly and into passages presented by said wall members, said surfaces being at a different angle with respect to the horizontal than said wall members.

References Cited in the file of this patent

UNITED STATES PATENTS

852,122 Kinealy ----- Apr. 30, 1907

5

10

1,761,170
2,278,432
2,627,396
2,882,996
2,892,509

703,823
175,601

Andrews ----- June 3, 1930
Dunn ----- Apr. 7, 1942
Simons ----- Feb. 6, 1953
Lanier et al. ----- Apr. 21, 1959
Baker et al. ----- June 30, 1959

FOREIGN PATENTS

Great Britain ----- Feb. 10, 1954
Germany ----- Oct. 8, 1906