O. M. GOULD.

WATER COOLING TOWER.

APPLICATION FILED MAY 11, 1906.

Patented Sept. 29, 1908.

2 SHEETS—SHEET 1.

899,665.

FIG. 1.

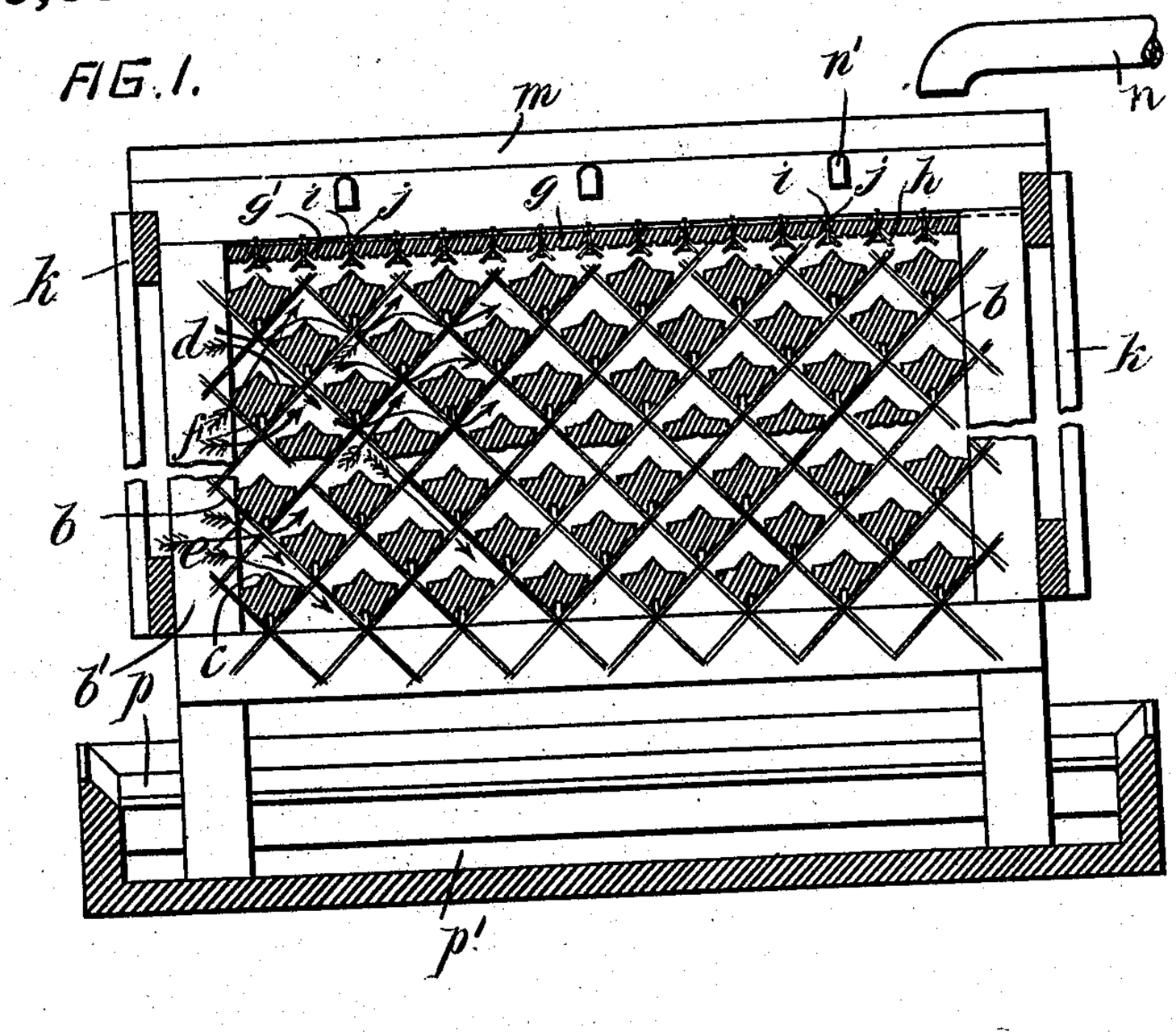
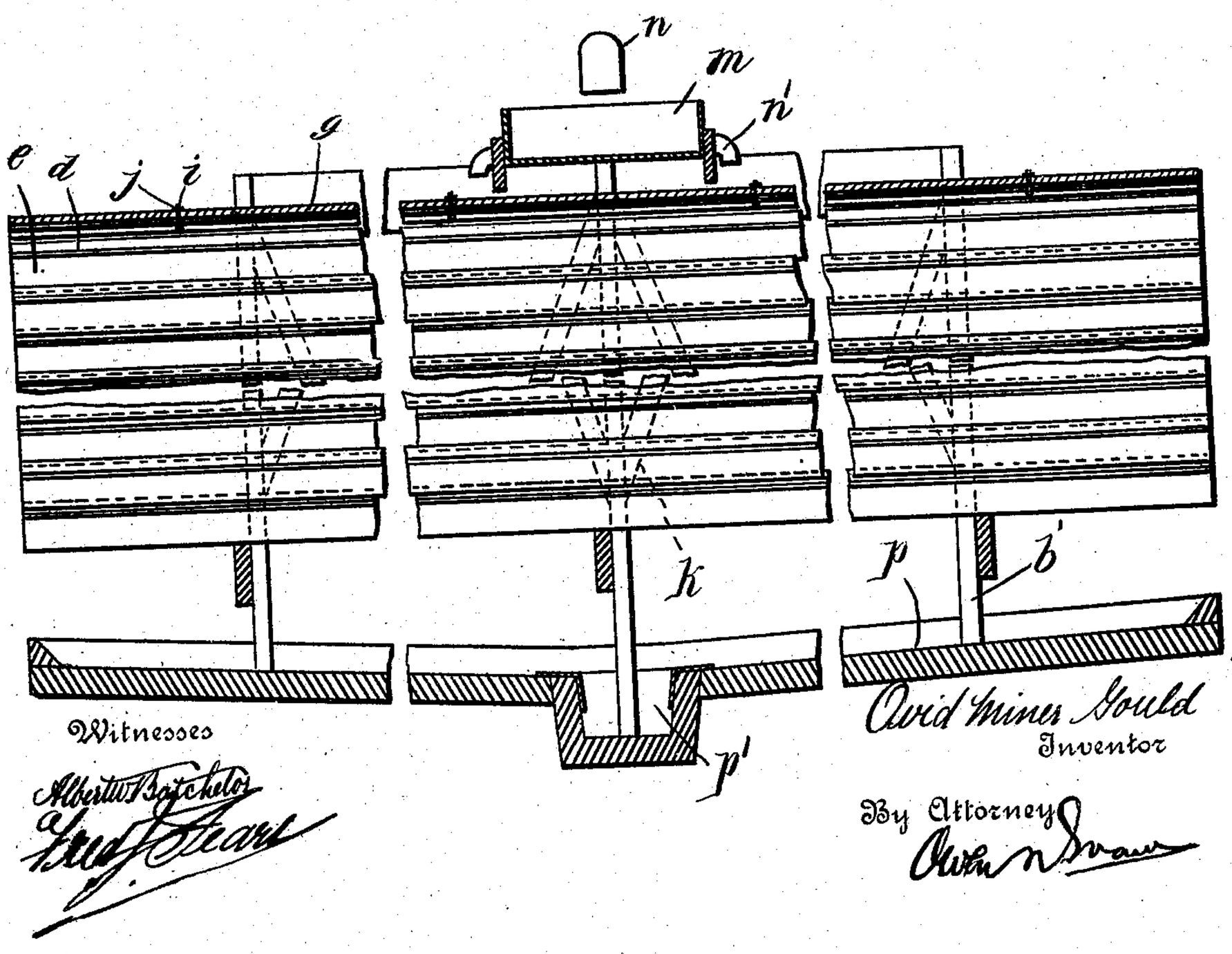


FIG. 2



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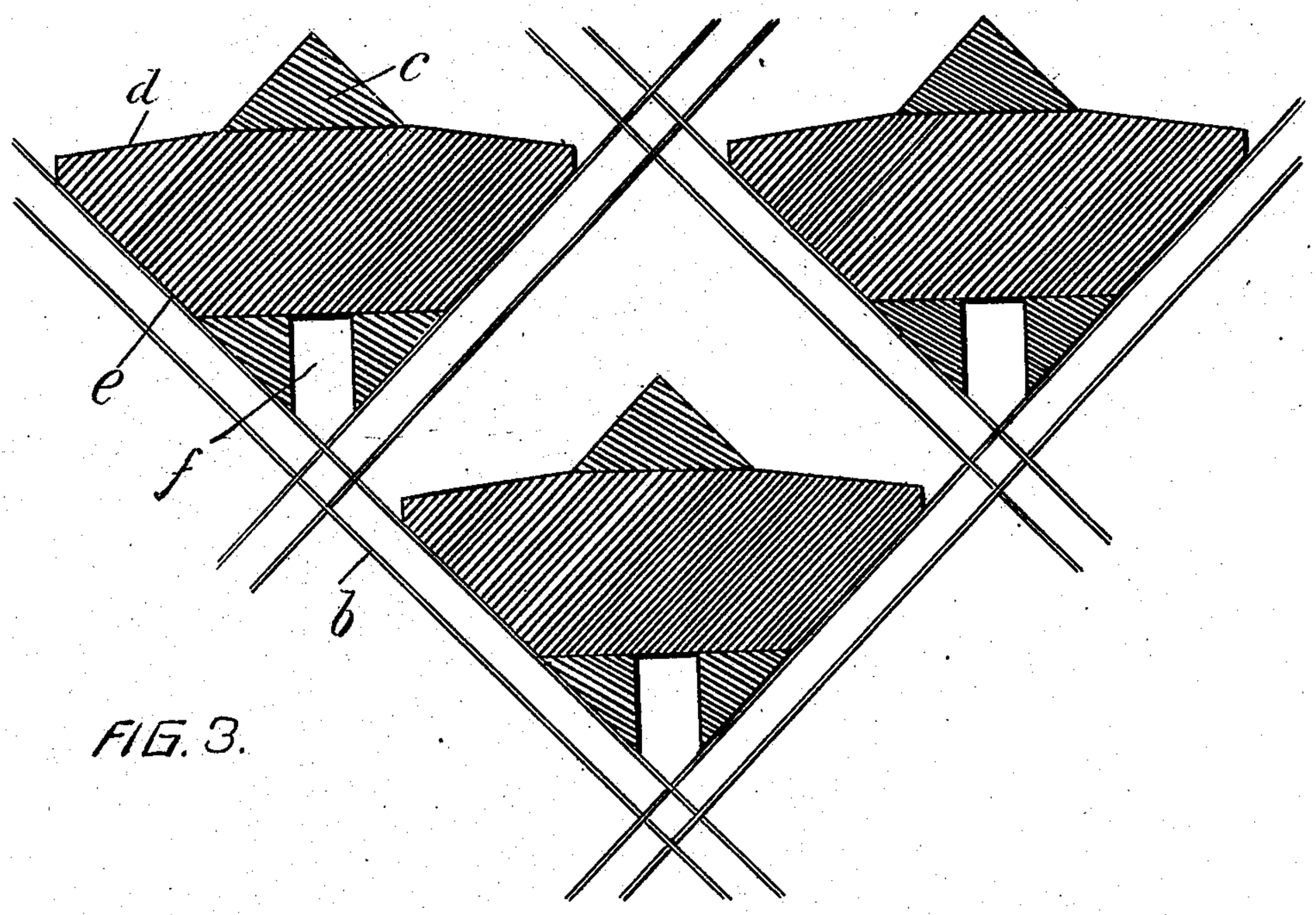


FIG. 3.

FIG. 4.

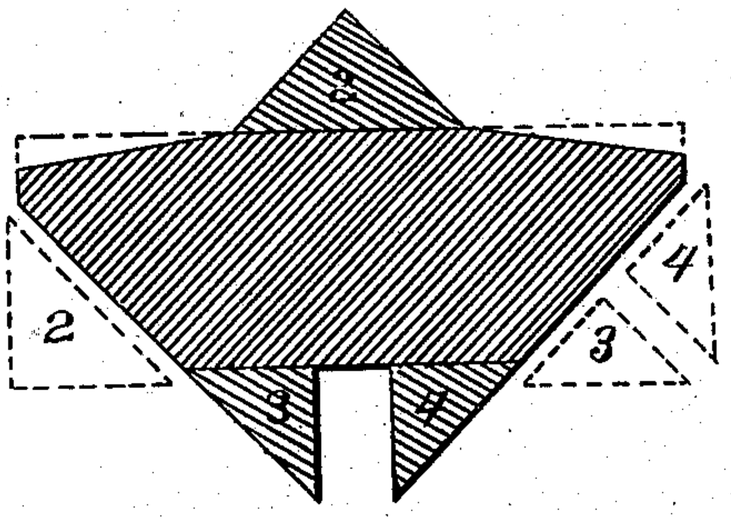
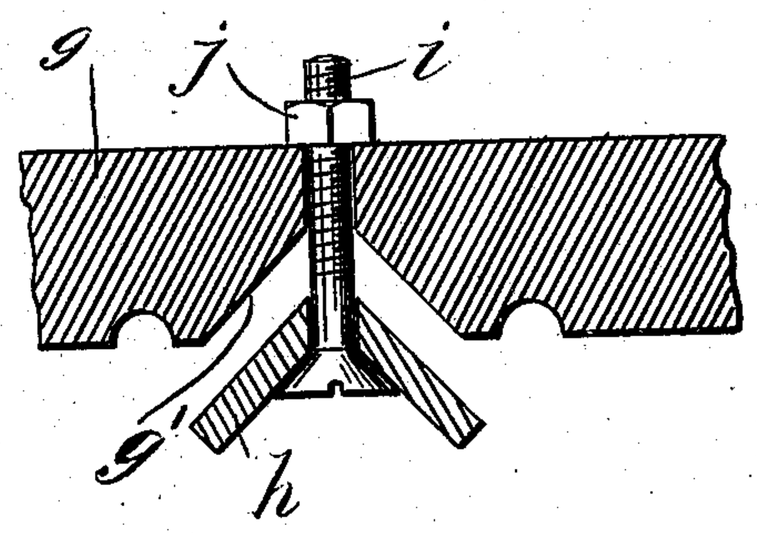


FIG. 5.



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UNITED STATES PATENT OFFICE.

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WATER-COOLING TOWER.

No. 899,665. Specification of Letters Patent. Patented Sept. 29, 1908.

Application filed May 11, 1906. Serial No. 316,394.

To all whom it may concern:

Be it known that I, OVID MINER GOULD, of the city of Montreal, Province of Quebec, Canada, have invented certain new and useful Improvements in Water-Cooling Towers.

My invention has for its object to provide a tower with a larger cooling surface to a given cubic space, better ventilation, greater retardance of the water in its passage through the tower, and greater facilities for maintaining the water in film-like condition while it runs over the retarding devices, than have been possible in towers heretofore in use.

For full comprehension, of my invention reference must be had to the accompanying drawings, forming a part of this specification, in which similar reference characters indicate the same parts and wherein

Figure 1 is a transverse vertical sectional view of a water cooling tower constructed according to my invention; Fig. 2 is a longitudinal sectional view thereof; Fig. 3 is an enlarged detail view illustrating several of my improved retarding bars in transverse section and the means for supporting the same; Fig. 4 illustrates the members of the bar ready for assembling; and Fig. 5 is an enlarged detail sectional view illustrating the valvular distributing means for regulating the flow of the water from the distributing platform.

The invention may be said briefly to consist of a pair of parallel vertical lattice frames made up of interlaced lengths of wire *b* secured to a preferably wooden frame *b'* and supporting retarding and aerating bars each presenting a longitudinal central triangular projection or apex *c* and a pair of downwardly inclined water shedding top portions *d*, while the sides *e* thereof converge downwardly and terminate at their lower ends in an upwardly extending longitudinal recess *f*; a horizontal distributing platform extending over this frame comprises a series of separated boards *g* the spaces between which are located in direct vertical line with the apices presented by the two top rows of retarding and aerating bars, and the lower corners of these boards are beveled (as at *g'*) thus presenting flared lower openings to the said spaces with which a series of angle-irons *h* are adjustably supported in valvular relation by bolts *i* projecting upwardly through such angle-irons and threaded into nuts *j* resting upon the top of the boards. The interlaced wires of the lattice work are preferably arranged in pairs for strengthening purposes, a series of braces *k* connect the lattice frames rigidly together, and a water supplying box *m* with a water supplying pipe *n* leading thereinto and a series of discharge pipes *n'* leading therefrom, is located above the distributing platform, while an inclined flooring, *p*, beneath the tower receives the cooled water and conducts it to any suitable receptacle *p'* from which it may be distributed as required.

My improved retarding and cooling bars are preferably (as shown in Figs. 3 and 4) each constructed from a rough surfaced plank the lower corners of which are rough sawed off, at an angle of 45°, one of such corners (2) being nailed along the middle of the top, and the other corner being subdivided into two pieces, 3 and 4, of triangular cross section, and nailed upon the bottom a short distance apart, with their inclined faces in line with the converging sides of the main portion of which they form a contraction, while the top at each side of the piece 2 is inclined slightly downwardly to its side edges.

The operation of my improved water tower is as follows:—The water pouring into the distributing box *m* flows therefrom in several separate streams upon the distributing platform at as many different points, spreading completely over the latter and finding its way through the crevices between the boards and falling in rain drops upon the apices of the bars beneath, over which latter the water spreads and runs down the converging sides in a film which again breaks into two series of drops at the two lower edges of the bars, the two series of drops falling from each bar upon the bar directly beneath it, one series upon one side of the apex of the said lower bar and the other series upon the other side of such apex, and thus it passes slowly downward alternately, in film-like thinness, and in the multifarious small drops into which a film of water will naturally break, from bar to bar until it finally reaches the inclined flooring. Simultaneously the air blowing upon either side of the tower will flow diagonally upwards or downwards, as indicated by feathered arrows in Fig. 1 or in a staggered path from side to side, as indicated by unfeathered arrows in such figure, thus thoroughly aerating the water, which aeration is facilitated by the film-like thinness of the streams and the smallness of the drops.

The main advantages of the bars are that they present a great area of surface over

which the water spreads, which has the effect not only of thinning the stream out into a film but also retarding its flow while the roughness of the surface increases the resistance offered to the film and consequently further retards its flow and with the increased area increases the time in which it is subjected to the evaporating and cooling action of the air.

What I claim is as follows:—

1. In an aerating and cooling device, a retarding bar having a central upwardly extending projection upon its top, the base of the said projection being of less width than the top of the said bar for the purpose of presenting a substantially horizontal surface at each side of the projection, and a pair of separated downwardly extending projections upon the bottom of the bar.

2. In an aerating and cooling device, a retarding bar having a central upwardly extending projection upon its top, the base of the said projection being of less width than the top of the said bar for the purpose of presenting a substantially horizontal surface at each side of the projection, a pair of separated downwardly extending projections upon the bottom of the bar, and a pair of angular aerating and cooling surfaces leading from opposite sides of the said top to the said lower projections.

3. In an aerating and cooling device, a retarding bar having a central upwardly extending projection upon its top, the latter exceeding in width the said projection, and a pair of separated downwardly extending projections upon the bottom of the bar, and each located inward from the side edges of such bar, and a pair of angular aerating and cooling surfaces leading from the said side edges to the said lower projections.

4. In an aerating and cooling device, a retarding bar presenting converging sides terminating in a bottom and having a member of triangular cross-section secured along the middle of the top thereof the base of such triangular member being of less width than the said top to present a pair of retarding surfaces one on each side of the middle triangular member, and a pair of members of triangular cross-section secured a short distance apart along the said bottom and forming a continuation of the said converging sides.

5. In a water cooling tower the combination with a plurality of aerating and cooling bars each presenting an angular apex extending throughout its length for dividing a stream falling upon such apex, and means maintaining such division during the fall of the water throughout the tower, of a water distributing platform made up of a series of separated boards with the spaces therebetween located over the apices of the bars, and means dividing the water falling through such spaces and causing the same to fall upon opposite sides of the said apices.

6. In a water cooling tower the combination with a plurality of aerating and cooling bars each presenting an angular apex extending throughout its length for dividing a stream falling upon such apex, and means maintaining such division during the fall of the water throughout the tower, of a water distributing platform made up of a series of separated boards with the spaces therebetween located over the apices of the bars, and angle irons dividing the water falling through such spaces and causing the same to fall upon opposite sides of the said apices.

7. A water cooling tower comprising a pair of lattice-work frames, a plurality of aerating and cooling bars supported by such lattice-work and each presenting a longitudinal apex of angular cross-section, the sides of each bar converging downwardly and the lower ends thereof being separated by an upwardly extending recess, a water distributing platform supported above the said bars and having a plurality of crevices parallel to and in vertical line with the bars, a plurality of angle irons, and means supporting such angle irons in valvular relation to the said crevices.

8. A water cooling tower comprising a pair of wire lattice-work frames, a plurality of aerating and cooling bars supported by such lattice-work and each presenting a longitudinal apex of angular cross-section, the sides of each bar converging downwardly and the lower ends thereof being separated by an upwardly extending recess, a water distributing platform supported above the said bars and having a plurality of crevices parallel to and in vertical line with the bars, a plurality of angle irons, and adjustable means supporting such angle irons in valvular relation to the said crevices.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

OVID MINER GOULD.

Witnesses:
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FRED. J. SEARS.