

July 26, 1932.

D. EDGE

1,868,632

SPRAYING SYSTEM

Filed April 28, 1930

Fig. 3.

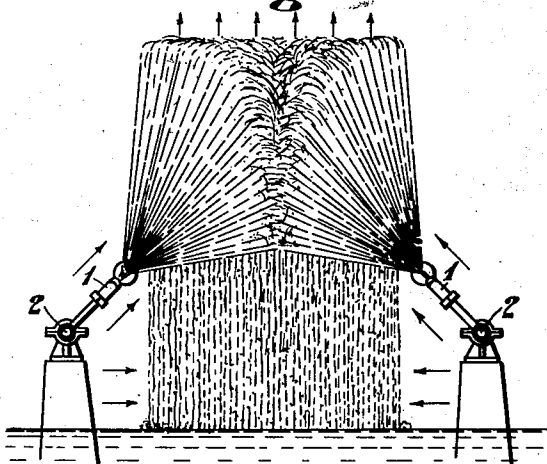


Fig. 3^a.

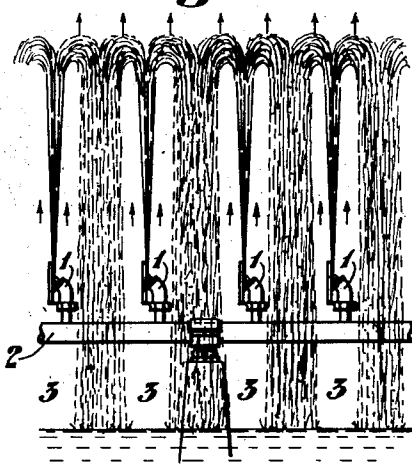


Fig. 4.

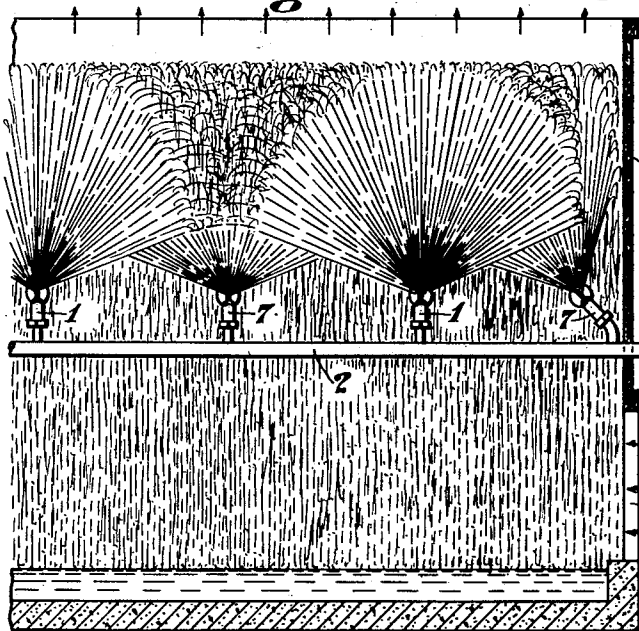


Fig. 4^a.

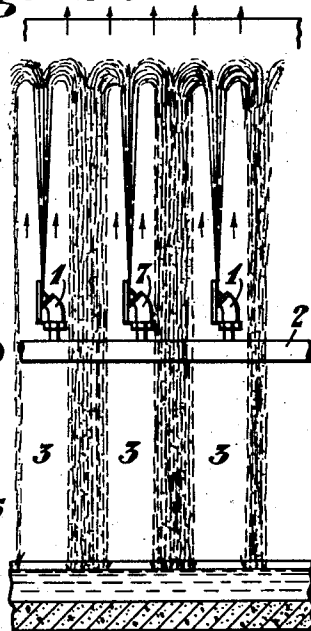


Fig. 1.

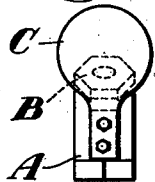
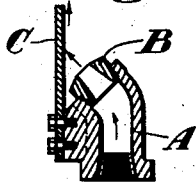


Fig. 2.



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UNITED STATES PATENT OFFICE

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SPRAYING SYSTEM

Application filed April 28, 1930. Serial No. 448,155.

This invention relates to a system of utilizing fluid spray and has in view the conservation of liquid and gaseous mediums in water and air conditioning installations,—such as in boiler rooms where a limited supply of water may be available and where, also, the water is sometimes chemically treated,—by a particular construction and arrangement of spray devices whereby the maximum cooling or heating effect and absorptive action may be obtained from a co-operative use of such mediums.

In the drawing:—

Figure 1 is a view in elevation of a type of spray nozzle particularly adapted for the improved system, and

Fig. 2 is a view in transverse vertical section thereof.

Figs. 3 and 3a are, respectively, views in front and side elevation of an arrangement of spray devices and distribution of spray for adapting the system to cooling water in a spray pond, and

Figs. 4 and 4a are similar views showing an adaptation of the system to a cooling tower.

In order to effect the desired distribution of spray, a baffle type of nozzle assembly substantially similar to that shown in Figs. 1 and 2 is adopted, said assembly comprising a body member A, a nozzle B and baffle or distributor plate C which is secured to said body member A. The fluid to be sprayed passes through the passageway provided in the body under a predetermined pressure in accordance with the desired velocity and then through the nozzle B, which increases its velocity, and strikes the distributor plate C at a predetermined angle. The fluid flattens on the distributor plate C and passes off the said plate at its circumference in the form of a flat spray, the width of which is determined by the angle of impingement against said plate.

In Fig. 3 the spray nozzles are generally

indicated at 1 and the piping for conveying the water to be cooled to the nozzles at 2. By this particular arrangement it will be seen that distinct passages or channels 3 are provided for the flow of air or a like gaseous medium between the sprays. The two flat surfaces of each spray moving at high velocity induce the air to move along with the spray, note arrows. The air is thus caused to pass through the spray where its velocity ceases and at a point where the spray changes its direction and falls downward into the pond. The air, therefore, is caused to pass through the spray particles when at the point at which the velocity imparted to them as they leave the nozzle is expended and at which time a minimum of resistance is offered to the escape of the air and entrained vapors after they have served their purpose of removing heat from the spray. The air passing on both sides of the spray and in close contact therewith effects a transfer of heat from the water by conduction, convection and vaporization. It has been found by this particular arrangement of spray devices and application of spray that loss of minute water particles which are ordinarily carried away by the movement of the air through the spray is reduced to a minimum. Furthermore, a more thorough and economical transfer of heat from the spray water to the air is effected by providing the maximum surface area to be acted upon. The liquid or water expelled from the spray nozzles expends its energy in inducting and propelling the air or gaseous medium, thereby accelerating the flow of such medium, so that a forced circulation of air is automatically established in the system.

In Figure 4 an application of the improved system to a cooling tower is shown. In this arrangement the nozzles of each alternate row are shown as staggered, so that the outer portion of the sprays of one row pass near the center of the spray of its adjacent row, thereby obtaining the maximum distribution

of spray when a number of rows of nozzles both lengthwise and crosswise are required. The wall or framework of the tower is indicated at 4, said wall being provided with
 5 openings 5, to admit atmospheric air into the channels 3, as indicated by the arrows.

The advantages of my invention will be apparent to those skilled in the art as there is a substantial economy in liquid and gaseous mediums effected. This is of particular
 10 importance where water is more or less scarce and also in installations where the water is to be chemically treated or subjected to treatment by a gaseous medium to render it free
 15 of objectionable properties, and conversely, the system is equally advantageous where gas or like mediums are to be subjected to treatment by water or analogous liquids, the improved system promoting either heat transfer
 20 and absorption of a gaseous body by a liquid body or absorption of liquids by gases as the requirements of each particular installation demand.

I claim:

25 1. The method of conditioning fluids which consists in discharging liquid fluid upwardly along at least two parallel lines at a predetermined initial velocity in the form of flat
 30 sprays which have their broadest dimensions transverse to the lines along which the liquid is discharged, said sprays of each line being of sufficient breadth to overlap the spray of the next line and form continuous flat spray
 35 walls extending transversely of the lines of discharge of the liquid with channels between said flat spray walls admitting a gaseous fluid into said channels, said liquid serving to propel and promote circulation of the gaseous
 40 fluid through said channels and to force said gaseous fluid to pass through said sprays at points at which the imparted or initial velocity is expended.

2. The method of conditioning fluids which consists in discharging liquid fluid upwardly
 45 along at least two parallel lines at a predetermined initial velocity in the form of flat sprays which have their broadest dimensions transverse to the lines along which the liquid is discharged, said sprays of each line being
 50 of sufficient breadth to overlap the spray of the next line and form continuous flat spray walls extending transversely of the lines of discharge of the liquid with channels between said flat spray walls admitting a gaseous
 55 fluid into said channels, said liquid serving to propel and promote circulation of the gaseous fluid through said channels and to force said gaseous fluid to pass through said space at points at which the imparted or initial
 60 velocity is expended.

3. Apparatus for conditioning fluids comprising, in combination, a plurality of combined spray nozzles and baffle members arranged in a plurality of parallel rows, said
 65 baffles being immediately adjacent said noz-

zles and extending vertically, said nozzles being directed upwardly and toward said baffles on an angle so as to discharge liquid against said baffles and form a vertical flat liquid
 70 spray, the sprays from the adjacent nozzles of each row overlapping so that the several sprays of each row combine to form upwardly moving substantially continuous walls of liquid spray, said sprays being adapted to induce
 75 a flow of gaseous fluid or air upwardly between said walls of liquid spray, which gaseous fluid will pass through said liquid spray at points at which the imparted initial velocity is expended.

In testimony whereof, I have hereunto set
 my hand.

DEXTER EDGE.

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