

Aug. 18, 1931.

G. S. DAUPHINEE

1,819,595

AIR WASHER

Filed May 10, 1926

2 Sheets-Sheet 1

Fig. 1.

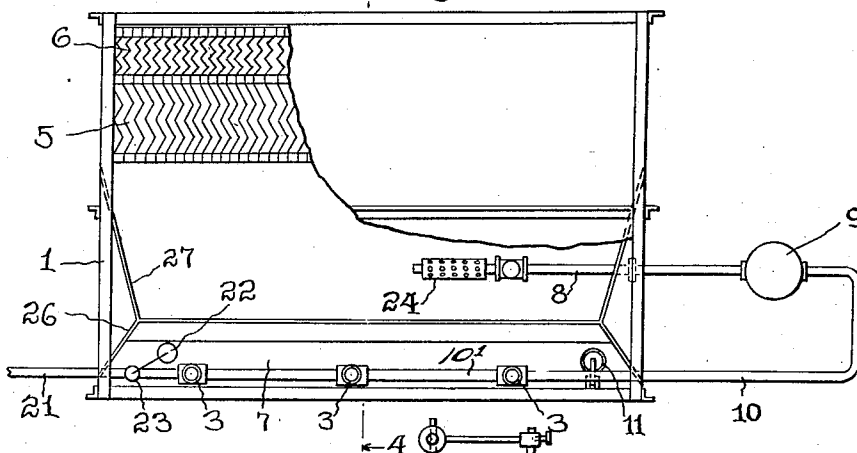


Fig. 2.

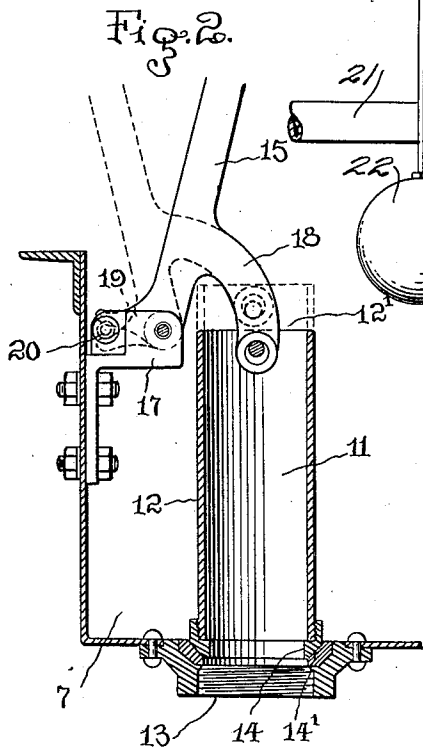


Fig. 7.

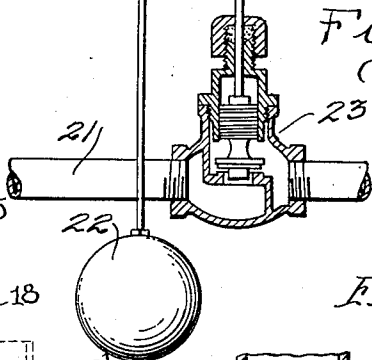
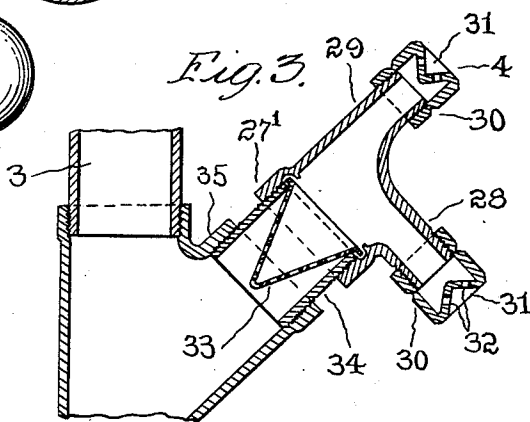


Fig. 3.



INVENTOR
George S. Dauphinee
BY
J. M. & J. M.
ATTORNEY

Aug. 18, 1931.

G. S. DAUPHINEE

1,819,595

AIR WASHER

Filed May 10, 1926

2 Sheets-Sheet 2

Fig. 4.

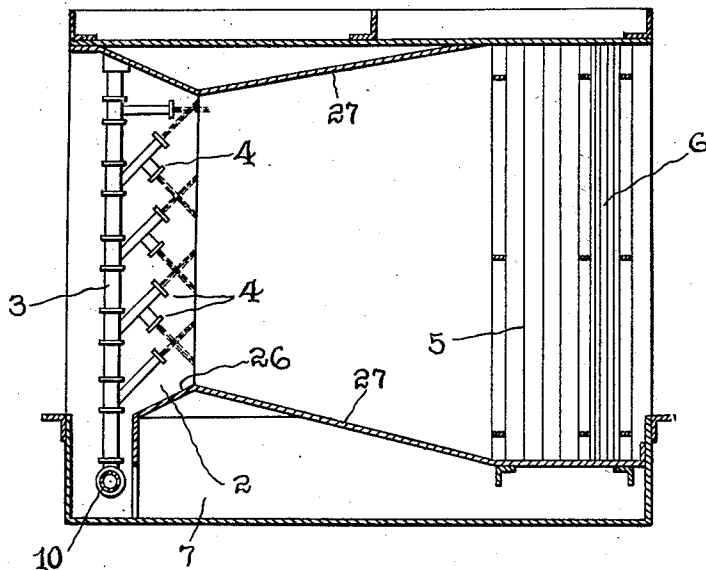


Fig. 5.

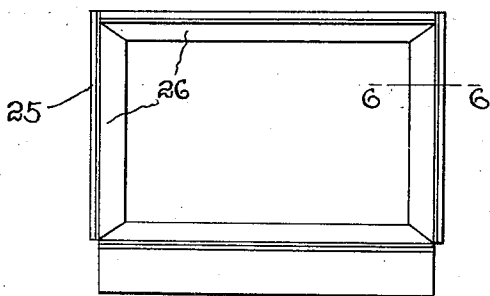
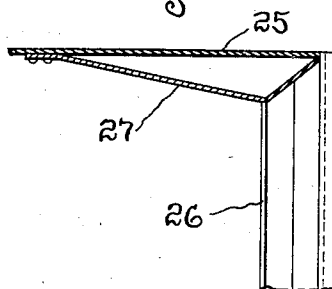


Fig. 6.



INVENTOR
G. S. Dauphinee
BY
James D. Jones
ATTORNEY

UNITED STATES PATENT OFFICE

GEORGE SCOTT DAUPHINEE, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE COOLING TOWER CO., INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

AIR WASHER

Application filed May 10, 1926. Serial No. 107,952.

My invention is for an improvement in air washers.

Among the principal objects which the present invention has in view are to provide a convenient device for the removal of dust, dirt and other impurities from the air; to provide means whereby the air may be purified by being passed through a bank of spray; to provide means whereby the air may be compressed on entering the washing chamber thereby bringing the dust particles in closer formation so that they may be more effectively intercepted by the spray; to provide means whereby the water may be automatically renewed without interruption of the operation of the air washer; to provide a novel and efficient system of eliminator and scrubbing plates in an air washer; to provide, in an air washer, a spray nozzle which will produce a spray of flat fan shaped form so arranged that the spray will be efficiently distributed; to provide in an air washer, a nozzle which will not become clogged; to provide an air washer in which a section of spray nozzles may be cut out for cleaning, repair and the like without interrupting the operation of the device and to provide a device by which all or a part of the above objects may be attained.

I accomplish these objects by the device illustrated in the accompanying drawings in which

Figure 1 is a plan view of the device with parts broken away,

Figure 2 is a sectional detail view of the drain mechanism,

Figure 3 is a sectional detail view of a nozzle,

Figure 4 is a vertical section on the line 4—4 of Figure 1.

Figure 5 is a detail view of the entrance to the washing chamber, and

Figure 6 is a section of the same on the line 6—6 of Figure 5.

Figure 7 shows a sectional view of the float valve.

Similar characters of reference refer to similar parts throughout the several views.

My device includes a washing chamber 1 positioned in an air duct and having an in-

wardly converging entrance 2 in which are provided vertical risers 3 carrying a plurality of spray nozzles each adapted to throw a flat fan shaped spray of water, and arranged in parallel, horizontal rows so that the flat sides of the fan shaped spray from the nozzles of each horizontal row will be in the same horizontal plane and so inclined as to intercept and impinge the spray thrown by adjacent nozzles thereby increasing the breaking up of the entire spray mass and distributing it evenly over the sectional area of the washing chamber, as indicated in Figure 4. In the rear of the washing chamber I provide a series of rows of vertical plates 5, the plates of each row joining those of the adjacent rows to form an obtuse angle.

These plates 5 are spaced apart laterally to form passages whereby the air and fine mist drawn through the passages is caused to repeatedly change direction and the mist particles being heavier than the air repeatedly cross its path, subjecting the air to severe scrubbing action. In the rear of these last mentioned plates 5 and adjacent the exit of the washing chamber I provide a series of vertical plates 6 in parallel rows, the plates in each row being set at angles of approximately ninety degrees to the plates in the next adjacent rows forming between them air passages having sharp turns which serve to eliminate the surplus moisture and any remaining dust particles from the air.

Below the risers 3, I provide a water tank or box 7, from which a discharge pipe 8 leads to a pump 9, a pipe 10 connects the pressure side of the pump 9 with a header 10¹ for the risers 3.

In the tank or box 7 I provide a combined drain and overflow valve 11, comprising an open pipe 12, through which the water, when at the level of its open upper end 12¹ will drain off into a drain pipe 13. The lower end of pipe 12 forms a drain valve 14 to engage the valve seat 14¹ which serves as a seal against the leakage of water when the valve is in its normal closed position.

On this valve 11 I provide an operating lever 15 pivoted on a suitable support 17

and having an arm 18 secured to the valve 11. The lever 15 has a heel 19 which normally rests upon a locking pin 20 slidably mounted in the support 17 whereby the valve 11 is normally held in its depressed closed position. When it is desired to open the valve 11 to flush the tank 7, the pin 20 is withdrawn and the lever 15 moved over to the position shown by the dotted lines in Figure 2 whereby the valve 11 will be raised, thereby permitting any water in the tank 7 to drain out through the drain 13.

Water or other liquid is supplied directly to the header 10¹ by a pipe 21 from a source of supply such as a water main. A float 22 and valve 23 of the usual automatic type is provided in the tank 7 to shut off the water from the source of supply when a sufficient quantity of water is provided in the tank 7. The float 22 and valve 23 will serve to admit, from the source of supply, such a quantity of water as may be required from time to time to compensate for water loss in operation, by evaporation and the like, whereby the tank 7 will be kept supplied with sufficient water for operation.

The water in the tank 7 is normally drawn therefrom through a strainer 24 on the open end of pipe 8 and is circulated by the pump 9 through the pipes 8 and 10 and header 10¹ to the risers 3, and is discharged through the spray nozzles 4 carried by the risers 3 from which it is collected in the tank 7 to be redistributed.

The supply pipe 21 is of sufficient capacity to supply the quantity of water required by the spraying capacity of the nozzles 4, 4.

When it is desired to clean out the tank 7, the lever 15 is thrown over to the position shown by the dotted lines in Figure 2 whereby the pipe 12 of valve 11 will be raised permitting the water in the tank 7 to drain off through the drain 13, thereby causing the float valve 23 to open the water supply pipe 21. The pressure exerted by the pump 9 will prevent the water or liquid from the outside supply from entering the tank 7 thru pipe 8, forcing it to go thru the risers and nozzles 4, 4. The drain 13 is designed in proportion to the supply pipe 21 so that the water will drain off more rapidly than it is supplied and the falling spray water from the nozzles 4 will serve effectively to wash and flush the tank 7 when the drain is open. When the tank has been cleaned out, the lever 15 is again thrown back to its normal position closing the valve 11 of the drain 13 and as the tank 7 fills the float 22 will rise closing the valve 23 and shutting off the outside water supply from the pipe 21 when the normal circulation of water as above described will be restored.

I have found it preferable to provide at the entrance of my improved washer, a

contracted neck or throat, which serves to increase the washing efficiency of the device and prevents back draft, and as the cross area is diminished at the exit side, by the eliminator plates, this narrow or contracted entrance serves to equalize the cross area at the entrance and exit. This contracted neck or throat is preferably formed in the rectangular casing 25 by converging plates 26, 26 and posteriorly thereto by plates 27, 27 diverging at a lesser angle than the converging angle of plates 26, 26 to minimize the impact friction loss.

My improved spray head includes a fitting 27¹ which is preferably set at a vertical angle of forty-five degrees to the riser 3. The fitting 27¹ has two counterpart branches 28 and 29 positioned at right angles to each other and set in the same vertical plane. On each of these branches, I provide a nozzle 30 having a concave head 31 provided with openings 32, 32 so arranged that the jets of the water issuing therefrom will impinge and form spray.

At the base of the spray nozzle I provide a conical strainer 33 which serves to prevent foreign substances in the water from clogging the nozzle openings. This strainer 33 is preferably held in position by means of a screw threaded sleeve 34 which also serves as a union by which the spray nozzle is joined to a V 35 provided in the riser 3.

My device being thus assembled, is positioned in the ventilation duct and the air entering the device passes through the bank of spray produced by the nozzles 4, 4. The dust and other impurities in the air are washed out by this spray and the air then passes through the angular passages between the washer plates 5 where it is scrubbed and then passes through the sharp angular passages between the eliminator plates 6 where the free moisture is eliminated, and the air is then passed on through a suitable duct for use. The falling of spray from the nozzles 4 carries with it the dust and other impurities to the tank 7 and the water from the plates 5 and 6 in like manner is conducted to the tank 7 from which the water is forced by pump 9 to the nozzles 4 producing a continuous flow as above described.

Having thus described my invention, what I claim is:

1. In a device of the character described the combination of a chamber, the bottom of said chamber forming a tank, a header pipe in said tank, risers on said header pipe, said risers having nozzles thereon, a strainer in said tank, pipe means connecting said strainer and said header pipe, a pump in said pipe means, other pipe means connected to said header pipe, an automatic valve in said other pipe means and means to drain said tank.

2. In a device of the character described the combination of a chamber having an entrance, risers in said entrance, nozzles on said risers, a tank beneath said chamber, a header pipe in said tank, said header pipe operatively connecting said risers, pipe means connected to said header pipe and terminating in said tank, a pump in said pipe means, whereby liquid in said tank may be supplied to said nozzles, other pipe means connected to the header pipe from an outside liquid supply, an automatic valve in said tank and said other pipe means whereby said outside supply will feed said nozzles when the water in the tank falls below a predetermined point.

3. In an air washer the combination of a washing chamber, spray means therein, a tank adapted to collect the water from said spray means, a pipe connecting said tank and said spray means, a pump in said pipe connection and adapted to re-circulate the water to the spray means when the water in the tank is above a predetermined level, a drain in said tank, a valve adapted to open said drain and thereby discontinue the re-circulation of water by said pump, a supply pipe adapted to supply water to said spray means independent of said pump, and a valve actuated by the difference in level of water in the tank resulting from the manipulation of the said drain valve and adapted to open and close said last mentioned independent supply means.

4. An air washer comprising in combination, a washing chamber, a plurality of risers therein, spray nozzles on said risers and adapted to discharge a curtain of spray over the area of the entrance of the washing chamber, baffles arranged anteriorly of said curtain of spray and adapted to eliminate moisture from the air passing through said curtain of spray, a header pipe connecting said risers, a tank adapted to collect water discharged from said spray nozzles, a pump, a suction pipe in said tank and having its mouth spaced from the bottom of the tank and connected with said pump, a second pipe connecting said pump and said header pipe, a drain in the tank, a valve adapted to open said drain and thereby cause the water in the tank to fall below the level of the mouth of the said suction pipe, a supply pipe adapted to supply water to said spray nozzles independent of the pump, and a valve actuated by the difference in level of the water in the tank resulting from the manipulation of the said drain valve and adapted to open and close the said last mentioned supply means.

In testimony whereof, I have signed my name to this specification this 27th day of April, 1926.

GEORGE S. DAUPHINEE.