Jan. 15, 1924. 1,480,775

N. C. MARIEN

AIR WASHER

Filed Jan. 5, 1923

Fig. 1.

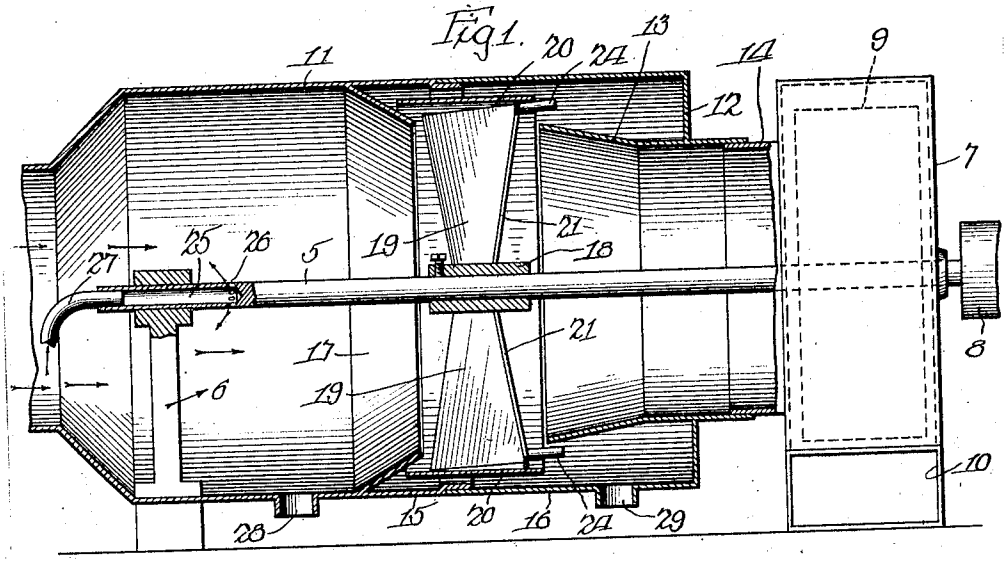


Fig. 3.

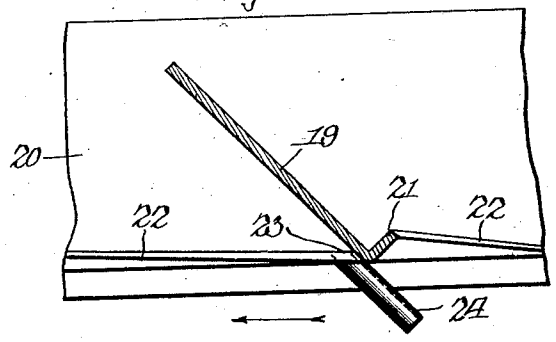
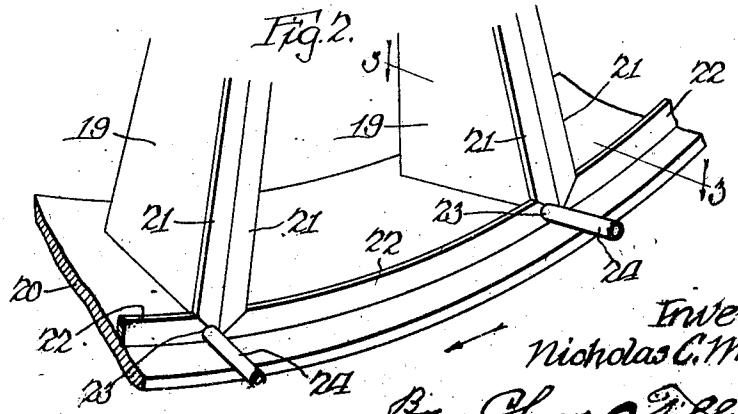


Fig. 2.



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UNITED STATES PATENT OFFICE.

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AIR WASHER.

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To all whom it may concern:

Be it known that I, NICHOLAS C. MARIEN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Air Washers, of which the following is a specification.

This invention relates to improvements in air moistening, dehumidifying and purifying apparatus, and it consists in certain peculiarities of the construction, novel arrangement and combination of the various parts thereof as will be hereinafter more fully set forth and specifically claimed.

The principal object of the invention is the production of an air washer, or apparatus of the above mentioned general character, which shall be compact in form, simple and inexpensive in construction, and highly efficient in operation, wherein and whereby a continuous current of air, which may or may not previously, or afterwards, have its temperature raised or lowered, is beneficially treated and caused to flow through a conduit or casing and be delivered to a suitable place or places for any desired purpose.

Another object is the provision of means comprising a portion of the apparatus, for the saturation of the volume of air as it enters the intake portion of the conduit therefor, without the necessity of employing a pump, and means for operating the same in order to maintain constant pressure for spraying water.

The invention contemplates as a further object thereof, rotary means within the conduit, for co-operation with the volume or current of humidified air for dehumidifying the same and for the elimination therefrom of impurities such as dust and the like.

Other objects and advantages of the invention will be disclosed in the following description and explanation.

In the accompanying drawing,—

Fig. 1 is a central longitudinal view partly in section and partly in elevation of an air washer embodying the invention.

Fig. 2 is an enlarged perspective view of a portion of the rotary eliminator for removing water and impurities from air as it passes through the apparatus, and

Fig. 3 is an enlarged plan view partly in section and partly in elevation taken on line 3—3 of Fig. 2 as indicated by the arrows.

Corresponding numerals of reference refer to like parts throughout the different views of the drawing.

Referring now more particularly to Fig. 1 of the drawing, the reference numeral 5 designates the rotary shaft of the apparatus which is horizontally journaled near one of its ends on an upright support 6 and near its other end in any suitable support but in the present instance is shown as being transversely journaled in the blower casing 7 of the apparatus. This shaft may be driven by any suitable means such as by applying power to a pulley 8 thereon through the medium of a belt employed for transmitting power from a motor, not shown, or the like.

Mounted within the blower casing 7 is a fan 9 of the ordinary or any preferred construction, which is employed to create and maintain a current of air through the conduit or casing of the apparatus and to force said current through an outlet 10 of the blower casing, from whence it may be conducted to any suitable place or places and used for the desired purpose.

As shown, a cylindrical casing, designated as a whole by the numeral 11, surrounds the shaft 5 and by preference is located concentrically with respect to the same. This casing has one of its ends, which will be termed the inlet end thereof, contracted and open for the entrance of air as shown in Fig. 1 of the drawings. The other end of the casing 11 has an inwardly extended annular flange 12; through the opening provided by said flange is extended a forwardly flared member 13, the outer portion of which member fits closely around an annular intake extension 14 with which the blower casing 7 is provided on its front surface. The casing 11 is by preference made of two sections 15 and 16, the front end of the section 16 overlapping the rear end of the section 15 so as to form a tight joint and in such a way as to prevent leakage of air. In front of the joint or juncture of the sections 15 and 16 of the casing 11, said casing is provided with an inwardly extended and rearwardly tapered collar or flange 17 which is employed for directing or guiding the current of air as it passes through the casing 11 into the rotary eliminator of the apparatus.

This eliminator comprises a hub 18 secured to the shaft 5 so as to rotate therewith and having a series of blades or vanes 19 radially extended therefrom and set at angles diagonally disposed with respect to the shaft 5 on which the eliminator is mounted. The ends of the blades or vanes 19 are connected to the inner surface of a circular rim or annulus 20 which is of less diameter than the diameter of the casing 11 so that the eliminator may be freely rotated within the casing without contact therewit

As shown in Fig. 1, the rim or annulus 20 is of greater width than the vanes 19 and has its front end overlapping the rearwardly tapered portion of the deflecting collar or flange 17, while its rear end extends some distance rearwardly of the rear edges of the blades 19 and terminates at the front end of the flared member 13 but outwardly concentric therewith.

Each of the vanes or blades 19 has on its rear edge at each side thereof, a longitudinally extended ledge or baffle member 21, which extend from the hub 18 to points near the inner surface of the rim or annulus of the eliminator wheel. The outer ends of each pair of the members 21 are transversely connected by means of a cleat or baffle member 22 which rest on the inner surface of the rim 20 and may be secured thereto as well as to the members 21 in any suitable manner. At one of the corners between the outer ends of each pair of blades 19 an opening 23 is provided, in each of which openings is located a tube 24 which have the same inclination as that of the blades or vanes 19 and as shown, project at their free ends beyond the rear end of the rim 20 of the eliminator wheel.

The front end of the shaft 5 is provided with a longitudinally extended opening 25 and at the inner end of said opening with a series of spaced perforations 26 which are inclined forwardly from their inner ends as will be readily understood by reference to Fig. 1 of the drawings. Fitted in the outer end of the opening 25 of the shaft 5, is a water supply pipe 27 which may have communication with a supply of water under pressure such as that ordinarily afforded by the water mains used in cities, not shown.

It will be understood that the vanes of the eliminator wheel, as well as those of the fan 9 of the blower, are so pitched as to produce and maintain a current of air through the casing 11, eliminator wheel, flared member 13, and inlet extension 14 of the blower, which constitute the conduit of the apparatus, by suction action, and that as the eliminator wheel and fan 9 are rotated in the same direction by the shaft 5, there will be but little friction incident to the passage of the current of air through the blades of the eliminator wheel.

From the foregoing and by reference to the drawing, it will be readily understood and clearly seen that the operation of the device is simple and as follows:

Assuming that the fan and eliminator wheel are rotated on the shaft 5 and that water under pressure is admitted through the water pipe 27 to the opening 25 in said shaft, it is manifest that a quantity of water will be discharged through the perforations 26 at the inner end of the opening 25 in the shaft 5, and that as said perforations are inclined so as to force the jets of water forwardly, a revolving sheet-like spray will be produced through which air entering the inlet end of the casing must pass and become moistened or saturated. In the further movement of the current of air through the casing, the same will strike the rapidly turning blades 19 and by reason of centrifugal action as well as its forward movement, will be forced against the ledges or baffle members 21 and 22 and out through the tubes 24 from which water and impurities will be discharged into the space between the rear end of the casing 11 and the flared member 13, thus permitting the purified, and to a certain extent de-humidified, air to pass through the member 13, and extension 14, into the blower casing 7 and from thence through its discharge opening 10 to any desired point.

As some water will collect in the lower front portion of the casing 11 from the spray, said part of the casing is provided with an outlet 28, and the rear lower portion of the casing 11 is provided with another outlet 29 for the discharge of water collected by the eliminator wheel and discharged by the tubes 24 thereof.

As the ledges or baffle members 21 and 22 are located at forwardly inclined angles to the blades 19 and rim 20 respectively, it is manifest that they will provide gutters or troughs for the water and impurities collected thereby which will be guided to the tubes 24 for discharge.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is—

1. In an air washer, the combination with a casing having one of its ends open for the entrance of air, of means near its open end for spraying water, an eliminator wheel mounted for rotation within said casing for co-operation with the moistened air, said wheel comprising radial blades set at an angle to its axis and provided with a peripheral rim connecting the outer ends of said blades, a ledge or baffle member on the rear edge at each side of each of said blades, a ledge or baffle member connecting each pair of said blades transversely and resting on the inner surface of said rim, an outlet at one of the corners between the outer ends of

each pair of blades, and means for producing a current of air through said casing.

2. In an air washer, the combination with a horizontally mounted casing having one of its ends open for the entrance of air, of a horizontally disposed shaft extended centrally into said casing, means near the open end of said casing for spraying water, a blower fan mounted on the shaft, a casing for said fan having an extension in communication with the first named casing, an eliminator wheel mounted on the said shaft rearwardly of the perforations therein, said wheel comprising radial blades set at an angle to its axis and provided with a peripheral rim connecting the outer ends of said blades, a ledge or baffle member on the rear edge at each side of each of said blades, a ledge or baffle member connecting each pair of said blades transversely and resting on the inner surface of said rim, and a tube extended rearwardly from one of the corners between the outer ends of each pair of blades, and a flared member mounted on the extension of the blower casing and extended to near the rear end of the eliminator wheel.

3. In an air washer, the combination with a horizontally mounted casing having one of its ends open and provided at its other end with an inwardly extended annular flange, of a horizontally disposed shaft extended centrally into and supported in said casing, means near the open end of said casing for spraying water, an air deflecting rearwardly tapered collar mounted in the casing rearwardly of said perforations, a blower fan mounted on the shaft near the inwardly flanged end of said casing, a casing for said fan having an extension directed towards the first named casing, a flared member extended through the opening provided by the inwardly extended annular flange of the first mentioned casing and communicating with the extension of the blower casing, an eliminator wheel mounted on said shaft between said air deflecting collar and said flared member, said wheel comprising radial blades set at angles to its axis and provided with a peripheral rim connecting the outer ends of said blades, a ledge or baffle member on the rear edge at each side of each of said blades, a ledge or baffle member connecting each pair of blades transversely and resting on the inner surface of said rim, and a tube extended rearwardly from one of the corners between the outer ends of each pair of blades and located to travel between the front portion of said flared member and the first named casing.

4. An air washer including a casing for the passage of air and a rotatable shaft located therein, an eliminator wheel mounted to rotate with said shaft, said wheel comprising radial blades each set at an angle to its axis and provided with a peripheral rim connecting the outer ends of said blades, a ledge or baffle member on the rear edge at each side of each of said blades, a ledge or baffle member connecting each pair of said blades transversely and resting on the inner surface of said rim, and an outlet at one of the corners between the outer ends of each pair of blades.

NICHOLAS C. MARIEN.