

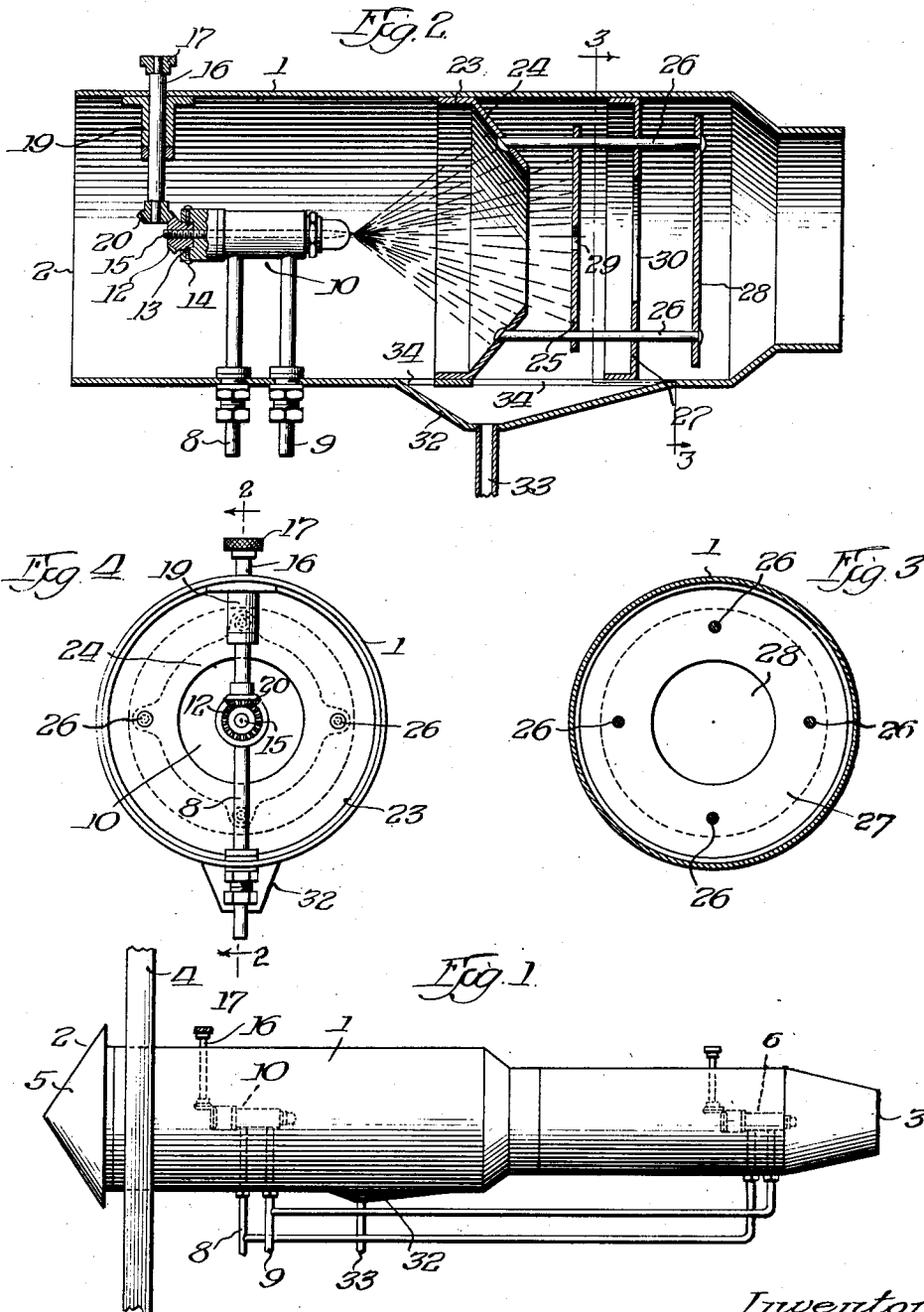
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AIR CONDITIONER

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Witness:
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UNITED STATES PATENT OFFICE.

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AIR CONDITIONER.

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My invention relates to air conditioners, more particularly for conditioning the air in buildings such as factories, warehouses, theaters, offices, hospitals, and the like, and its object is to provide an improved means for washing, humidifying and cooling the air which is being taken into the building.

My invention provides for discharging a spray of water, which may be broken up by means of compressed air, into the inflowing current of new air to intercept any particles of dirt which may be therein and thus load them with moisture so that they will be precipitated or caused to fall from the inflowing current of air and in this manner be prevented from entering the building. The spray of water, in addition to removing the dust and other foreign particles from the air, humidifies and may, where desired, cool the air, thereby greatly improving the conditions within the room or building.

In positions where the length and shape of the duct, casing or passage will permit, the spray may be pointed or directed in the direction of the current of the inflow of air and will thereby augment the induction. By arranging a series of baffles, the spray may be prevented from carrying, too far, and the air impinging on the baffles will further tend to arrest or eliminate impurities, but where the duct is relatively short, the spray may be mounted to deliver against or across the current of air.

Where the invention is used in connection with an air induction system caused by a jet of compressed air considerable advantage may be gained owing to the fact that the compressed air may be utilized for both operations, i. e., for producing the current of air and for breaking up the spray of water. In such a combination, the air pressure for the air washing element may be reduced by applying any of the well known types or other suitable reducing valves. The volume of air may also be reduced by providing a smaller outlet for the air washing element than for the current induction air, or the air may be reduced in both pressure and volume.

My invention is illustrated in the accompanying drawings, in which;

Figure 1 is a side elevational view of one embodiment of the invention;

Fig. 2 is a longitudinal section on line 2—2 of Figure 4;

Fig. 3 is a transverse section on line 3—3 of Figure 2, and

Fig. 4 is an end view from the left hand side of Figure 2.

Referring to the drawings, 1 designates a cylindrical casing having an open inlet end 2 and an open outlet 3 which may be tapered slightly as shown, restricted or otherwise formed.

The casing 1 may be mounted in a wall, window, partition, or the like 4, with its inlet drawing from the desired source and its outlet directed or discharging into the desired room. The open inlet end 2 may be provided with a cowl 5, and a compressed air nozzle or spray 6 is mounted axially in the forward end of the casing 1 and induces free air through the casing from the cowl or inlet end 2. A pipe 8 for compressed air and another 9, for liquid, such as water, or the like, are connected with the nozzle 6 and also with a spraying nozzle 10, mounted in the posterior part of the casing 1.

Either or both nozzles 6 and 10 may be provided with adjusting means for controlling the delivery of air or water. The means shown for this purpose comprises a bevel gear or pinion 12 mounted for rotation and held against axial movement in a socket 13 in the end of the casing of the spraying nozzle 10 as by means of radial screws 14, these screws being threaded through the base of the nozzle casing radially thereof with their ends projecting into a groove in the neck of pinion 12, as illustrated in Fig. 2. A threaded shaft 15 constitutes a pin or needle valve for the nozzle. Its forward end, for example, may be tapered to vary the outlet of the nozzle by axial movement of the needle valve and the opposite end of the shaft forming this valve has threaded engagement with the bevel gear 12. The shaft 15 is slidably mounted in nozzle 10 and may be prevented from turning as by having a portion of its length shaped square or non-circular and cooperating with a similarly shaped hole in a part of the casing of the nozzle. The shaft 15 is moved axially and the needle end thereof advanced or withdrawn by turning a shaft 16 having a finger piece or knob 17 on its outer end for turning it and extending radially through and journaled on the casing at 19 and provided at its inner end with a bevel gear 20 meshing with the bevel gear 12 to turn the same and move the shaft 16 axially thereby.

The spray nozzle 10 discharges the water or other liquid supplied to it by the pipe 9 toward or into a series of baffles mounted within the casing 1 between the outlet of the nozzle 10 and the forward part of the casing 1. The spray of water which issues from the nozzle 10 is broken up by means of the compressed air supplied by means of the pipe 8 and is positioned to discharge into the current of air flowing through the casing 1 from the inlet 2. The first baffle 23 may have a cylindrical portion mounted within the casing 1 and an open ended converging conical body portion 24 shaped to supplement the current of air which is passing through the casing. The next baffle 25 may be mounted on rods 26 carried by the baffle 23 and another baffle 27, said last baffle 27 having a cylindrical flange portion mounted within the casing 1. A further baffle or baffles 28, as may be required, may be linked up and supported by the rods 26. The baffle 25 is shown as being proportioned to leave an annular space between it and the interior of the casing 1 and in addition it may have a relatively small central opening 29. The next baffle 27 fits within the casing, leaving no annular space around it, but is provided with a relatively large central opening 30. The next baffle 28 again leaves an annular space between it and the casing, said baffles thereby forming a tortuous passage ahead of the nozzle 10 and between it and the outlet of the device. A relatively narrow draining funnel 32 with a drain pipe 33 may serve to carry away the surplus liquid together with the deposited soot, dirt, and other foreign particles.

In use, the discharge from the nozzle 10 which may be controlled by the knob 17 comprises a water or other liquid spray broken up by the compressed air supplied to said nozzle and this broken up spray is discharged ahead of the baffles 23, 25, 27 and 28 into the current of air flowing through the casing 1. The liquid spray intercepts any particles of dirt or other foreign substance which may be in the current of air and loads them with moisture so that they will be precipitated and caused to fall to the bottom of the casing 1 where they may enter the drain 32 through the openings 34 and carried away with any surplus liquid by the drain pipe 33. The dust and foreign particles are thereby prevented from entering the building, and it will be obvious that this method of washing the air will load the air with a certain amount of moisture and may also cool the same. If the outside air entering by way of the inlet 2 is hot and dry, the evaporation will lower the temperature and greatly improve the conditions within the room or building. If it is desired to raise the temperature of the

air or reduce the relative humidity, the air may be passed over heated surfaces or mixed with a current of heated air or otherwise treated for heating or drying. The nozzles 6 and 10 may be supported by the pipes 8 and 9 or in any other suitable or preferred manner.

It will also be obvious that this system can be used to wash the air which is being recirculated within a building, by providing an additional inlet for air in that part of the casing 1 which is within the wall and providing suitable dampers or gates. While I have shown and described, my invention in connection with a system in which the air is inducted into the building or room by means of an escaping jet of compressed air discharged from within the casing 1, it is to be understood that the current of air supplied to the room may be blown by means of a fan or an impeller or it may otherwise set up, also that I do not intend to be limited to the precise details shown and described.

I claim:

1. In combination, a casing having an inlet and an outlet, baffle means mounted in the casing and forming a tortuous passage between the inlet and outlet, means for projecting a current of air through the casing to said outlet and for discharging a liquid spray into said air current between the inlet and said outlet, said air current projecting and liquid spray means comprising a nozzle having a controllable outlet and liquid and air lines leading to said nozzle.

2. In combination, a generally cylindrical casing having an inlet at one end and an outlet at the other end, a pair of baffles mounted at their margins in said casing and provided with relatively large central openings, supporting rods carried by said baffles, a second pair of baffles alternately disposed with respect to said first baffles and carried by said rods, said second baffles being peripherally spaced from the interior of the casing, a nozzle mounted between the inlet and said baffles and liquid and air lines leading to said nozzle.

3. In an air conditioner, a casing, a nozzle, means for supplying a liquid under pressure to said nozzle, means for supplying air under pressure to said nozzle to cause a spray of liquid globules and air to be injected axially into said casing to induce an air current therein, means for increasing the velocity of said air current including a tapered restriction in the path of said spray and having a port, and staggered baffle means disposed behind said port and adapted to collect liquid globules.

4. In combination, a horizontally disposed casing communicating at both ends with the atmosphere, a spray nozzle within the casing for projecting water toward the

outlet end thereof and throughout a substantial portion of the cross-area of the casing, baffles beyond the nozzle causing the air leaving the casing to assume a tortuous path of travel, the baffles preventing the liquid from being discharged through the outlet end of the casing, the nearest to the nozzle of said baffles being of frusto-conical shape and converging away from the nozzle, the area of the opening of the last mentioned baffle being less than the cross-area of the spray from the nozzle at said opening, and means at the lower portion of the casing for collecting and taking off the water and foreign materials entrapped thereby discharged from the baffles. 15

In witness whereof, I hereunto subscribe my name this 20th day of April, 1925.

CHARLES L. BURDICK.