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AIR HUMIDIFYING AND WASHING APPARATUS

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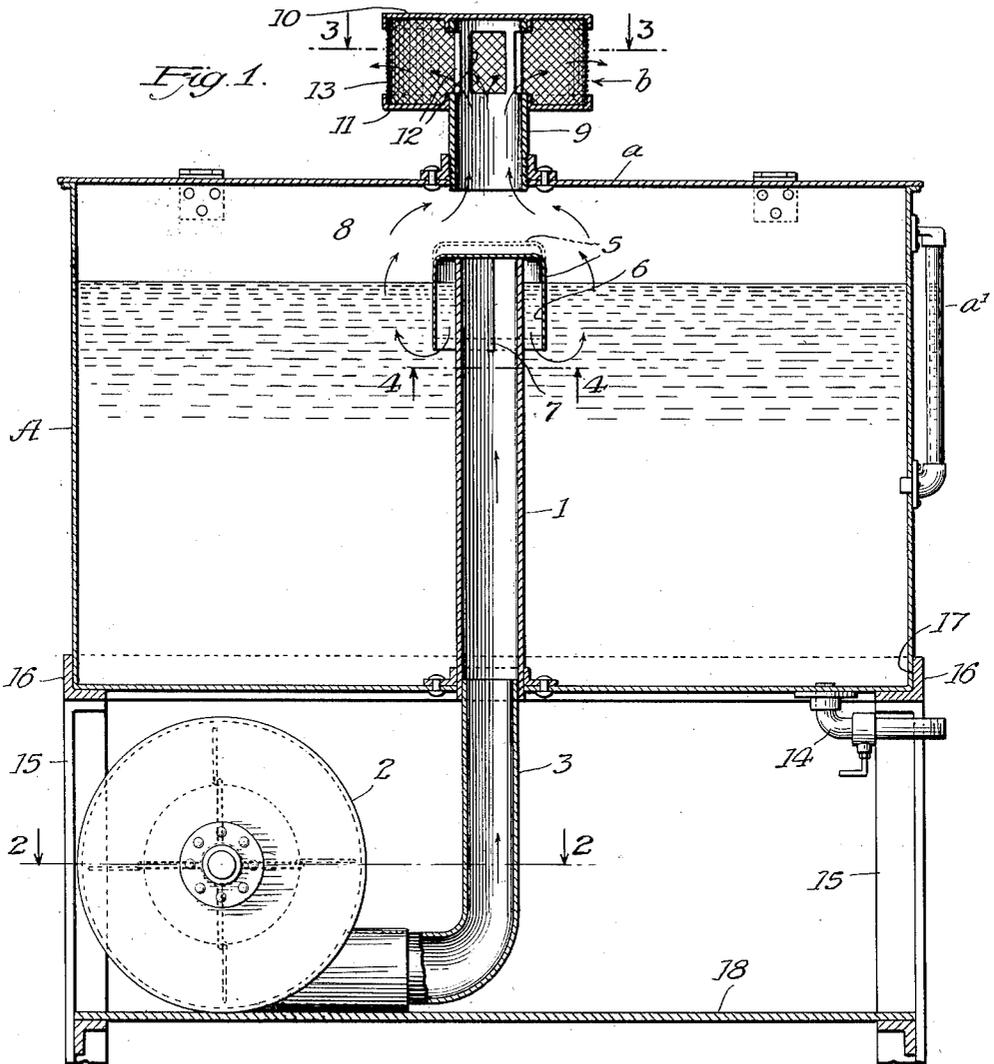


Fig. 2.

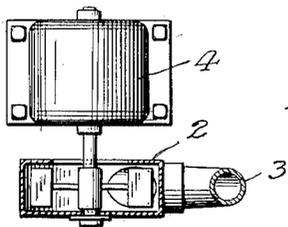


Fig. 4.

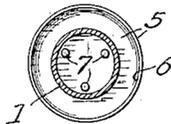
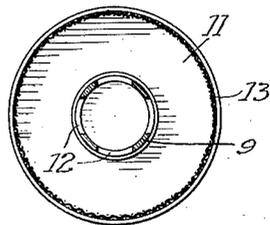


Fig. 3.



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## UNITED STATES PATENT OFFICE

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AIR HUMIDIFYING AND WASHING APPARATUS

Application filed October 25, 1930. Serial No. 491,223.

This invention relates to apparatus for humidifying and washing air, particularly air supplied to residences, offices, factories, auditoriums and other places where people reside or congregate.

The object of the invention is to provide an apparatus for furnishing a supply of clean, humid air to rooms where persons live, work or congregate, which will be simple in construction, relatively inexpensive to produce, and effective for its designed purpose.

To effect the objects thereof, apparatus embodying my invention and improvements comprises the various features, combinations of features, and details of construction hereinafter described and claimed.

In the accompanying drawing, in which the invention is fully illustrated,

Fig. 1 is a vertical, central, sectional view of my improved apparatus.

Fig. 2 is a sectional plan view, on a reduced scale, taken substantially on the line 2-2 of Fig. 1.

Fig. 3 is a sectional plan view on the line 3-3 of Fig. 1; and

Fig. 4 is a fragmentary, sectional plan view from the position 4-4, Fig. 1, looking in the direction indicated by the arrows.

Describing the invention with particular reference to the drawing, A is a closed receptacle, adapted to contain water or other liquid, the top *a* of said receptacle being preferably hinged to the body portion thereof, to provide convenient access thereto.

As shown, said receptacle is equipped with a gauge *a'* for the purpose of indicating the liquid level in said receptacle.

In operation, air under pressure is adapted to be supplied to the receptacle A through a pipe 1 secured in upright position in the bottom of said receptacle, with its lower end projecting downwardly through the bottom of the receptacle and its upper end extending above the designed water level therein.

The lower end of said pipe 1 is adapted to be connected to a source of supply of air under pressure designed to supply air there-

to at a pressure not exceeding 2 ounces per square inch.

In the preferable embodiment of the invention, air is adapted to be supplied to the pipe 1 and thus to the receptacle A by means of a usual form of fan indicated at 2, the discharge opening from the fan casing being connected to the pipe 1 by a pipe 3, which, as shown, extends into the lower end of the pipe 1, being closely fitted thereto to prevent leakage. As shown, see Fig. 2, the fan 2 is driven by an electric motor indicated at 4, but my invention contemplates any desired or approved means for driving the motor.

The upper end of the supply pipe 1 of the apparatus is enclosed by what may be designated a hood 5, the top and side walls of which are closed and the bottom of which is open, said hood being proportioned transversely so that an annular space 6 will be formed between the pipe 1 and the side walls of said hood. In the preferable construction shown, also, the side walls of said hood are maintained substantially concentric with the pipe 1 by means of pins 7 secured in the top wall of said hood and which extend downwardly within the pipe 1 closely adjacent to the sides thereof, all as clearly shown in Fig. 4 of the drawing.

When the apparatus is not running, the top wall of the hood 5 is adapted to rest on the top of the pipe 1 and the dimension of said hood from the top wall to the lower edges of its side walls is such that its lower edge will extend downwardly into the liquid contained in the receptacle A from  $\frac{5}{8}$  to  $\frac{3}{4}$  of an inch.

In practice, the hood 5 will be made of aluminum or other light material having a low specific gravity, whereby only slight air pressure in the pipe 1 will be required to raise said hood above the top of said pipe to the position, for example, indicated in dotted lines, thereby permitting air to pass from the pipe 1 into the space at the top of said hood and thence downwardly between the pipe 1 and the side walls of said hood, whence it escapes through the water

into the clear space 8 at the top of the receptacle A.

Air under pressure contained in the clear space 8 of the receptacle is adapted to be discharged therefrom through a discharge pipe 9 secured in an opening formed in the top wall  $a$  of the receptacle, mounted in association with which is an air diffusing apparatus indicated as a whole  $b$ , for discharging air from the pipe 9 laterally instead of vertically.

As shown, the diffuser  $b$  consists of vertically spaced top and bottom plates 10 and 11, the plate 10 being secured to the top of the pipe 9, closing the same, and the plate 11 being provided with a hole or opening closely fitted to the exterior of said pipe 9 and rigidly secured thereto in any desired manner.

Formed in the portion of the pipe 9 between the plates 10 and 11 are ports or openings 12 for the discharge of the air. As shown, also, a horizontally positioned diffusing means embodying a cylindrical screen 13, preferably made of fine wire mesh, is supported between the edges of the plates 10 and 11 in position to enclose the discharge end of the pipe 9, as clearly shown in Figs. 1 and 3. The air forced from the pipe 9 will be directed laterally and be broken up or atomized by the construction of diffusing means.

In practice, the fan 2 will be driven at a peripheral speed of approximately 5000 feet per minute which will develop an air pressure in the pipe 1 of approximately two ounces, the weight of the hood 5, as previously stated, being such that this pressure will operate to raise said hood from the position shown in full lines, Fig. 1, to the position shown in dotted lines. Obviously, however, this relation may be varied to meet different requirements.

Also, should the weight of the hood 5 exceed the pressure developed by the fan 2, my invention contemplates increasing the buoyancy of the hood 5 by applying a float thereto, sufficient to supplement the air pressure developed by the fan to raise said hood to uncover the discharge end of the pipe 1.

A desired balance between the weight of the hood 5 and the available air pressure is such that, under the contemplated operating air pressure, the side walls of the hood will be submerged to a depth of approximately  $\frac{1}{2}$  inch, thereby forcing the air supplied to the receptacle A to traverse a stratum of water of this depth.

To provide for conveniently cleaning the receptacle A, it is provided with a valve controlled drain pipe 14.

In the construction shown, in which air is supplied to the apparatus by a motor driven fan or blower, the receptacle A is preferably mounted on a base, consisting of legs 15 se-

cured to the upper ends of which are sections of angle bars 16 disposed in position to form an angular recess 17 adapted to receive the lower end of the receptacle A. Adjacent to their lower ends, the legs 15 are connected by a plate 18, which provides a convenient support on which to mount the fan 2 and motor 4.

While the apparatus which forms the subject-matter of the present application is particularly designed and adapted for humidifying and washing air, I do not desire to limit myself to its use in this application, as the apparatus is obviously equally well adapted for washing any permanent gas and in specifying air, I have used this designation to exemplify any gas for treating which the apparatus may be adapted.

I claim:

An air humidifier for rooms comprising a closed case forming a water receptacle for containing water to a predetermined level and a compartment for holding an air-pump, an air pipe connected directly to said air-pump for supplying air under pressure to the upper end of said water-receptacle and a cup-shaped valve located at the top end of said air-pipe and formed to direct air from the upper end of said air-pipe downwardly into the water and permit its escape upwardly through the water around its side-walls, and an outlet for the water-saturated air at the top of the case provided with a horizontally positioned diffusing and laterally directing means for breaking up and spreading the saturated air before it discharges into the room.

In testimony that I claim the foregoing as my invention, I affix my signature this 4th day of May, 1931.

LOUIS LARSON.