J. C. FLEMING.

VENTILATION AND CLEANING DEVICE.

APPLICATION FILED DEC. 20, 1916.

1,223,684. Patented Apr. 24, 1917.

Fig. 1.

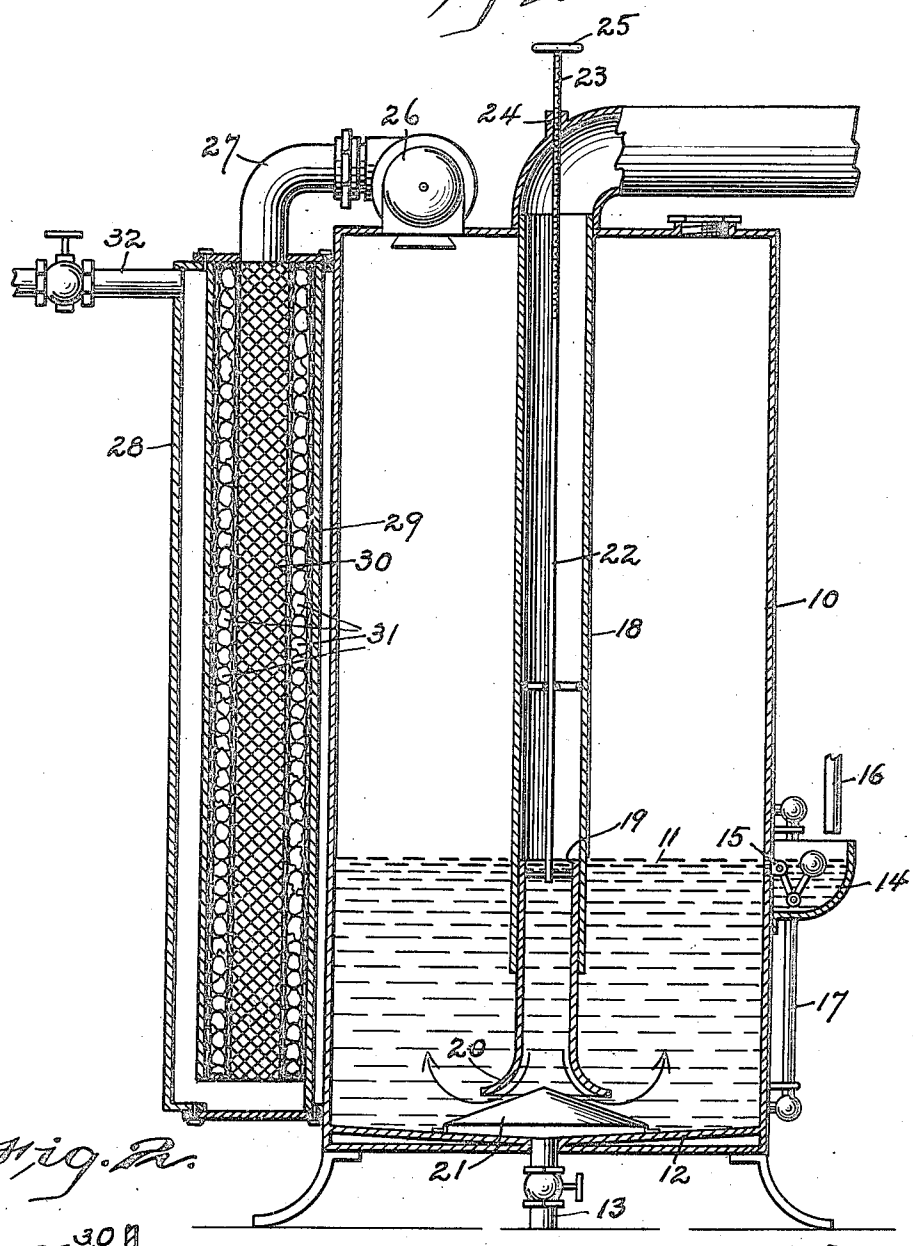
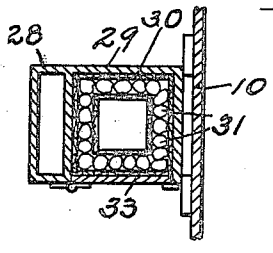


Fig. 2.



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VENTILATION AND CLEANING DEVICE.

1,223,684. Specification of Letters Patent. Patented Apr. 24, 1917.

Application filed December 20, 1916. Serial No. 138,068.

To all whom it may concern:

Be it known that I, JOHN C. FLEMING, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Ventilation and Cleaning Devices, of which the following is a specification.

This invention is an improved device of the type employed to clean and purify atmospheric air for ventilating purposes.

One of the objects of the invention is to provide a ventilation and cleaning device of simple construction, which can be employed to so treat atmospheric air that it will partake of the properties of the atmosphere of different localities, such as the atmosphere of the sea coast or the atmosphere of mountainous regions. A further object is to provide an apparatus having means for neutralizing any impure gases carried by the atmospheric air.

The invention will be hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawing:—

Figure 1 is a longitudinal sectional view of a ventilation and cleaning device constructed in accordance with the invention. Fig. 2 is a detail cross section of the chamber for removing impure gases.

Referring to the drawing, 10 designates a tank or receptacle, constructed to contain a liquid 11 which may be plain water, or it may be a suitable chemical solution capable of charging and impregnating any air passing through the liquid. For instance, said liquid may be a solution of sea salt, if it be desired to charge, saturate or impregnate the air to partake of the properties of sea air; or the liquid may be a solution of carbonate of potassium so as to cause the air to partake of the properties of mountain air. The character of the solution may be varied or changed to meet different conditions without departing from the spirit of the invention.

The bottom 12, of the tank is provided with a drain pipe 13, and attached to the exterior of said tank is a trough 14, communicating with the interior of the tank, the communication being controlled by a float valve 15, by means of which the height of the liquid 11 is automatically maintained at the proper level within the receptacle, the trough being supplied from a suitable source, through a supply pipe 16. Arranged conveniently on the tank is a water gage 17.

Arranged centrally and vertically of the receptacle 10, is the atmospheric air supply and regulating pipe 18, which extends below the liquid 11, and engages with an extension section 19, preferably by a telescopic connection as illustrated, the lower end of the section 19 being flared, as indicated at 20, and concentrically positioned with respect to a deflector 21, attached in suitable manner to the bottom 12. Extending longitudinally through the pipe 18, is an operating rod 22, attached to the extension 19, the upper portion of said rod being threaded as indicated at 23, and engaging a threaded boss 24, formed on the pipe 18, the exposed end of said rod 22 being provided with a handle 25, by which it may be conveniently rotated. It will be readily understood that by rotation of the rod 22, the telescopic section 19 may be raised or lowered with respect to the deflector 21, so as to increase or diminish the space or opening between the flared end 20 and the deflector 21. By means of this construction, the quantity of atmospheric air passing from the supply pipe 18 into the liquid 11 can be nicely regulated. For instance, in cold weather the extension 19 is raised so as to admit a greater quantity of air, resulting in more pressure and greater heat; while in warm weather the extension is lowered, admitting less air and causing a more rarefied condition of the same within the receptacle, thereby having a tendency to cool the air therein.

Arranged as shown in the drawing, is an air pump 26, of any suitable character or construction capable of producing a partial vacuum within the interior of the tank 10, so that the atmospheric air will be forced through the pipe 18, and through the liquid 11, by atmospheric pressure, the air so passing into the tank being discharged therefrom through the action of the pump, into the outlet conduit 27. Said conduit discharges into a purifying chamber 28 provided with a compartment 29, containing a basket 30, of substantially tubular form, having a central longitudinal conduit surrounded by animal charcoal, indicated at 31. The lower end of the basket 30 is spaced from the bottom of the chamber 28, so that the air passing over the animal charcoal may pass out of the compartment 29 at the

bottom thereof, and move upwardly to the discharge pipe 32, from which point the purified air is conducted to any point at which it is desired to utilize the same. The basket 30 with its animal charcoal, is preferably made up as a unitary element, removably held within the compartment 29 in any suitable manner, one side of said compartment being formed as a door 33. A cubic foot of animal charcoal will absorb impurities from millions of cubic feet of air moving in contact therewith, when dry and clean, and either hot or cold. The condition of the charcoal is practically unaffected by the action of the air, so that it indefinitely retains its active principles unchanged, thereby fitting it for domestic use in a manner superior to any other material.

In operation, when the movable section 19 is elevated toward or near the surface of the liquid, the air in the receptacle above the surface of said liquid will be relatively slightly rarefied, under the action of the pump, for the reason that only a relatively slight minus pressure in the receptacle is necessary to cause the atmospheric pressure in the supply pipe 18 to force air to the bottom thereof and into the liquid. On the other hand when the section 19 is in a lowered position, an increased rarefaction or minus pressure must be maintained within the receptacle above the surface of the liquid, so as to allow atmospheric pressure in the supply pipe to force air to the bottom thereof and through the liquid, it being understood of course, that the pressure within the supply pipe is constant. Obviously, this result would not be obtained were the air forced through the liquid by pump pressure, for the reason that by such an arrangement the pressure within the supply pipe would vary according to the position of the movable section 19, but the pressure within the receptacle above the surface of the liquid would be constant, which would defeat one of the primary objects of the invention, namely, that of controlling the extent of rarefaction of the air. As the air passes through the liquid 11, it will naturally absorb or become impregnated with the characteristics of the liquid, and after passing through the liquid the air will be free of foreign particles and substances ordinarily found in suspension in atmospheric air. By then passing the cleansed air over animal charcoal, any impure gases combined with the air as it passes through the liquid 11, are completely neutralized the result being that the air discharged through the pipe 22 is thoroughly cleaned and purified, and possesses excellent properties for ventilation purposes.

Having thus explained the nature of the invention, and described an operative manner of constructing and using the same, although without attempting to set forth all of the forms in which it may be made, or all of the forms of its use, the following is claimed:—

1. An improved method of ventilation and cleaning air comprising guiding a stream of atmospheric air at atmospheric pressure through a body of purifying liquid and releasing the same into said liquid contiguous to the bottom thereof, maintaining a rarefaction of air above the surface of said liquid, thereby causing said air at atmospheric pressure to first pass downwardly and then to be discharged upwardly therefrom through the liquid by its natural force, whereby the air pervades the liquid and is rarefied and cooled, varying the rarefaction of air in the space above said liquid by controlling the volume of discharge therefrom, and finally delivering said air to the space to be ventilated.

2. An improved method of ventilation and cleaning air comprising guiding a stream of atmospheric air at atmospheric pressure to the bottom of a purifying liquid, maintaining a rarefaction of air above the surface of said liquid, thereby causing said air at atmospheric pressure to pass downwardly into the liquid and then to be discharged upwardly therefrom by its natural force, whereby the air is rarefied and cooled, neutralizing any impure gases intermingled with the air, and finally delivering the purified air to the space to be ventilated.

3. A ventilation and cleaning device comprising a liquid holding receptacle, an atmospheric air supply pipe having its discharge end located below the liquid in the receptacle, means for creating a partial vacuum within the receptacle above the surface of the liquid therein, to cause air to pass through the liquid in the receptacle by atmospheric pressure, and means for causing the air to pass over animal charcoal after passing through said liquid.

4. A ventilation and cleaning device comprising a liquid holding receptacle, an atmospheric air supply pipe having its discharge end located below the liquid in the receptacle, means for creating a partial vacuum within the receptacle above the surface of the liquid therein to cause air to pass through the liquid in the receptacle by atmospheric pressure, a chamber containing animal charcoal, and a conduit leading from said receptacle above the surface of the liquid to said chamber.

5. A ventilation and cleaning device comprising a liquid holding receptacle, an atmospheric air supply pipe having its discharge end located below the liquid in the receptacle, means for creating a partial vacuum within the receptacle above the surface of the liquid therein to cause air to pass through the liquid in the receptacle by at-

mospheric pressure, a chamber through which the purified air passes upon leaving said receptacle, and a cage within said chamber containing animal charcoal.

6. A ventilation and cleaning device comprising a liquid holding receptacle, an atmospheric air supply pipe having its discharge end located below the liquid in the receptacle, means for creating a partial vacuum within the receptacle above the surface of the liquid therein, to cause air to pass through the liquid in the receptacle by atmospheric pressure, a chamber through which the air passes at it leaves said receptacle, a tubular cage removably supported within said chamber, and animal charcoal located in said cage and surrounding the bore thereof.

7. A ventilation and cleaning device comprising a liquid holding receptacle, an atmospheric air supply pipe having its discharge end located below the surface of the liquid in the receptacle, means for creating a partial vacuum within the receptacle above the surface of the liquid therein, to cause air to pass through the liquid in the receptacle by atmospheric pressure, a chamber through which the air passes at it leaves said receptacle, said chamber being provided with a door, and a receptacle removably supported within said chamber and containing animal charcoal.

In testimony whereof I have hereunto set my hand.

JOHN C. FLEMING.