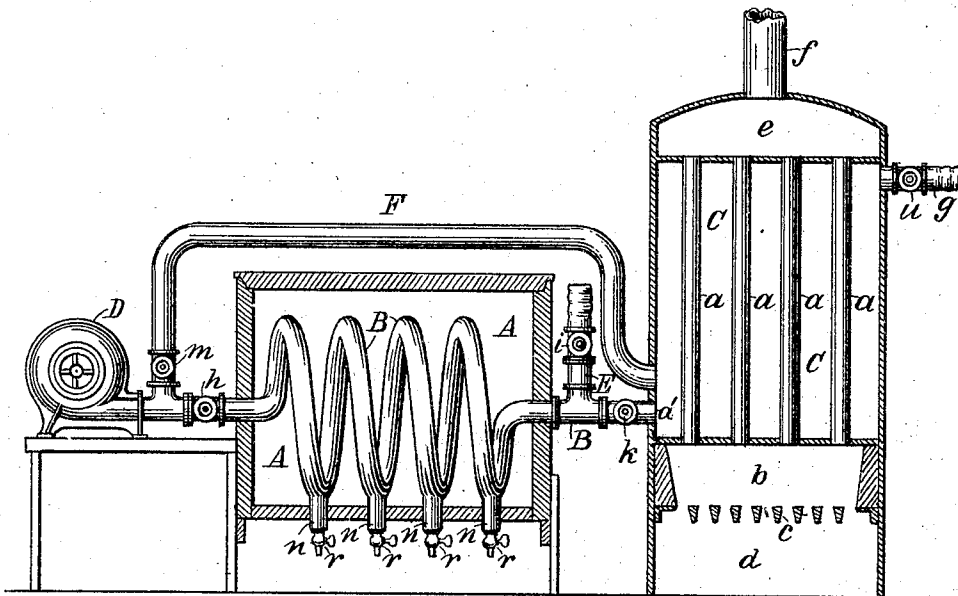


No. 772,387.

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J. & W. TITUS.
APPARATUS FOR TEMPERING AIR.
APPLICATION FILED AUG. 20, 1902.

NO MODEL.



WITNESSES:

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JOHN TITUS, OF OYSTER BAY, AND WILLIAM TITUS, OF OLD WESTBURY,
NEW YORK.

APPARATUS FOR TEMPERING AIR.

SPECIFICATION forming part of Letters Patent No. 772,387, dated October 18, 1904.

Application filed August 20, 1902. Serial No. 120,294. (No model.)

To all whom it may concern:

Be it known that we, JOHN TITUS, a resident of Oyster Bay, and WILLIAM TITUS, a resident of Old Westbury, in the town of North Hempstead, in the county of Nassau and State of New York, citizens of the United States, have jointly invented certain new and useful Improvements in Apparatus for Tempering Air; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, making a part of this specification, which is a vertical sectional view of an apparatus comprising our said invention.

This invention is designed for the economical production of air tempered by the removal of undue moisture and by heating to any required degree for respiratory uses, as required in hospitals, dwellings, manufactories, and the like in the amelioration of unhygienic or unsanitary conditions or for curative or other purposes.

A is a chest intended to contain ice, a mixture of ice and salt, or any other suitable refrigerating material.

B is an air-conducting pipe, preferably of coiled construction, which extends through the refrigerating-chest and which is refrigerated by the action thereon of the refrigerating material. Connected with the exit end of the air-conducting pipe is a heating apparatus which may be of any suitable construction, but which, as shown in the drawing, comprises a heating-chamber C, through which are passed tubes or flues *a* from the fire-box *b* of a suitable furnace, the grate of which latter is indicated at *c* and the ash-pit at *d*. The upper ends of the tubes *a* communicate with a conduit *e*, common to all. The gaseous products of combustion from the fire-box after passing through the tubes make their exit from the conduits to and through the uptake *f*. The flame and hot gases thus passed through the tubes *a* heat (through the walls of the latter) the contents of the heating-chamber C. The heating-chamber connects, preferably, at or near its bottom, as shown at *a'*, with the outlet end of the air-conducting refrigerating-pipe B and also, preferably near

its top, has an outlet for the tempered air, as indicated at *g* in the drawing. A blower D, operated from any suitable source of power, is provided at the inlet end of the air-conducting pipe B to propel a volume of air continuously through the said pipe B and into and through the heating-chamber C. In the pipe B, adjacent to the blower, is a valve *h*. The said pipe B, at or near its junction with the heating-chamber C, has a branch pipe E, in which is a valve *i*. In the pipe B, between its branch pipe E and its junction with the heating-chamber, is a valve *k*. From the pipe B at a point between its valve *h* and the outlet of the blower extends a pipe F, the opposite end of which communicates with the heating-chamber. In this pipe F, preferably as near as may be to the blower, is a valve *m*. At the bottom of each coil of the pipe B is a hanging cup *n*, which has an outlet-cock *r*. These cups collect water condensed from the air as it passes through the pipe.

In the operation of the apparatus (the valves *m* and *i* being closed and the valves *h* and *k* being open) external air is drawn into the blower and by the latter is forced through the refrigerating-coil B, where all superfluous moisture is condensed by the cold and passes off to the cups *n*, from which the water by condensation may be drawn off through cocks *r*. The air thus dried by the elimination of its moisture and purified by like elimination of condensible products, or those which have been held in suspension by the moisture, passes into the heating-chamber C, where it is either restored to normal temperature for purposes of ordinary respiration or heated to any other preferred temperature proper for the purposes to which the purified and tempered air is to be put. The air makes its exit, of course, from the outlet *g* of the heating-chamber, in which latter may be provided a valve *u* to control such exit of the air and may when desired be conducted to any distance in any direction by any suitable pipe or tube attached at the outlet *g*.

When for any reason air simply purified and refrigerated is desired, the cock *k* is closed and the cock *i* is opened, whereupon the re-

frigerated air passes to the branch pipe E and through and from the latter without entering the heating-chamber. When simply heated air is required, the valves *h* *h* or the valves *k* *i* are closed and the valve *m* is opened, whereupon the air is shut off from the refrigerator and passes through the pipe F direct to the heating-chamber, from which it may be withdrawn through the outlet *g*. By the means described one and the same apparatus with a single blower may be used for the production of air: simply heated, the production of air simply refrigerated with the moisture condensed therefrom, or purified by condensation and removal of moisture therefrom and subsequently raised in temperature to any desired degree.

What we claim as our invention is—

1. The combination with a chest for holding refrigerating material, and an air-conducting pipe within said chest constructed and arranged for the removal of water of condensation therefrom, of a heating apparatus connected with the exit end of the said pipe, a valve in said pipe whereby its communication with the heating apparatus may be shut off, a separate pipe extended from the heating apparatus to the air-pipe at a point in the latter remote from its refrigerated parts, and a

valve in said separate pipe whereby communication may be opened from the blower direct to the heating apparatus, while passage through the refrigerated air-pipe is closed, as described.

2. The combination with a chest for holding refrigerating material, an air-conducting pipe within said chest constructed and arranged for the removal of water of condensation therefrom, a heating apparatus communicating with the exit end of said pipe, a valve in said pipe, a branch to said pipe having a valve for closing and opening the same, a blower for forcing a volume of air, separate pipe extended to the heating apparatus from or near the outlet of the blower and having a valve for opening and closing passage there-through whereby air from a single blower may be refrigerated with condensation of moisture therefrom, or heated without such refrigeration or refrigerated with deposition of moisture therefrom and subsequently raised in temperature, as described.

JOHN TITUS.
WILLIAM TITUS.

Witnesses:

JAMES A. WHITNEY,
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