(No Model.)

W. R. MACDONALD.

COMBINED HEATER AND VENTILATOR.

No. 441,574. Patented Nov. 25, 1890.

Fig. 1.

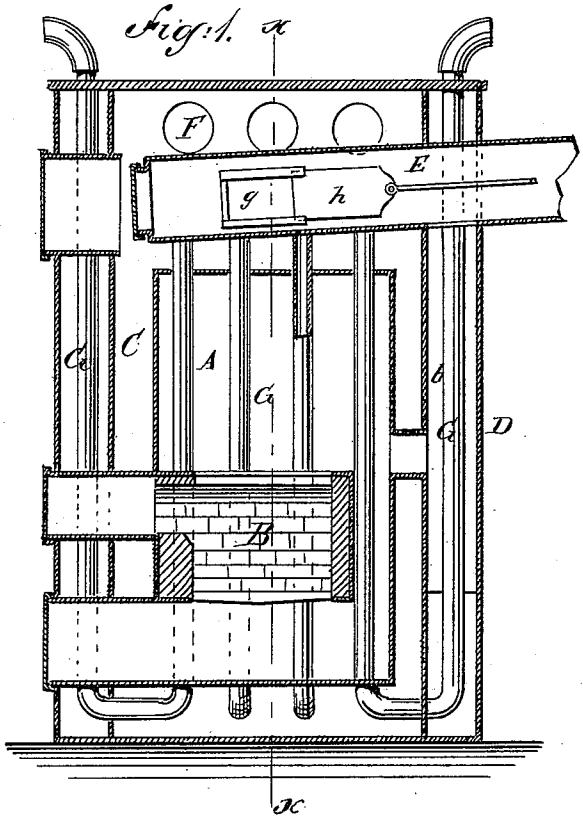


Fig. 3.

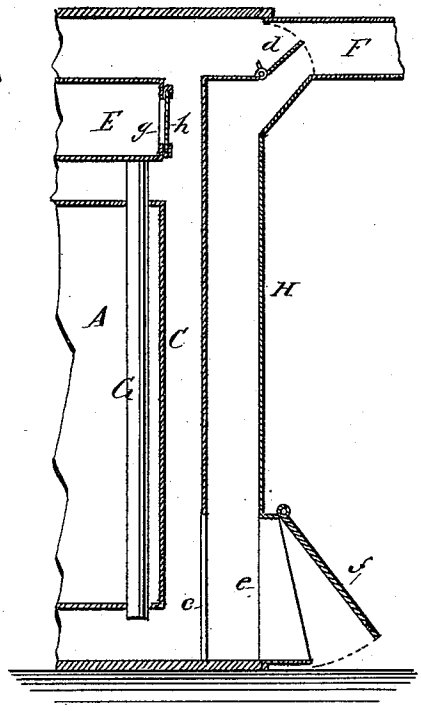
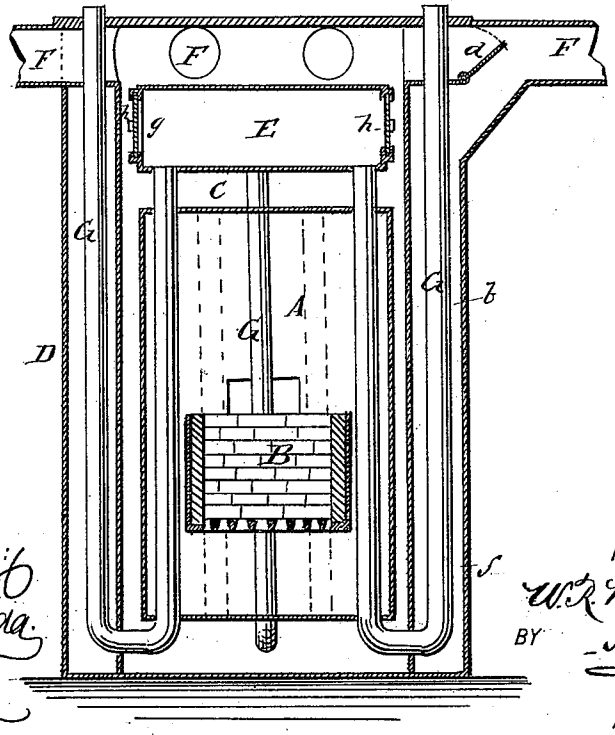


Fig. 2.



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WILLIAM R. MACDONALD, OF ALLEGHENY, PENNSYLVANIA.

COMBINED HEATER AND VENTILATOR.

SPECIFICATION forming part of Letters Patent No. 441,574, dated November 25, 1890.

Application filed February 26, 1890. Serial No. 341,790. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. MACDONALD, of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new Combined Heater and Ventilator, of which the following is a full, clear, and exact description.

This invention is designed as an improvement upon the combined heater and ventilator for which Letters Patent No. 206,739 were issued to me on August 6, 1878, and the object of which was to furnish a combined heating and ventilating apparatus that might be used either solely as a heater or as a heater and ventilator, or for summer use as a ventilator alone, the same supplying the heat in the customary manner, but drawing off the vitiated and foul air from apartments, water-closets, soil-pipes, and such like, and conducting it away, supplying pure air in the place thereof. The apparatus described in said patent included a combination, with a heater, of ventilating flues or ducts that were connected with the apartments or pipes or parts to be ventilated and conducted through the heater to a collecting and discharging foul-air flue. It also included a combination, with the hot-air flue and air-chamber of a heater, of ducts connecting the hot-air flue with a foul-air flue and with the bottom of the air-chamber, the hot-air flue and ducts being provided with dampers to use the heater either for heating or ventilating.

My invention has for its object the simplifying and improving of a combined heater and ventilator operating upon the same general principles; and it consists in a novel construction and combination of parts, substantially as hereinafter described, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 represents a vertical longitudinal section of my improved heating and ventilating apparatus. Fig. 2 is a transverse vertical section of the same upon the line *x x* in Fig. 1; and Fig. 3, a further vertical longitudinal section in part, showing certain portions in a different operative position.

A is the fire-chamber, and B the fire-box, of the heater, both of which may be of any approved construction. C is the air-chamber, in which the fire-chamber is inclosed, and D is an outer shell or casing inclosing in its turn the air-chamber and leaving a space *b* between them. The top of the whole heater covers both the air-chamber C and the space *b*. The gaseous products may pass off through the main foul-air flue E or otherwise. The cold air is drawn in through suitable openings and heated in the air-chamber C by the inclosed furnace or fire-chamber and then conducted by any number of hot-air flues F at top to the different apartments to be heated, supplying pure heated air to the same by means of registers in the usual way.

G G are the ventilating-flues, which also connect with the apartments, water-closets, or elsewhere, and are designed to be fitted with registers above, and which, passing down through the space *b* inside of the outer shell D, are bent to pass up through the fire-chamber A and through the top of the heater, and there to connect with the main foul-air flue E, which extends to the chimney or outside of the building. The suction created by the heating of these ventilating-tubes within the heater draws the foul air and dust from above and passes them off to the outside of the building by the main foul-air flue E, as in my former patent; but under the present construction it will be noticed that the foul-air flue E is placed below the roof of the heater instead of above it, thus economizing space and causing said flue to serve as a radiator, and by its becoming heated quickening the discharge of the foul air. This arrangement of the main foul-air flue E within the heater enables me to dispense with the former direct pipe-and-damper connection between the hot-air pipe and said foul-air duct and utilizes the down outside duct or pipe shown in my previously-patented construction, or which might be placed in a hollow wall or between an inner and outer casing for summer ventilation, said pipe operating in connection with valves or dampers to empty the air-chamber when required of vitiated air by passage through the air-chamber and through one or more valves or dampers in the portion of the foul-air duct which lies within the heater. Thus H is the elbow or reversing-current

pipe, which connects either of the hot-air flues F with the air-chamber C below through an opening *c*. This pipe H is provided at its top with a valve or damper *d*, that, accordingly as it is raised or lowered, opens or shuts off communication between said pipe at its top and the air-duct F, and is further provided with a cold-air opening *e* below, opened and closed by a door or valve *f*. The main foul-air duct E has one or more openings *g* in its sides or ends controlled by slides or valves *h* or a removable cap, as the case may be, all arranged within the heater. When the damper *d* is lowered and the door of the cold-air opening *e* is opened by the door *f*, heat is delivered in the usual way to the apartments; but when the damper *d* is raised to cut off direct communication between the hot-air pipe and the air-chamber C and the cold-air opening *e* is closed by the valve or door *f* and the openings *g* exposed by adjustment of the valves *h*, then the several hot-air conduits for conveying air to the rooms of a building, to each or any of which a pipe H may be connected, are changed to air and dust conduits, and air is drawn or taken from the apartment through said conduits.

To explain, for ventilation only during summer the valve *d* is raised to close the hot-air pipe F from connection with the top of the chamber C, the valve *f* closed, and the opening *g* in the main foul-air flue E opened. Then the pipe F, instead of becoming an inlet for heated air to the apartment, becomes an outlet for the vitiated air from the apartment, such vitiated air passing from the pipe F down the elbow or current pipe H through the opening *c* at the bottom and up through the air-chamber, where it is heated, and to and through the opening *g* of the main foul-air flue, where it escapes; but when the apparatus is designed to be used as a heater only, or to convey heat to the apartment, as well as vitiated or foul air from it, then the pipe H ceases to act, as the valve *d* is lowered to close its connection with the duct F, the valves *f* being opened to admit fresh air to the chamber C, where, becoming heated, it escapes by the pipe F to the apartment. In this operation of the apparatus the opening *g* to the main foul-air pipe E is closed, and the vitiated air from the apartments then passes down the pipes G and through the heater to the main foul-air flue E, where it escapes.

The ventilating-ducts G by being passed between the inner and outer casings of the structure and up through its roof afford increased convenience for making the necessary connections.

The heat of the fire-chamber imparts motion to all currents, and each foul-air and duct pipe passing through the heater next to the fire is independent in its action whether the house-connections be near or remote.

No mingling of the vitiated air which escapes to the outside of the building with the fresh air which enters from the outside can possibly take place.

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

1. The combination, with the hot-air chamber of a combined heater and ventilator and with the ventilating-tubes passing through the heater, of the main foul-air-discharge flue arranged within and under cover of the heater, substantially as specified.

2. In a combined heater and ventilator, the reversing-current pipe H and its valves or dampers *d* and *f*, in combination with the pipe F, with which it connects, and the foul-air-discharge flue E, having one or more valvular inlets, substantially as specified.

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