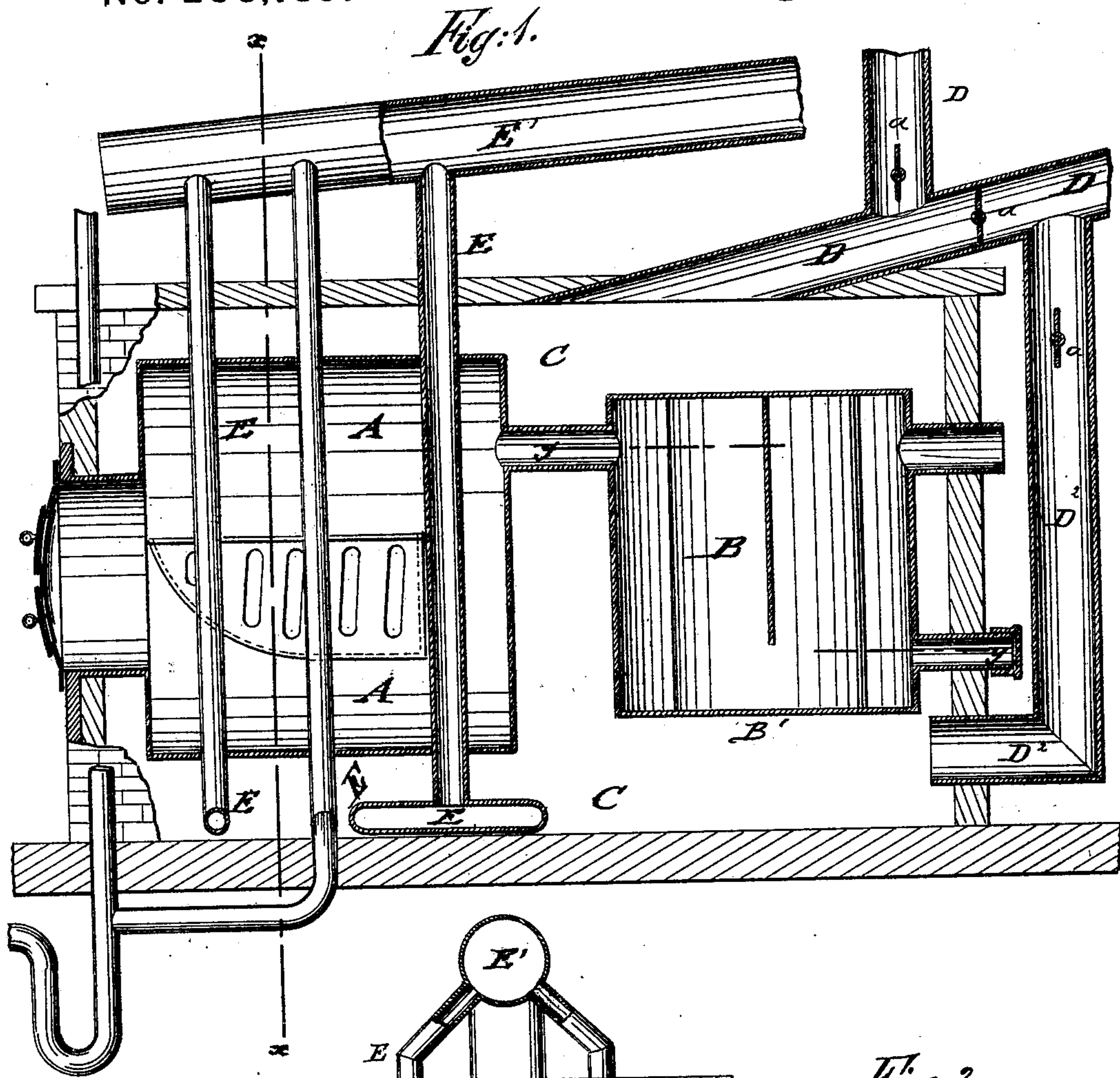


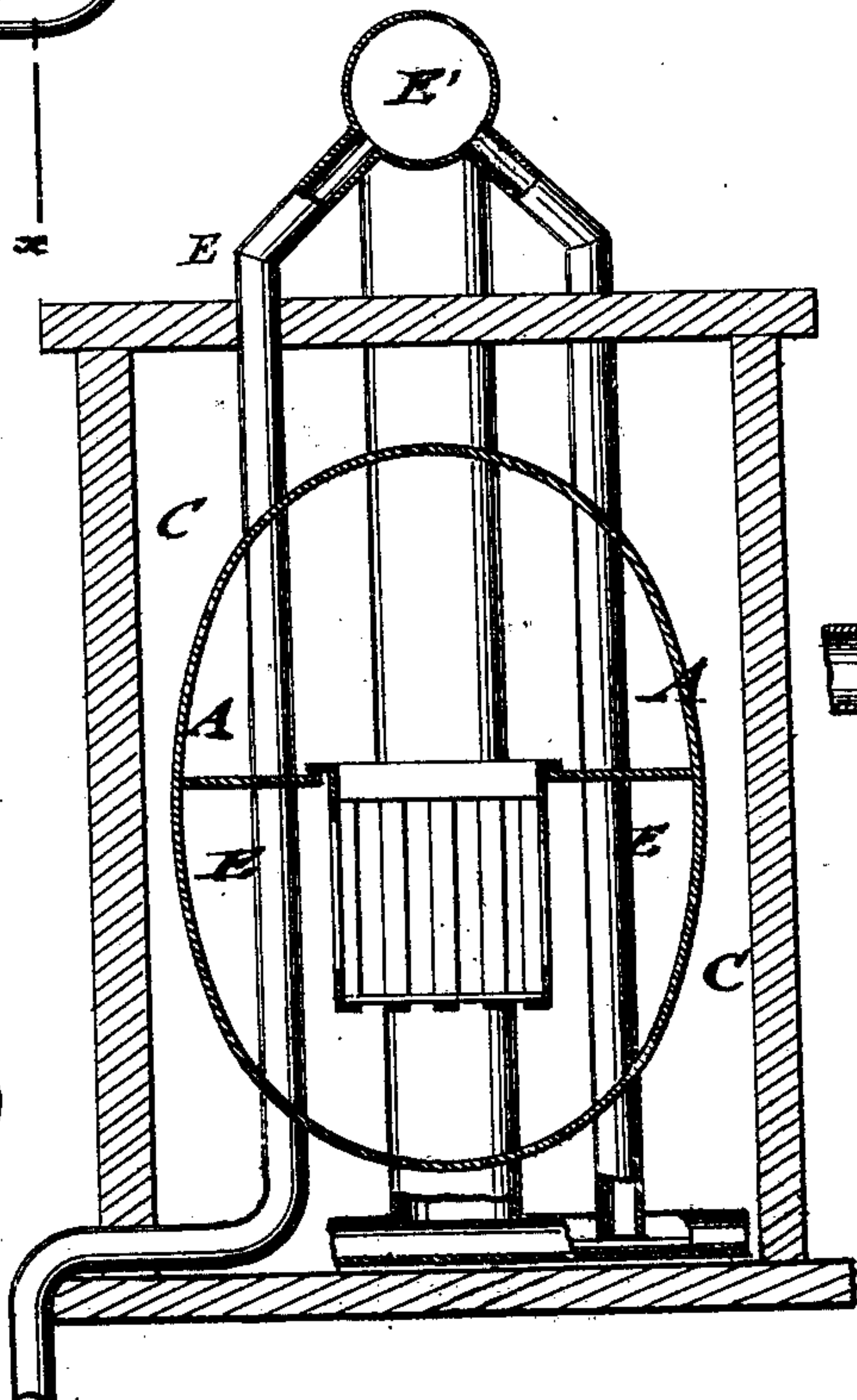
W. R. MacDONALD.  
Combined Heater and Ventilator.

No. 206,739.

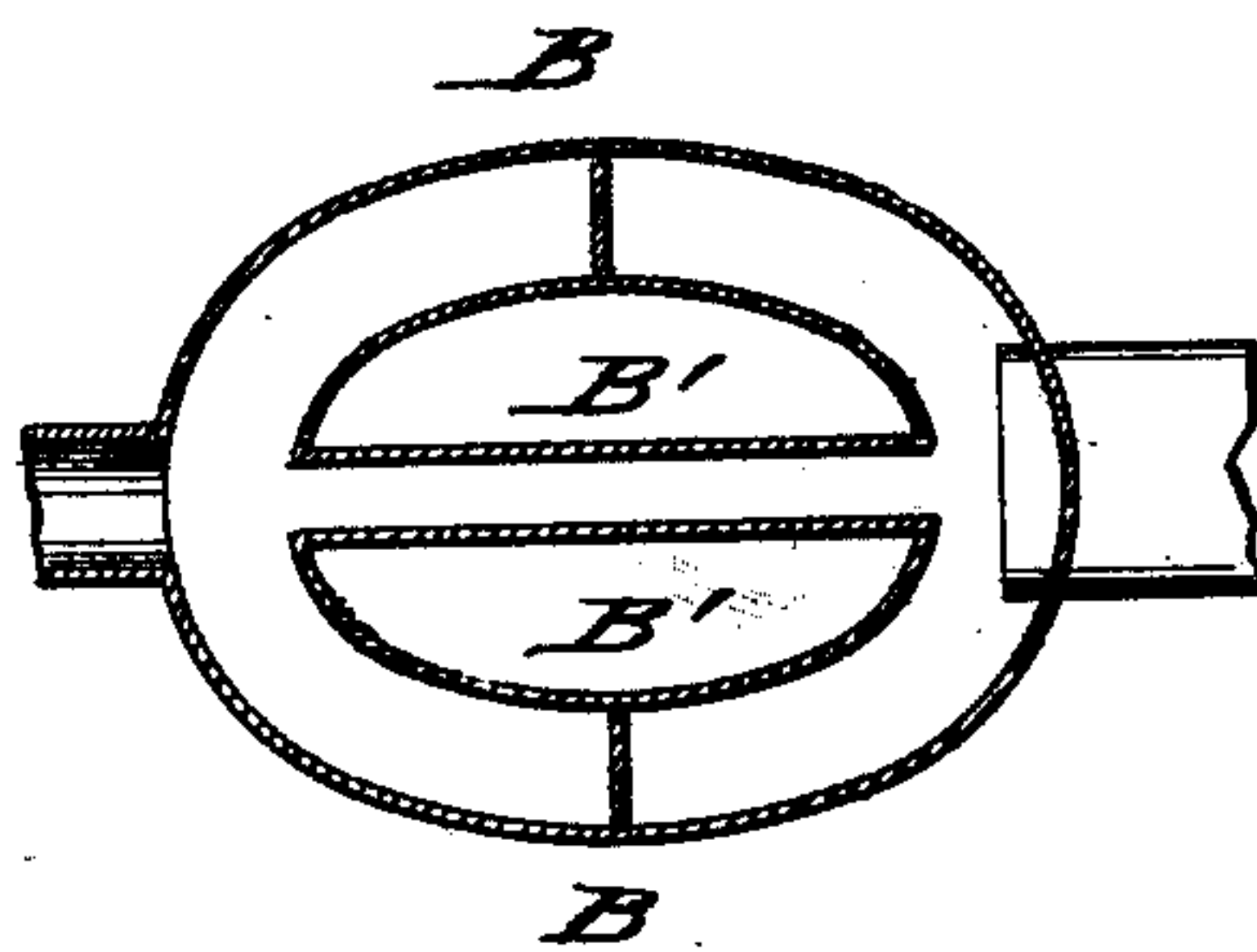
Patented Aug. 6, 1878.



*Fig: 2.*



*Fig: 3.*



WITNESSES:

*Chas. Nida*  
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INVENTOR:

*W. R. MacDonald*

BY

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# UNITED STATES PATENT OFFICE.

WILLIAM R. MACDONALD, OF ALLEGHENY, PENNSYLVANIA.

## IMPROVEMENT IN COMBINED HEATER AND VENTILATOR.

Specification forming part of Letters Patent No. **206,739**, dated August 6, 1878; application filed June 28, 1878.

*To all whom it may concern:*

Be it known that I, WILLIAM R. MACDONALD, of Allegheny city, in the county of Allegheny and State of Pennsylvania, have invented a new and Improved Combined Heater and Ventilator, of which the following is a specification:

In the accompanying drawings, Figure 1 represents a vertical longitudinal section of my improved heating and ventilating apparatus. Fig. 2 is a vertical transverse section through the heater on line *x x*, Fig. 1; and Fig. 3, a horizontal section of the same on line *y y*, Fig. 1.

Similar letters of reference indicate corresponding parts.

This invention has for its object to furnish a combined heating and ventilating apparatus, that may 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, &c., and conducting it away, supplying pure air in place of the same.

The invention consists of a heater and radiator of the usual construction, arranged at the interior of an air-chamber, the heater being connected by ventilating flues or ducts with the apartments, &c., to be ventilated, the flues passing from the bottom of the air-chamber through the heater and through the top of the air-chamber to a foul-air flue, so as to draw off the vitiated air by suction. The hot-air flue is connected by valved ducts with the foul-air flue and with the bottom of the air-chamber, so that by closing the hot-air flue in summer the vitiated air is drawn into the air-chamber and discharged into the foul-air duct.

Referring to the drawings, A represents the heater, which is made of sheet metal, of oval form, and provided with a grate and doors, so as to form a complete furnace in itself that may be adapted for coal or wood, corn-cobs, or other fuel.

The heater A is connected by a smoke-pipe with a radiator, B, which is also made oval in form, and with oval flues B' in the center, for enlarging the heating-surface. The gases of combustion pass in a circuitous route through

the radiator, so as to emit their heat before passing off to the exit-pipe and chimney.

The radiator may be easily cleaned with a scraper, from a bottom tube with exterior cap. Both heater and radiator are inclosed by brick or other walls that form an air-chamber, C, around heater and radiator.

The cold air is drawn in through suitable openings and heated up in the air-chamber by the large heating surface of the heater and radiator, and then conducted, by the hot-air flue D at the top, to the different apartments to be heated, supplying pure heated air to the same by means of registers, in the usual manner.

The apartments are also connected with the air-chamber C by means of ducts or flues E, which enter into the air-chamber near the bottom, are then passed vertically through the heater, and out at the top of the air-chamber to a main flue, E'.

The heating up of the flue-sections at the inside of the heater causes the heated air within to rise rapidly, forming a vacuum that draws in the foul air, so as to convey it to the outside of the building.

One of the foul-air flues, E, is connected to the soil-pipe above the trap, so as to draw down the foul gases in the water-closets and conduct them to the collecting foul-air flue E'. The foul-air flue E is jointed to the lower part of soil-pipe near the trap, as shown in Fig. 1, and thereby the water-closets and soil-pipe kept free of obnoxious gases in the most effective manner.

The foul air cannot mingle with the pure heated air in the air-chamber, as it cannot escape at all, but has to pass to the collecting-flue for being finally discharged.

The hot-air flue D is also connected by a duct, D<sup>1</sup>, with the main foul-air flue E', and by an elbow-shaped duct, D<sup>2</sup>, with the bottom of the air-chamber C. These ducts serve for the purpose of summer ventilation, they being not used in winter.

The hot-air flue D, as well as the flues D<sup>1</sup> and D<sup>2</sup>, are arranged with tightly-fitting dampers *a*, so that the hot-air flue may be used for heating purposes by closing the dampers of the ducts D<sup>1</sup> D<sup>2</sup>, but that also the current of air may be reversed and drawn down from the rooms to be ventilated by closing the damper



of the hot-air pipe and opening the dampers of the ducts  $D^1 D^2$ , as in Fig. 1.

By keeping up a small fire in the heater, the vitiated air from the rooms is drawn down into the air-chamber by the partial vacuum formed therein by the heating up of the air and quick passing off of the same through the duct  $D^1$  and foul-air flue  $E'$ , fresh air being then supplied to the rooms through the windows.

The elbow-duct  $D^2$  may be removed in winter and the opening in the hot-air flue closed by a cap, while the opening of the air-chamber may remain open for the admission of cold air. The ducts  $D^1 D^2$ , intended for summer ventilation, as well as the foul-air flues  $E$ , for winter ventilation, may be used in connection with any approved heating furnace or radiator, and thereby the perfect and effective ventilating, or both heating and ventilating, of public and private buildings in all seasons is produced.

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

1. The combination, with a heater, of ventilating flues or ducts that are connected with the apartments, soil-pipe, &c., to be ventilated, and conducted through the heater to a collecting and discharging foul-air flue, substantially as and for the purpose set forth.

2. The 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 bottom of air-chamber, the hot-air flue and ducts being provided with dampers to use heater either for heating or ventilating, substantially as set forth.

WILLIAM ROBINSON MACDONALD.

Witnesses:

O. S. RICHARDSON,  
J. C. THOMPSON.