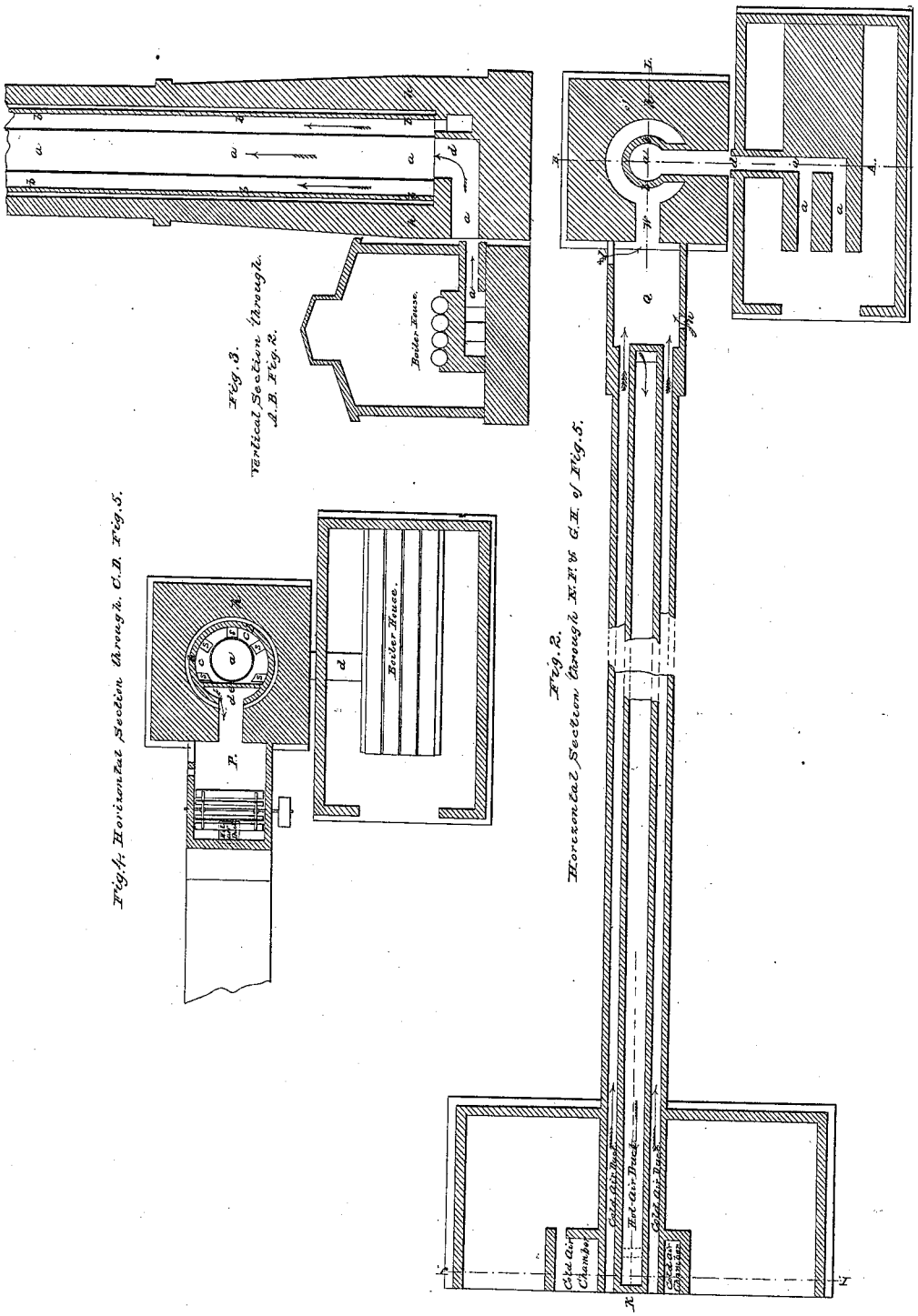
Sheet 1. 2 Sheets.

S. Rodman

House Ventilator.

No. 5,664. Patented July 11, 1848.

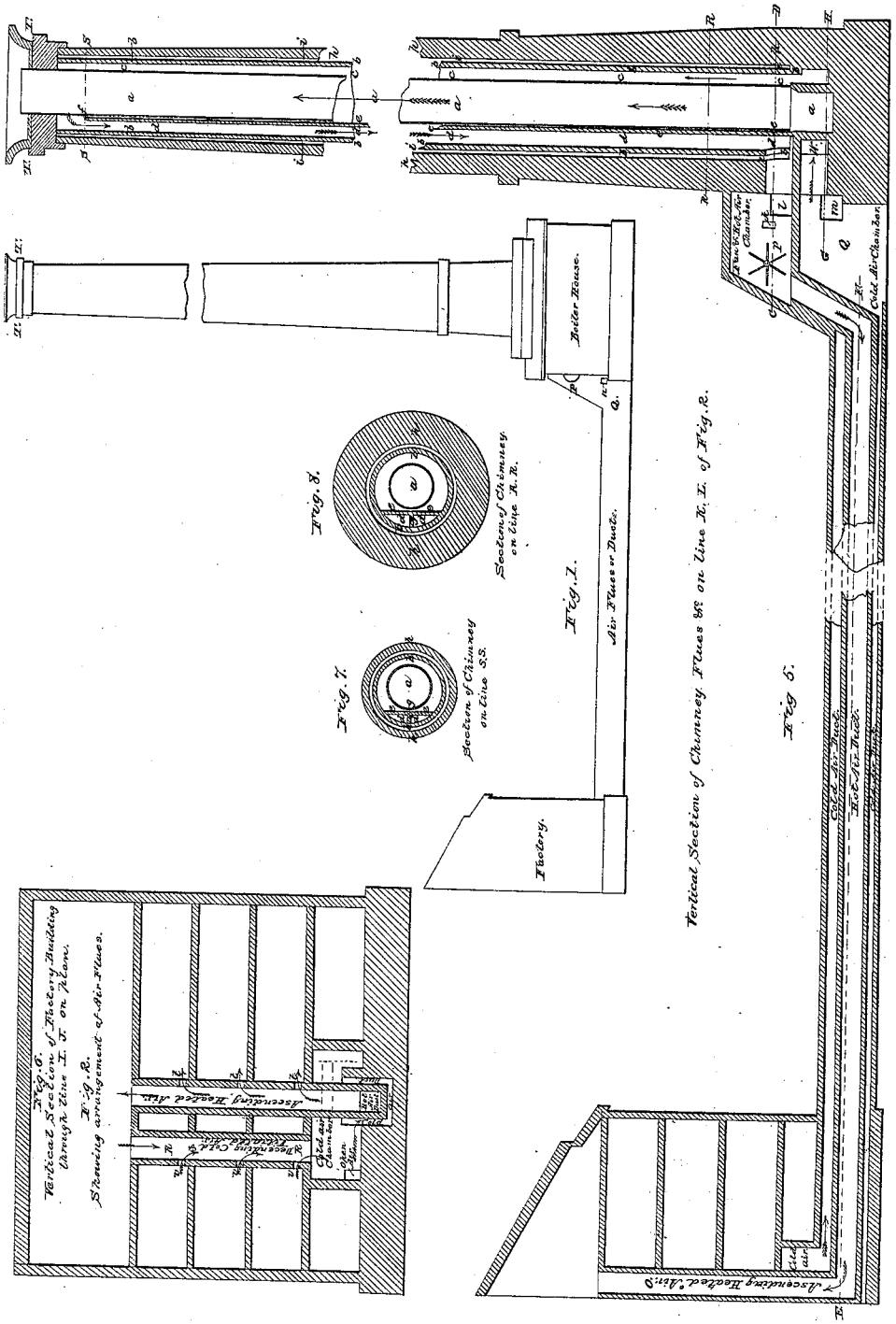


Sheet 2-2 Sheets

S. Rodman.

House Ventilator.

No. 5664. Patented July 11, 1848.



UNITED STATES PATENT OFFICE.

SAMUEL RODMAN, OF NEW BEDFORD, MASSACHUSETTS.

CONSTRUCTION OF FACTORY CHIMNEYS.

Specification of Letters Patent No. 5,664, dated July 11, 1848.

To all whom it may concern:

Be it known that I, SAMUEL RODMAN, of New Bedford, in the State of Massachusetts, have invented an Improvement in the Construction of Factory-Chimneys, of which the following is a specification.

In the construction of chimneys connected with furnaces of steam engines, or other works wherein powerful fires are used, all the heat that escapes upward through the smoke flue is quite lost to any useful purpose, if we except its aid in promoting the draft of the chimney.

The object of my invention is to render this waste heat available for warming and ventilating the works, or buildings having such furnace chimneys connected, or accessory thereto, and the following is a full and clear description of my invention, reference being made to the dissected model of the same, and also to the accompanying drawings—viz:

Sheet No. 1 contains, 1st a side elevation of the external form of the chimney, air ducts, boiler house &c. at Figure 1. Secondly, a vertical section of the chimney, air chambers and ducts. The flues leading up into the apartments to be heated and ventilated as seen in Fig. 5. Thirdly, a vertical section of the structure that is to be heated and ventilated, showing the arrangement of the air flues, valves etc. for the ingress and egress of air as seen in Fig. 6. Fourthly, two horizontal sections of the furnace chimney to show the positions and construction of the several flues as seen in Figs. 7 and 8. Sheet 2d. contains, first, a horizontal section of the structure to be heated and ventilated, the air ducts leading from the same to the hot and cold air chambers, and thence opening into appropriate air passages of the furnace chimney, due notice being given to the letters of reference as seen in Fig. 2. Secondly, a vertical section of the boiler house and chimney stack, at right angles to the vertical section of said chimney—given in Fig. 5 sheet 1st, is seen in Fig. 3. Thirdly, a horizontal section of said chimney, air chamber and boiler house, on a plane above that given in Fig. 2, as explained by letters of reference and shown in Fig. 4.

Where similar italics are used to explain the several parts of Figs. 1 to 8 they refer to the same parts of the construction.

The center flue or smoke pipe (*a*), of the chimney (communicating with the furnace fires in the boiler house, by a suitable opening at the level of the point (*a*) Fig. 5), is constructed of boiler iron, or other material suitable for the radiation of heat. This smoke pipe is inclosed by a brick wall (*b*), sufficient space being left between the brick wall (*b*), and smoke pipe (*a*), to form two air flues (*c*—*d*). These two air flues (*c*—*d*) which contain the ascending and descending current of air to be heated as hereinafter described, are formed by constructing a dividing wall (*e*—*e*) from the base of the chimney to a point (*f*) near the top of the same. It will be seen in Figs. 7—8 that this dividing wall (*e*—*e*) forms a chord line to the circular wall (*b*) and that it is strengthened and subdivided by another wall (*g*) bonded into the circular wall (*b*). Between the inclosing circular wall (*b*) and the exterior wall of the chimney (*h*) an air space (*i*—*i*) is left all around, to prevent the radiant heat of the smoke pipe (*a*) and the sudden changes of temperature due to the kindling and extinguishing of the furnace fires, from affecting the exterior wall (*h*) so as to fracture the masonry. The masonry of the chimney is covered at the top with a disk of cast iron (T), to protect it from the action of rain and frost, which is surmounted by a cornice, also of cast iron, the disk (T) having a circular opening near its center through which passes the top of the smoke pipe (*a*), the orifice of said smoke pipe being fitted with a cover or damper of the usual form, to retain heat or regulate the draft.

The boiler house is placed on one side of the chimney and communicates therewith as shown in Fig. 2. On the adjacent side of the chimney and attached to the base thereof are constructed two small air chambers, one above the other (P and Q) communicating respectively with the hot (*d*) and cold (*c*) air flues of the chimney and having valves or doors (*l*—*m*) opening to the external air. In the hot air chamber (P) is placed a fan, the shaft of which projects through the wall next the boiler house, and fitted with a nest of pulleys, to carry the driving belt and give the desired velocity to the circulating current of air. Opposite the other end of the fan shaft is a small door (*k*) to admit of oiling the journal. From these two air chambers (P—Q) two horizontal air ducts or flues connect the same with the building to be warmed and

ventilated, the larger and exterior duct or flue containing cold air, while the smaller duct inclines downward from the air chamber (P) till it enters the other and passes interiorly and parallel thereto, forming the flue for the hot air. At a suitable point within the building to be heated and ventilated these two air ducts connect with vertical pipes ascending to the several floors of said building, and opening into the apartments thereof by means of suitable registers or valves.

In the air chamber (Q) the door or valve (*n*) is designed to communicate with a flue under the hearth of the boiler house in front of the ash pit, into which pit apertures may be arranged, through which apertures, by means of a tight flue opening into the hot air duct, and passing through said air chamber, the hot current of air can be diverted from its course toward the building to be heated and ventilated, and driven into the furnace to quicken the fires, when this hot air is not otherwise needed during the summer season.

The process of heating and ventilating is effected in the following manner: The smoke flue (*a*) of the furnace chimney becoming sufficiently heated by the smoke and gases of combustion from the fires in the boiler house, the valves (*v*—*v*) Fig. 6, are opened and the cold air of the several apartments indicated in the drawing, descends through the vertical pipe (R) into the horizontal and larger air duct, passing through which it enters the cold air chamber (Q seen in section Fig. 5) and thence enters the chimney by the flue (W); or by opening the door or valve (*m*) the fresh external air is admitted to the cold air chamber (Q) and thence through the side flue (W) into the chimney, and passes upward into the air chamber or flue of the chimney (C) through the openings (*s*, *s*,) seen in Fig. 4, continuing to ascend thence to the top of the dividing wall (*e*, *e*,) at the line (*s*, *s*,) and becoming heated in its passage upward by the radiant heat of the smoke pipe (*a*) the column of air is now forced to descend through the hot air flue (*d*) into the hot air chamber (P,) by the action of a fan or other propeller, working in said chamber (P,) which forces the air thus heated and drawn from flue (*d*) into the horizontal hot air duct, and thence into the several apartments of the building as seen in Fig. 6, through the vertical pipe (O) and valves (*t*, *t*, *t*,).

By this process, a uniform circulation of the air within the several apartments of a factory or other large building may be effected, and a thorough ventilation maintained, either by the warm air from the chimney, or by the external atmosphere admitted directly into the chamber (P), at the same time that an amount of heat is at command by the continuous action of the machinery, sufficient for comfort in the coldest months in this climate.

I do not claim as original the propulsion of heated air through ducts and flues for the purpose of warming and ventilation, but

What I claim as my own invention and desire to secured by Letters Patent of the United States, is—

The peculiar construction and division of my furnace chimney into smoke and air flues as herein described, and for the particular purposes herein set forth.

SAML. RODMAN.

Witnesses:
ALDEN G. SNELL,
THOS. R. RODMAN.