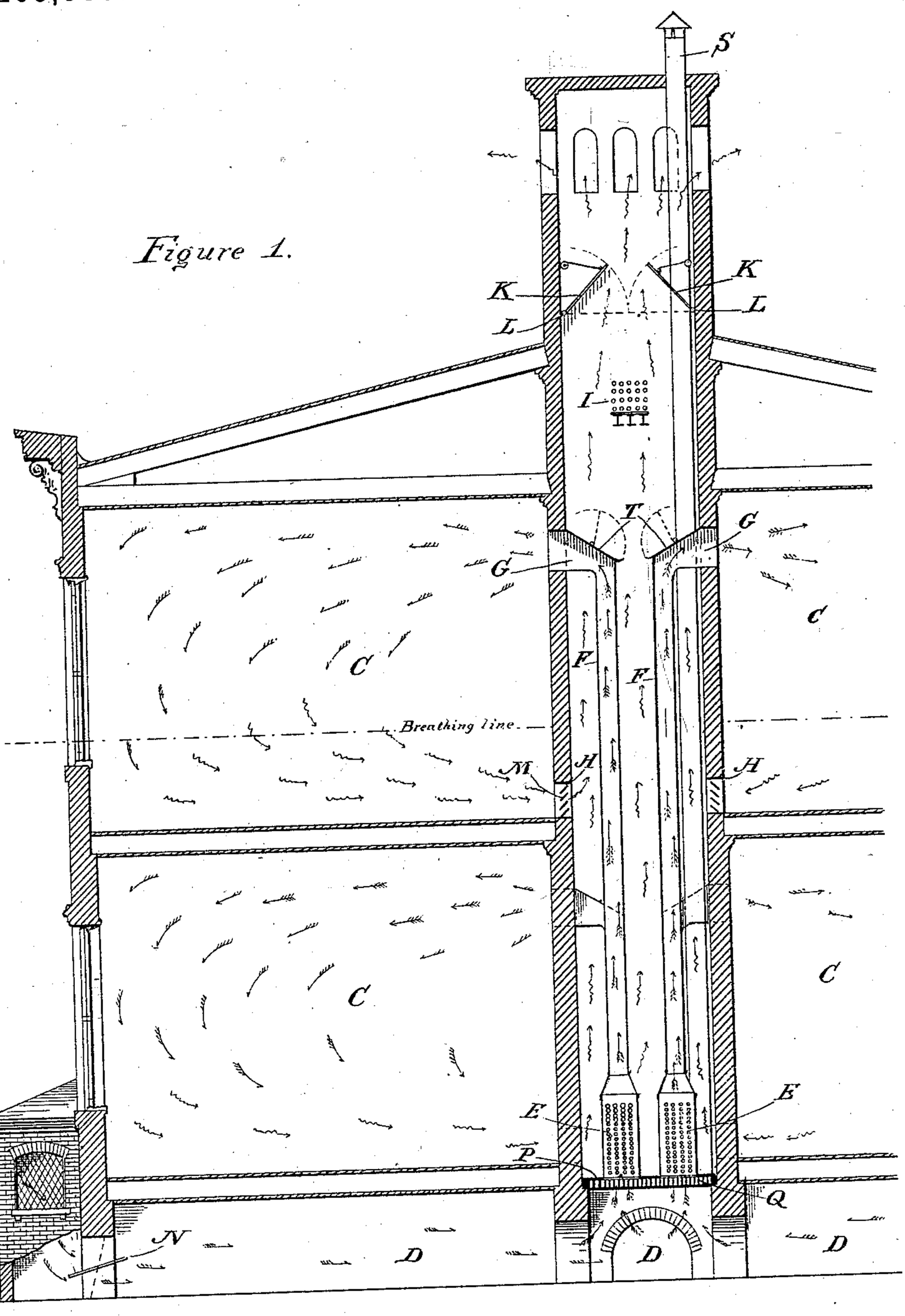
(No Model.) 2 Sheets—Sheet 1.

N. WHEELER.

SYSTEM OF HEATING AND VENTILATING BUILDINGS.

No. 285,539. Patented Sept. 25, 1883.

Figure 1.



Witnesses.
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(No Model.) 2 Sheets—Sheet 2.

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Figure 2

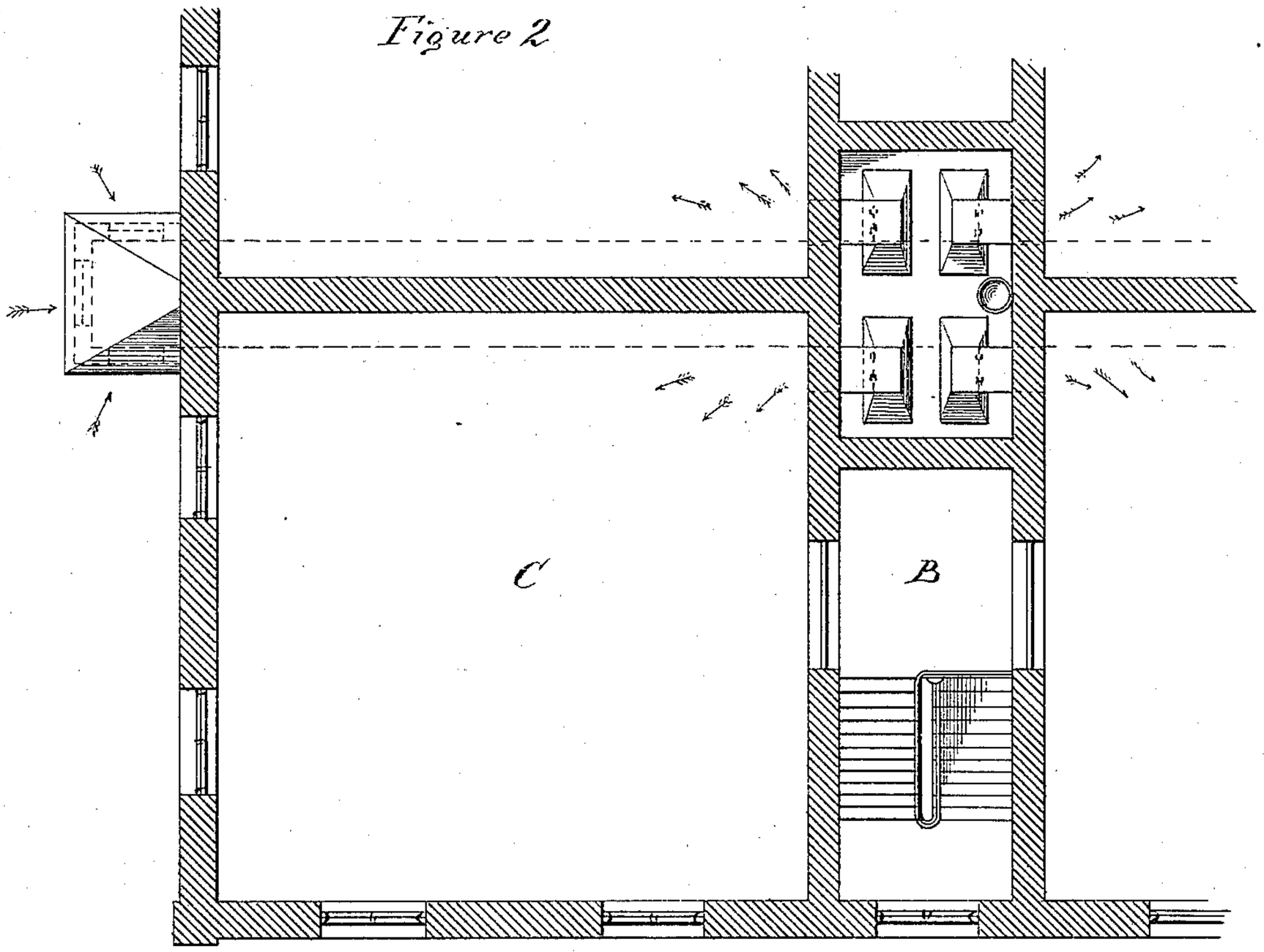
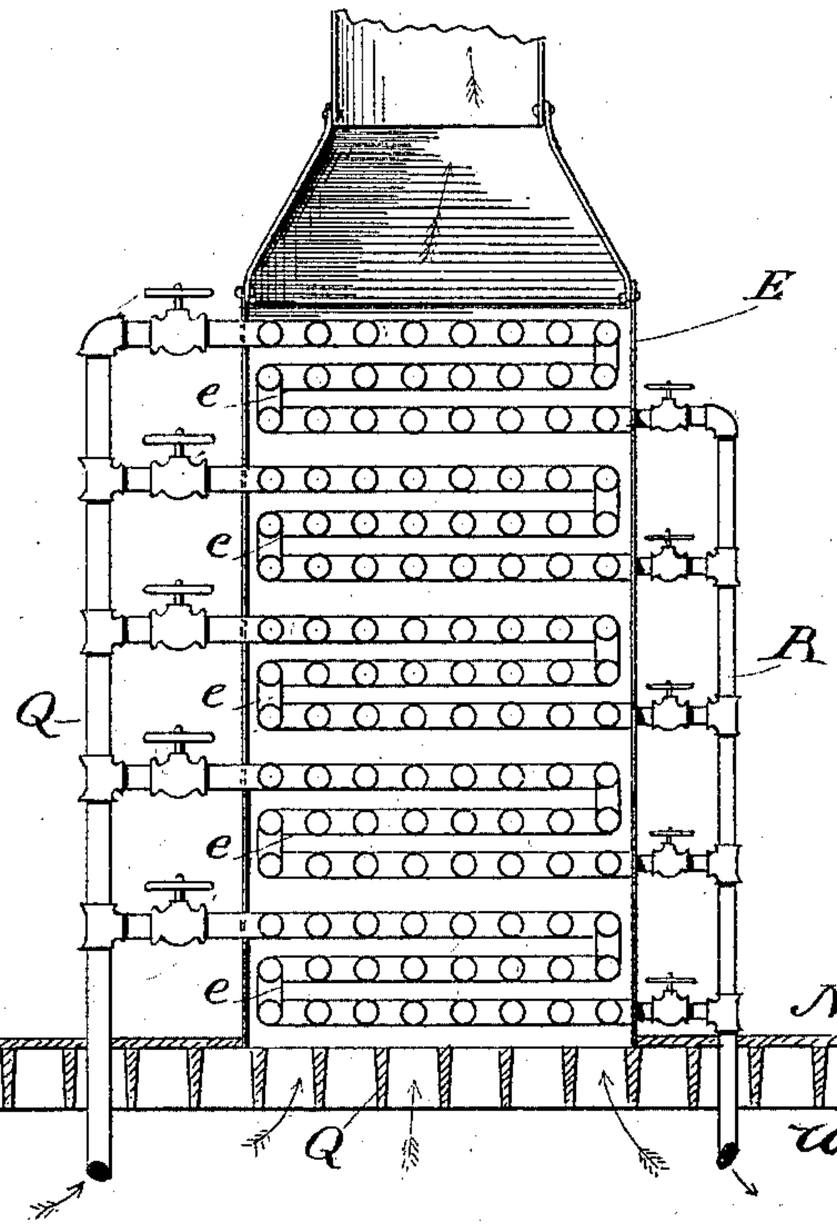


Figure 3.



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UNITED STATES PATENT OFFICE.

NATHANIEL WHEELER, OF BRIDGEPORT, CONNECTICUT.

SYSTEM OF HEATING AND VENTILATING BUILDINGS.

SPECIFICATION forming part of Letters Patent No. 285,539, dated September 25, 1883.

Application filed March 30, 1883. (No model.)

To all whom it may concern:

Be it known that I, NATHANIEL WHEELER, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented a new, useful, and Improved System of Heating and Ventilating Buildings; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to the heating and ventilation of buildings, and has for its objects to thoroughly warm any number of rooms by indirect heat, and at the same time to secure perfect ventilation by supplying the heated air in such quantities and in such a manner that all the air in the rooms may be rapidly changed as often as may be desired, the foul air being forced out at the level of the floor. Numerous attempts have been made heretofore to accomplish these objects, but with very imperfect results, as some of the requirements necessary to the perfect working of the system have been omitted in every system that has been tried previously to mine.

My invention consists in the details of construction and arrangement, which will be hereinafter fully described, and then specifically designated by the claims.

For the purpose of enabling those skilled in the science to which this invention appertains to understand and use my improved system, I will proceed to describe the same, referring by letters to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a central vertical section of a building containing my improved system of heating and ventilation. Fig. 2 is a partial plan of one floor of the building, and Fig. 3 is a vertical section of one of the coil-chambers.

Similar letters indicate like parts in all the figures of the drawings.

A is the shaft, situated near the center of the building. This shaft contains the coil-chambers and flues for supplying warm air, and also serves as a ventilating-shaft.

B is a hall, and C C are rooms.

D D are cold-air ducts, which enter from the four sides of the building, so that no matter what may be the direction of the wind the supply of air is not affected thereby. These ducts preferably end in short towers carried up in the angles of the side walls ten or twelve feet above the surface of the ground, for the purpose of securing pure air.

E E are the coil-chambers, situated directly above the cold-air ducts, a separate coil-chamber being provided for each room. A pipe or flue, F, leads from each coil-chamber through the shaft directly to the room to be heated. These pipes are made large enough to admit the required amount of air, and terminate in registers or openings G G of still larger dimensions. These openings are located a short distance below the ceilings, and may advantageously be placed in the inner corners of the rooms, the corners being clipped to form a flat surface for the register-openings. The coil-chambers are situated in the shaft directly over the coil-air ducts and rest upon iron girders Q, over which is placed a sheet-iron cover, P, so that all air entering from the ducts must pass into the coil-chambers. These chambers are provided with two or more separate coils, *e e*, each connected directly with the supply-pipe 2 and escape-pipe R, and provided with cut-off valves. No attempt is made to regulate the temperature of the rooms at the incoming-registers, the temperature of the air to be supplied being regulated by the number of coils in the chambers into which steam is admitted, and by a damper which regulates the supply of cold air admitted to the coil-chambers. Other sets of dampers regulate the exhaust from the rooms, as will presently be explained.

Speaking-tubes or bells may be used to signal to the janitor or engineer from the rooms above.

In extreme cold weather all of the coils belonging to rooms to be heated may be used; but ordinarily one or two coils for each room will be found sufficient.

It will of course be understood that one or any number of rooms may be heated without in any way affecting rooms which it is not desired to heat.

After passing through the coil-chamber the pure warm air passes through pipe F to the room to be heated. It is not intended to ever heat the air to a very high temperature. From

100° to 125° Fahrenheit will be found sufficient at any time. The orifice for the outgoing air is located at the level of the floor, preferably in the same corner of the room at which the warm air enters, and should be at least twice the size of the opening which supplies the warm air. The motion of the incoming air is upward and outward until it reaches the outer walls, where it is rapidly cooled, and falls toward the floor. The stratum of vitiated air being forced downward instead of being allowed to rise, it then passes along the floor toward the outgoing-register H.

It will be seen that most of the air entering is made to traverse the entire room before it can reach the outgoing-register, which necessarily causes a constant movement of the air in all parts of the room, the essential principle being that at the breathing-line a constant supply of absolutely pure and moderately-warmed air is received from above. The constant supply of air coming in above the breathing-line renders it impossible for the foul air to rise. It is therefore continually forced toward the floor and out at the lower register. No fans whatever are required in the shafts, as the radiation of heat from the outer surfaces of the hot-air flues and from the boiler smoke-pipe S will be found amply sufficient to cause a strong upward current of air. As an additional safeguard, however, coils in direct connection with the boiler may be placed in the shafts, into which steam may be admitted should it be found necessary. These coils are indicated at B in the drawings.

The dampers, which I will now describe, form an important feature of my invention, in connection with the parts described above.

At night, and over Sundays and holidays, the boiler-fires are banked, and of course little or no steam can enter the coil-chambers. In order to prevent the temperature of the rooms from being seriously reduced, I place dampers K K in the shafts, which effectually close them, and prevent the warm air in the rooms from being drawn out and into the shafts, and also prevent the cold air from settling down into the rooms. These dampers are preferably placed above the coils. They are hinged at L L, as shown, and are raised by cords, which pass ever pulleys and down into one of the rooms. Dampers which wholly close the main shaft are very important, and have never been used previously in this connection. I also place some simple style of dampers in the outgoing-registers, as at M. The particular style of damper used is unimportant. For the purposes of my invention a flap-damper, or the ordinary register slat-damper shown, will be found equally efficient. Ordinarily in regulating the temperature of the rooms this damper need not be used.

In addition to the sets of dampers specified above, I also place a damper, N, in each of the side walls of the building at the entrances to the cold-air ducts. These dampers should in cold weather be closed at night, to prevent the entrance of cold air and consequent chilling of the floors. They are also used to regulate the quantity of air admitted to the coil-chambers. They may be arranged to operate in any simple manner, the precise mode of operation not being of the essence of my invention.

For the purposes of summer ventilation the operation I have described above is to a certain extent reversed. Dampers K and N are fully opened, damper M being partially closed, the external air entering from the ducts through the coil-chambers, to which of course no steam is admitted. External air is also admitted to the rooms, in as large quantities as may be desired, at the windows. The exhaust from the rooms is mainly at registers G, the caps or covers T at the angles of pipes F being removed or turned out of the way, so as to offer no obstruction to the outgoing air. A strong current is kept up in the shaft by admitting steam to coils I.

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

1. In a heating and ventilating system, a shaft provided with dampers which wholly close it, and containing coil-chambers and hot-air flues, in combination with rooms into which the heated air is delivered, and from which the foul air passes into the shaft.

2. Shaft A, having dampers K, in combination with pipes F and coil-chambers E, substantially as described.

3. Shaft A, having dampers K and registers H, in combination with coil-chambers E, containing two or more coils, *e e*, each separately connected to the supply and waste pipes, and having cut-off valves and pipes F leading to the rooms, whereby, when in use, ventilation is constant, the temperature being regulated at the coil-chamber, and when not in use escape of warm air and entrance of cold air is wholly prevented.

4. Shaft A, having dampers K K, in combination with ducts D, having dampers N, coil-chambers E, and pipes F.

5. Coil-chambers E, containing two or more coils, *e e*, each separately connected to the supply and waste pipes, and having cut-off valves, in combination with pipes F and registers H, opening into the shaft, whereby constant ventilation is secured and the temperature is regulated at the coil-chambers.

6. Coil-chamber E, containing two or more coils, *e e*, each separately connected to the supply and waste pipes, and having cut-off valves, in combination with air-duct D and damper N.

7. Air-ducts D, shafts A, and coils I, in combination with pipes F and registers G and H.

8. Air-ducts D, having dampers N, and shaft A, having dampers K, in combination with

coil-chambers E, pipes F, having caps T, and rooms C, having registers G and H, all as described, and for the purposes set forth.

9. In a heating and ventilating system, coil-chambers, each of which contains two or more coils, which are separately connected to the supply and waste pipes, and provided with cut-off valves, in combination with pipes which connect the coil-chambers with the rooms to be heated, whereby the temperature of the air admitted to the rooms may be regulated at the coil-chambers.

10. In a heating and ventilating system, pipes which convey the heated air to the rooms, and registers for the escape of foul air, in combination with a ventilating-shaft having dampers which wholly close it and prevent circulation of air and cooling of the rooms when not in use.

In testimony whereof I affix my signature in presence of two witnesses.

NATHANIEL WHEELER.

Witnesses:
A. M. WOOSTER,
W. T. HAVILAND.