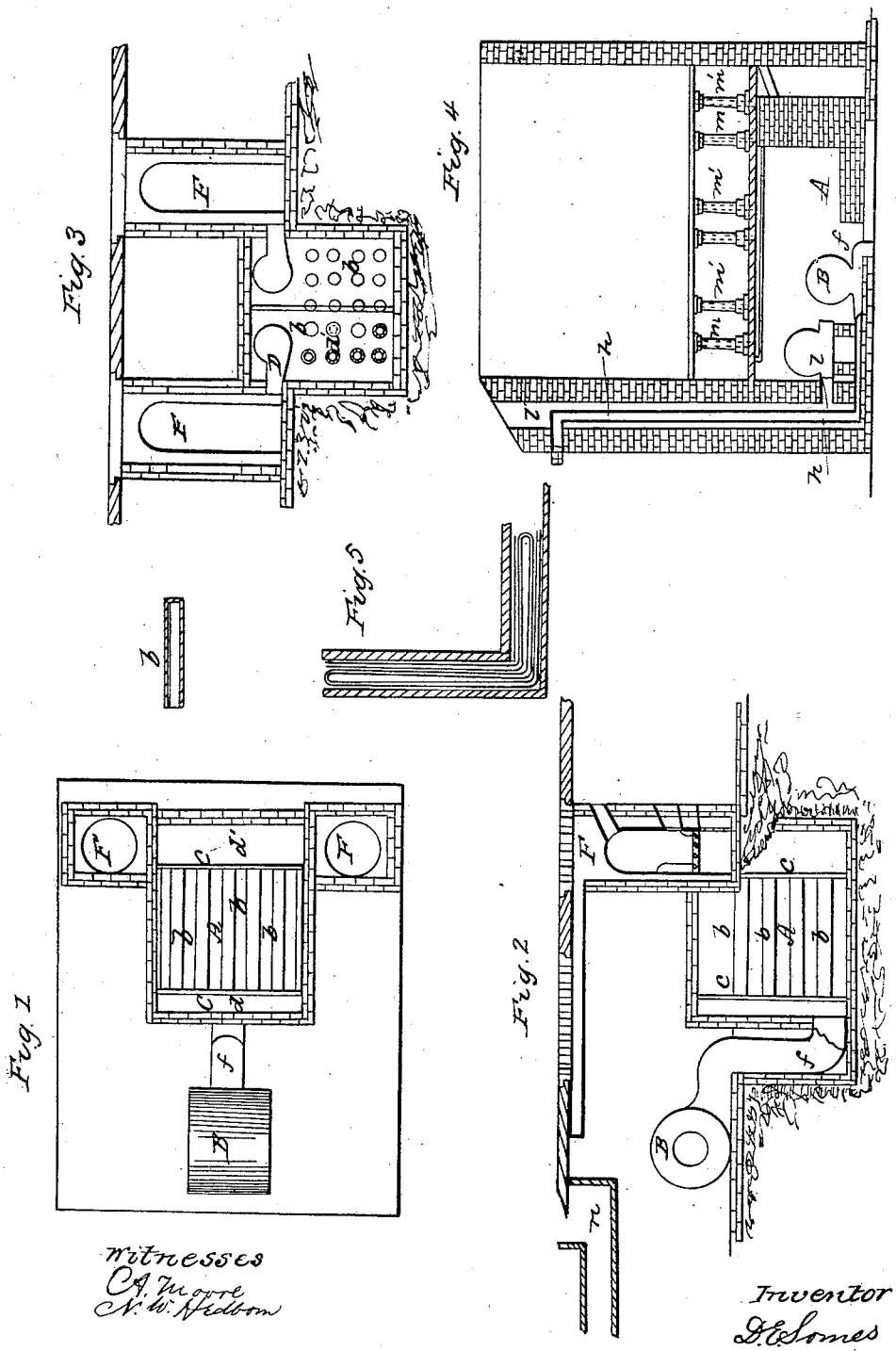
D. E. SOMES.

Apparatus for Heating, Cooling, and Ventilating.

No. 51,236. Patented Nov. 28, 1865.



# UNITED STATES PATENT OFFICE.

D. E. SOMES, OF WASHINGTON, DISTRICT OF COLUMBIA.

## IMPROVEMENT IN APPARATUS FOR HEATING, COOLING, AND VENTILATING.

Specification forming part of Letters Patent No. **51,236**, dated November 28, 1865.

*To all whom it may concern:*

Be it known that I, DANIEL E. SOMES, of the city of Washington, in the District of Columbia, have made a new and useful Improvement in Cooling, Heating, and Ventilating Buildings and Apartments; and I do hereby declare that the following is a full and exact description of the same, reference being had to the annexed drawings, making a part of the specification.

The first part of this invention consists in certain devices for cooling air, the object being to present to the current of the air a large cooling-surface without increasing too much the friction. For this purpose I construct what I call a "cooling-tank," as shown at A in the drawings. This tank may be situated deep in the earth, and thus cooled by the low temperature always existing at certain depths below the surface, aided, if need be, by artificial modes of cooling, or the tank may be situated at any point at which it may be cooled. In this tank are placed the air-tubes *b b b*, arranged in head-pièces C C in the manner well known in the construction of tubular boilers, so as to present a large cooling-surface. At each end the tubes *b b* open into the spaces *d d'*. One of these spaces, *d*, is connected by the duct *f* with the fan-blower B or any suitable device for forcing air. The other space, *d'*, is connected with the distributing-pipes D, which convey the air to the building to be cooled.

The tubes *b* may be contracted where they enter the space *d'* so as to cause some pressure on the air contained in the tubes immersed in the cooling-tank A. This compression causes the air to give up part of its heat, and as it expands from the narrow outlets into space *d'* its temperature will fall. There will be but little loss from friction, as the contraction is made by partly closing, by means of a disk, the outlet ends of the tubes.

In many buildings it is desirable to warm the air used in ventilating at some seasons and to cool it at others. Therefore, the second part of my invention consists in so arranging the cold-air tubes and ducts above mentioned as to form a continuous system with the ordinary hot-air flues or passages, so that the same flues are used to distribute at pleasure either hot or cold air. This arrangement is shown in plan in Figure 1 and partly in section in Fig. 3, where F F' are the ordinary hot-air furnaces or other convenient heaters for warming buildings. By this arrangement I am enabled at pleasure to throw into the building either hot or cold air, and thus to secure at all times the proper or desirable temperature with the necessary amount of ventilation.

For the purpose of warming the air, instead of using the ordinary heaters F F' or other heaters of the common forms, I sometimes arrange a furnace under the tank A, so as to heat the water therein, and tank A then with its tubes becomes a very convenient air-warming apparatus.

Instead of a furnace under A steam-pipes may be carried through the tank A or steam may be admitted directly into the tank, so as to heat the water contained therein.

When the tank A is used as a heater the tubes *b b* should not be contracted where they open into space *d'*.

The air, after having been warmed as just described, may be, if necessary, still further warmed by passing it through the cold-air spaces of an ordinary hot-air furnace, as shown at F F', or by means of any ordinary heater.

The same registers and other devices commonly used in heating and ventilating may be used with my system of cooling, heating, and ventilating.

When I wish to economize heat as much as possible I arrange the flues or channels which convey the fresh air into the warming or cooling apparatus so as to bring them in contact with or through the flues and channels which convey the foul air from the building, so that the fresh air in winter will be partially warmed by passing in a flue or channel through or near the flue or channel which conveys the warm foul air from the building. In summer the conditions are reversed with the same arrangement of devices.

In Fig. 4, *h* is the fresh-air duct, passing through the foul-air flue *l*. These flues may change places—that is, the fresh air may at pleasure be made to pass through either and the foul air through the remaining one. Instead of passing the one within the other they may be arranged side by side. When desirable, the outgoing current may be further cooled by

a jet of water. This will in turn cool the incoming current and serve to produce a downward draft in the fresh-air flue; or cold-water pipes or channels may be arranged by the side of the fresh-air flue so as to cause an inward draft.

I prefer to bring the cold air in the room at the top or at some distance above the floor, so that it will fall and be evenly distributed. (See M, M′, M″, &c., in Fig. 4.)

To carry off the foul heavy gases, carbonic acid, &c., I place registers at or near the floor. An artificial draft may be made to aid the drawing off of these gases, or the arrangement of a ventilator to be acted upon by the natural wind currents may be made to keep up a draft. By drawing the foul air from the bottom of the room in winter the warm air will be prevented from accumulating in the top of the room, as it does when the common registers, placed near the top of the room, are used.

In applying my system to a large or expensive building the best plan is to use any convenient motive power, as steam, to produce the force required; but where such power would be too expensive and troublesome, as in ordinary dwellings, a substitute may be found in the natural currents of the wind. A convenient mode of using the wind for this purpose is shown at P, Fig. 4. A frame is made to project some distance beyond the building at the point where the air is to be taken in, with a vane balanced so that the long end shall point inward. The vane will then turn so as to catch the current of air and conduct it into the building with the full force of the wind. At the point where the air is to be expelled from the building this arrangement is to be reversed and the foul air will be drawn out by the current of wind passing by the vane.

In Fig. 5 is shown a chimney or stack, which may be situated at a distance from the building to be cooled. Inside this chimney are cold-water pipes, which may be arranged vertically as shown in Fig. 4, or they may be arranged in the form of a coil, the object being to present as large a cooling surface as possible. By arranging the water-pipes so as to ascend and descend many times, a small quantity of water is made to cool a large quantity of air, for, after descending into the earth or into a cooling-tank, the water again rises into the chimney and further cools the air. Water-tubes as here described may be connected with the ordinary water-pipes as used in cities.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The construction and arrangement of a system of tubes or pipes in a cooling tank or cistern so as to obtain a large cooling-surface, substantially as set forth and described.

2. The combination of a system of warming and cooling apparatus with devices for receiving, cooling or warming, and distributing air in buildings or apartments, as described.

3. The combination of the flues or channels for introducing air into and expelling air from buildings, so as to economize in heating or cooling, as herein described.

4. The combination of air-forcing apparatus with a system of flues or channels for cooling air, as described.

5. The arrangement of devices whereby the foul air is drawn off through or near the floor and fresh air is thrown into the upper part of the building.

D. E. SOMES.

Witnesses:
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