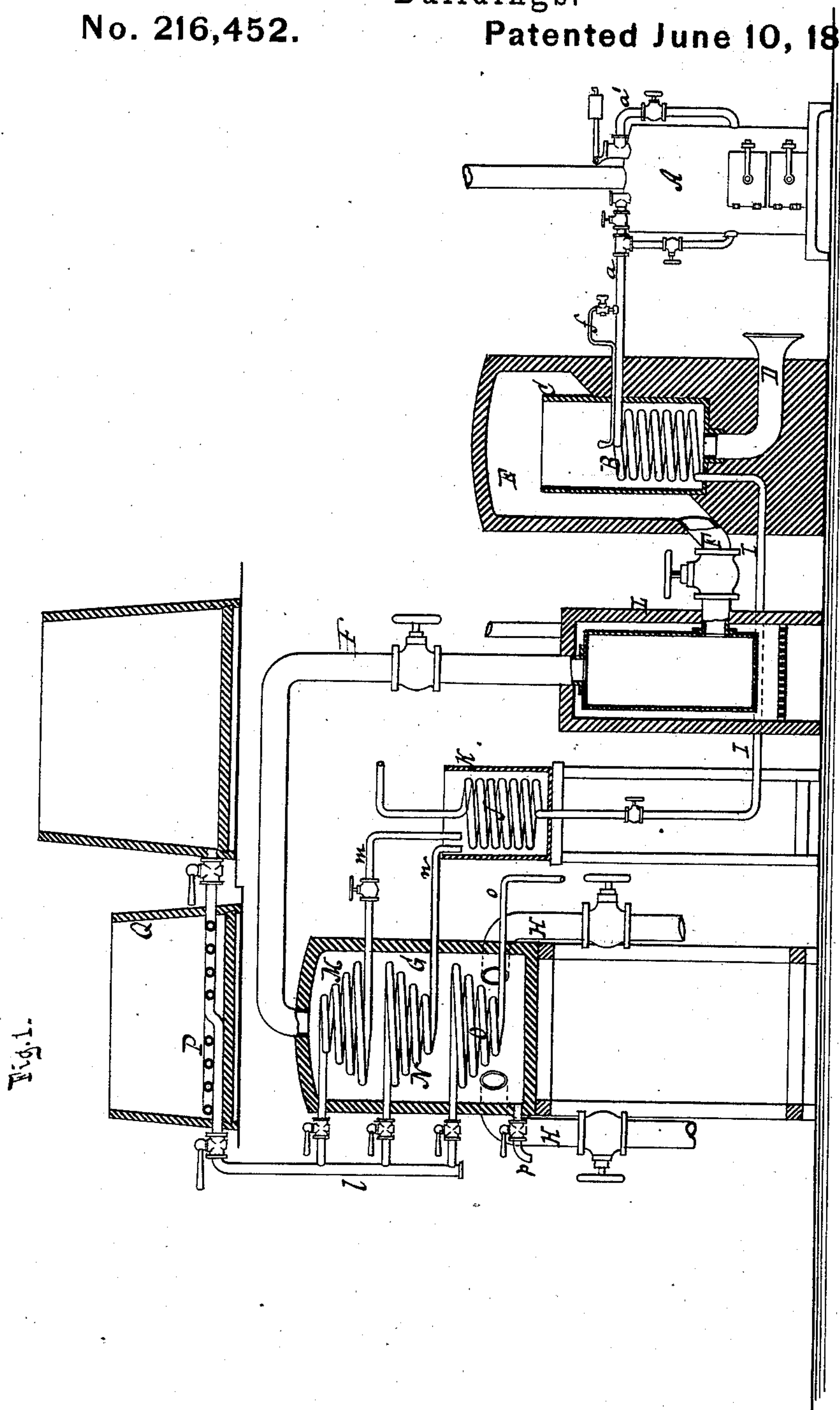


W. PICKHARDT:
Air-Heating and Cooling Apparatus for Ventilating
Buildings.

No. 216,452.

Patented June 10, 1879.



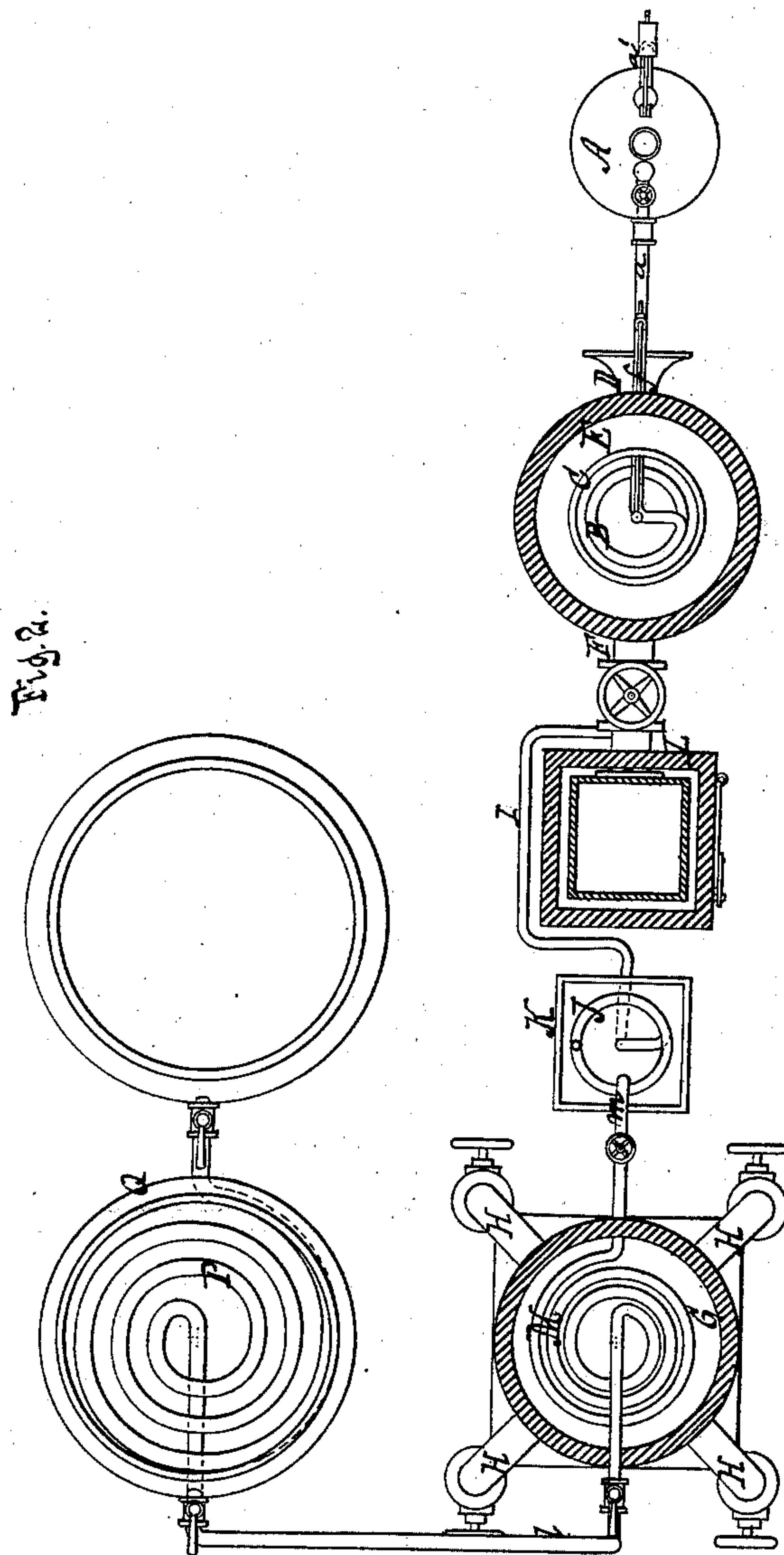
Witnesses.
Otto Sufeland
William Miller

Inventor
Wilhelm Pickhardt.
by Van Santvoord & Hauff
his attys.

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UNITED STATES PATENT OFFICE.

WILHELM PICKHARDT, OF NEW YORK, N. Y.

IMPROVEMENT IN AIR HEATING AND COOLING APPARATUS FOR VENTILATING BUILDINGS.

Specification forming part of Letters Patent No. **216,452**, dated June 10, 1879; application filed March 29, 1879.

To all whom it may concern:

Be it known that I, WILHELM PICKHARDT, of the city, county, and State of New York, have invented a new and Improved Apparatus for Ventilating Buildings, which invention is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a vertical section. Fig. 2 is a sectional plan.

Similar letters indicate corresponding parts.

This invention consists in the combination, with an air-heating chamber, of an air collecting and cooling chamber, from which extend a series of distributing-pipes to the various rooms or apartments to be ventilated. The air-heating chamber contains a coil which is supplied with steam from suitable steam-generators, and fresh air is admitted into said heating-chamber at or near its bottom, so that the same, by coming in contact with the steam-coil, becomes heated and rarefied. From the heating-chamber extends a pipe to the upper part of the collecting-chamber, in which are situated one or more coils, which connect with a reservoir or tank containing cold water, so that the air flowing in from the heating-chamber becomes cooled off by contact with the coil or coils in the collecting-chamber, and if one or more of the distributing-pipes are opened the room or rooms connected to said distributing pipe or pipes are supplied with cold air, the supply of fresh air being kept up by rarefaction and consequent expansion of the air in the heating-chamber.

In the drawings, the letter A designates a steam-generator, the steam-space of which connects by a pipe, *a*, with a steam-coil, B. In the example shown in the drawings, this steam-coil is situated in a cylinder, C, of sheet metal or other suitable material, open at the top and connected at the bottom with the air-supply pipe D. Said cylinder is situated in a chamber, E, which is constructed of brick-work or other suitable material, and from the lower part of which extends the air-conducting pipe F, leading into the air-collecting chamber G at or near its top. This chamber is provided in its sides near its bottom with a series of distributing-pipes, H. All these

pipes are provided with suitable stop-valves to control the circulation of the air.

The escape-opening of the steam-coil B connects by a pipe, I, with a coil, J, which is inclosed in a tank or boiler, K, adapted to be filled with water. From the steam-pipe *a* extends a small pipe, *f*, into the upper part of the cylinder C, so that, whenever it may be desirable, the hot air in the cylinder can be supplied with moisture. The surplus heat can be let off from the collecting-chamber into the chimney or any other duct through a suitable pipe.

If desired, the cylinder C in the air-heating chamber E can be omitted, and the coil B placed directly in said chamber. The cylinder C, however, assists in producing a uniform circulation of the air. The waste-steam which escapes from the steam-coil B is utilized for heating the water in the tank K, either by circulating it through the coil J in said tank or by passing such waste-steam directly into the water in the tank.

In order to raise the temperature of the air in my apparatus to a high degree, a second steam-pipe, *a'*, extends from the steam-space of the generator A, which, after having passed through the fire-chamber of said generator, or through any suitable superheater, connects with the steam-pipe *a*, so that the coil B can be supplied with superheated steam, whereby the temperature of the air in the chamber E is raised. For the purpose of still further increasing the temperature of the air, the conducting-pipe is passed through a furnace, L, where the same is exposed to the direct action of the fire, and the effect of this fire can be increased by enlarging that portion of the pipe F which is situated in the interior of the furnace L, as shown in the drawings. For some purposes the air-heating chamber E and the steam-generator can be dispensed with, the temperature can be raised to the desired degree by means of the furnace L, and in this case the air-supply pipe is connected to or forms part of the air-conducting pipe F.

In the interior of the air-collecting chamber G are placed one or more coils, M N O, the receiving ends of which connect with a pipe, *l*, which connects with a coil, P, situated on the

bottom of the tank Q, and through which passes a current of cold water.

In order to reduce the temperature of the water which passes through the coil P, the tank Q may be filled with ice or other suitable material.

The discharging ends of the coils M and N connect with pipes *m n*, which lead into the hot-water tank K; but the discharging end of the coil O connects with a pipe, *o*, which may lead into the sewer when the temperature of the water discharging from this last-named coil is not sufficiently high to render it desirable that such water shall be run into the tank K.

In the lower part of the chamber G is a faucet, *p*, to draw off the water which results from the condensation of moisture in the coils M N O. In order to effect a proper circulation of the cold air the distributing-chamber G must be located in the upper part of the building, and the distributing-pipes H extend down into the different rooms or apartments which are to be ventilated. Each of these pipes is provided with a stop-valve, and whenever one or more of these stop-valves are opened fresh air begins to enter the heating-chamber, where it is heated and rarefied and caused to pass with rapidity into the collecting-chamber, being constantly followed by a supply of fresh air. This fresh air is taken near the surface of the earth, where it is purest, and, as it is conducted into the collecting-chamber and there cooled, a constant supply of cold air is secured, which is forced from the collecting-chamber and through the delivery-pipes by the pressure of the current of continually-entering hot air. Of course, as the air is cooled it would flow or sink through the delivery-pipes; but the effect of gravity alone is not sufficient to produce such a current as will ventilate and cool a number of rooms. An artificial current of air might be produced by a ventilator, which, however, would require steam-power. My apparatus is intended particularly for dwelling-houses, where steam-power is not available.

As the heated air enters the collecting-chamber its temperature is reduced by contact with the coils M N O, and it finally discharges

through such of the distributing-pipes the stop-valves of which have been opened.

By these means every room or apartment in the building can be supplied with fresh cool air, and in the hot season a comfortable temperature can be maintained in said rooms or apartments.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with an air-heating chamber, of an air collecting and cooling chamber and a series of distributing-pipes extending from said cooling and collecting chamber, substantially as and for the purpose set forth.

2. The combination, in an apparatus for ventilating buildings, of a steam-generator, an air-heating chamber, a collecting and cooling chamber, a steam-coil (one or more) situated in the heating-chamber, an air-supply pipe communicating with this chamber, a hot-air-conducting pipe leading from the heating-chamber into the upper part of the cooling and collecting chamber, and a series of distributing-pipes which extend from the lower portion of the cooling and collecting chamber, substantially as and for the purpose described.

3. The combination, in an apparatus for ventilating buildings, of an air-heating chamber, an air-supply pipe communicating with this heating-chamber, an air cooling and collecting chamber, a hot-air-conducting pipe leading from the heating-chamber into the upper part of the air cooling and collecting chamber, one or more coils situated in the air cooling and collecting chamber, a coil situated in a cold-water tank, Q, a pipe connecting this coil with the coil or coils in the air cooling and collecting chamber, and a series of air-distributing pipes which extend from the lower portion of the cooling and collecting chamber, substantially as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand and seal this 24th day of March, 1879.

WM. PICKHARDT. [L. S.]

Witnesses:

W. HAUFF,
E. F. KASTENHUBER.