W. PICKHARDT.
Air-Heater.

No. 212,499. Patented Feb. 18, 1879.

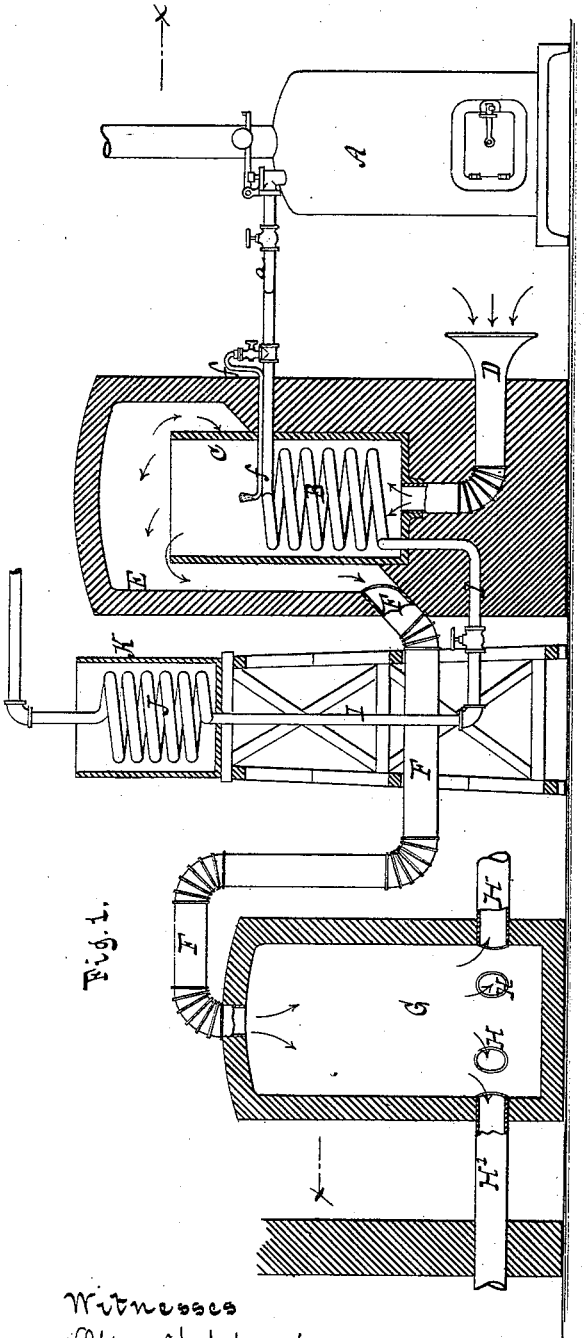

Fig. 1.

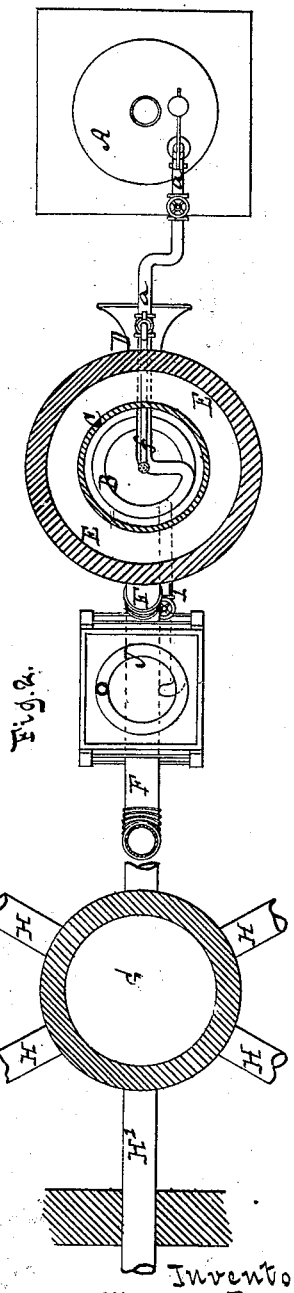

Fig. 2.

Witnesses
Otto Stupland
Wm Miller

Inventor
Wilhelm Pickhardt
by
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his attys.

UNITED STATES PATENT OFFICE.

WILHELM PICKHARDT, OF NEW YORK, N. Y.

IMPROVEMENT IN AIR-HEATERS.

Specification forming part of Letters Patent No. **212,499**, dated February 18, 1879; application filed January 3, 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 useful Improvement in Air-Heaters, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a longitudinal vertical section. Fig. 2 is a horizontal section in the plane *x x*, Fig. 1.

Similar letters indicate corresponding parts.

This invention consists in the combination, in an air-heater, of a steam-generator, a steam-coil, a cylinder of sheet metal or other suitable material, which is open at the top and incloses the steam-coil, an air-supply pipe, which extends through the bottom of said cylinder, a closed chamber of brick-work or other bad conductor of heat inclosing the cylinder and the steam-coil, and an air-conducting pipe extending from the side or bottom of said chamber, so that the air which passes through the supply-pipe into the cylinder becomes heated by contact with the steam-coil; and as it is thereby rarefied and caused to rise up, a uniform current of air is created, which, as it strikes the ceiling of the air-heating chamber, is caused to turn down in the annular space between the cylinder and said chamber, thereby insuring a good circulation; further, in the combination, with the air-heating chamber and with a steam-coil situated therein, of a pipe leading off from said coil, a secondary coil connected to said pipe, and a water-tank inclosing said secondary coil, so that the waste steam which escapes from the steam-coil is utilized for heating the water in the tank or boiler.

In the drawings, the letter A designates a steam-generator, from the steam-space of which extends a pipe, *a*, to a coil, B. In the example shown in the drawings this coil is situated in a cylinder, C, of sheet metal or other suitable material, which is open at the top, and connects at its bottom with the air-supply pipe D. Said cylinder is inclosed in a chamber, E, which is built up of brick or other bad conductor of heat, and from the side or bottom of which extends the air-conducting pipe F, leading into the air-distributing chamber G at or near its top. This chamber is provided in its sides, near its bottom, with a series of air-distributing pipes, H. These pipes, as well as the air-conducting pipe F, are all provided with suitable valves or dampers, for the purpose of controlling the currents of the heated air.

The escape end 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, when it is desirable, the heated air in this cylinder can be supplied with moisture. The surplus heat from the distributing-chamber can be let off through a pipe, H′, into the sewer or chimney.

When steam is passed through the coil B, the air in the cylinder C becomes immediately heated by contact with the steam-coil and rarefied, so that it rises up. By these means a current of air is created through the air-supply pipe D into the cylinder C, and as this air becomes heated and rarefied it rises to the ceiling of the air-heating chamber E, whence it is forced down through the annular space between the cylinder C and chamber E into the hot-air-conducting pipe F, and through this pipe into the collecting-chamber G, which it reaches in a highly-heated state, so that it can be used to heat or warm different rooms or compartments in a building by distributing it through the pipes H.

In order to facilitate the passage of the hot air to the air-conducting pipe F, the bottom of the air-heating chamber is made inclined, as shown in Fig. 1.

The fresh air, which is supplied through the supply-pipe D, and heated in the cylinder C, is driven down inside the chamber E and into and down in the collecting-chamber G, for the purpose of obtaining a uniform draft or current.

If desired, the cylinder C in the heating-chamber E can be omitted and the coil B placed directly in said chamber; but by the action of the cylinder C a more complete circulation of the air can be effected than can be produced if said cylinder is left out.

The waste steam which escapes from the steam-coil B is utilized for heating the water in the tank or boiler K by circulating it through the coil J in said tank.

By my air-heating apparatus the heated air which is conducted to the several rooms or compartments in a building is as pure and moist as the open air, and free from all disagreeable odors and from smoke, dust, and ashes, and the temperature in all parts of the building can be maintained comfortably and with a comparatively small expenditure of fuel.

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

1. The combination, in an air-heater, of a steam-generator, an air-heating chamber, a hot-air-distributing chamber, situated outside of the air-heating chamber, one or more steam-coils inclosed in said air-heating chamber, an air-supply pipe leading into said chamber, and an air-escape pipe leading from the bottom of said chamber into the top of the hot-air-distributing chamber, and air-distributing pipes extending from the lower part of said hot-air-distributing chamber, all constructed and adapted to operate substantially as herein shown and described.

2. The combination, in an air-heater, of a steam-coil, a cylinder of sheet metal or other suitable material, which is open at the top and incloses the steam-coil, an air-supply pipe which extends through the bottom or lower part of said cylinder, a closed chamber of brick-work or other bad conductor of heat inclosing the cylinder and the steam-coil, and an air-conducting pipe extending from the side or bottom of said chamber, all constructed and adapted to operate substantially as set forth.

3. The combination, with the air-heating chamber, substantially as described, and with a steam-coil situated therein, of the pipe I, leading from said coil, the coil J, connected with said pipe, and the water-tank K, inclosing said coil, essentially as set forth.

4. The combination, with the air-heating chamber E, air-supply pipe D, and steam-coil B, of a steam-pipe, *f*, for moistening the heated air in the chamber E, substantially as set forth.

5. The combination, with the air-heating chamber E, air-supply pipe D, steam-coil B, a cylinder, C, and air-conducting pipe F, of an inclined bottom in the air-heating chamber E, substantially as and for the purpose described.

In testimony that I claim the foregoing I have hereunto set my hand and seal this 31st day of December, 1878.

WILHELM PICKHARDT. [L. S.]

Witnesses:

W. HAUFF,

E. F. KASTENHUBER.