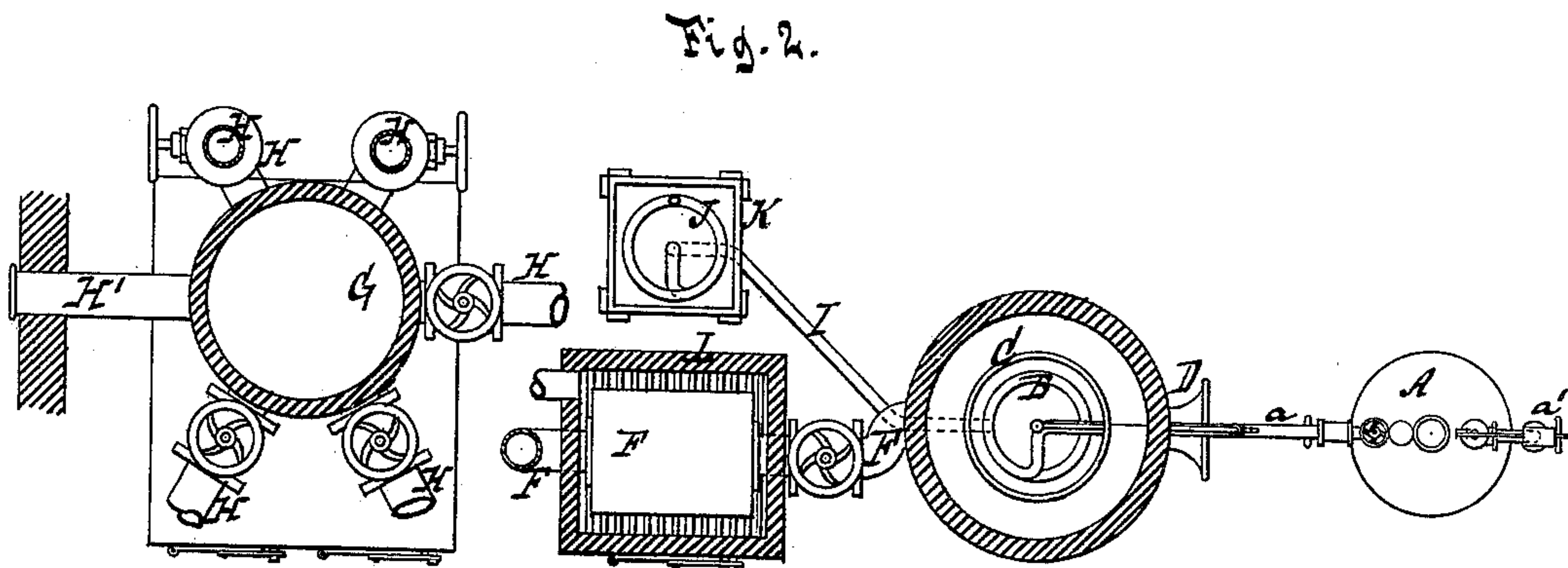
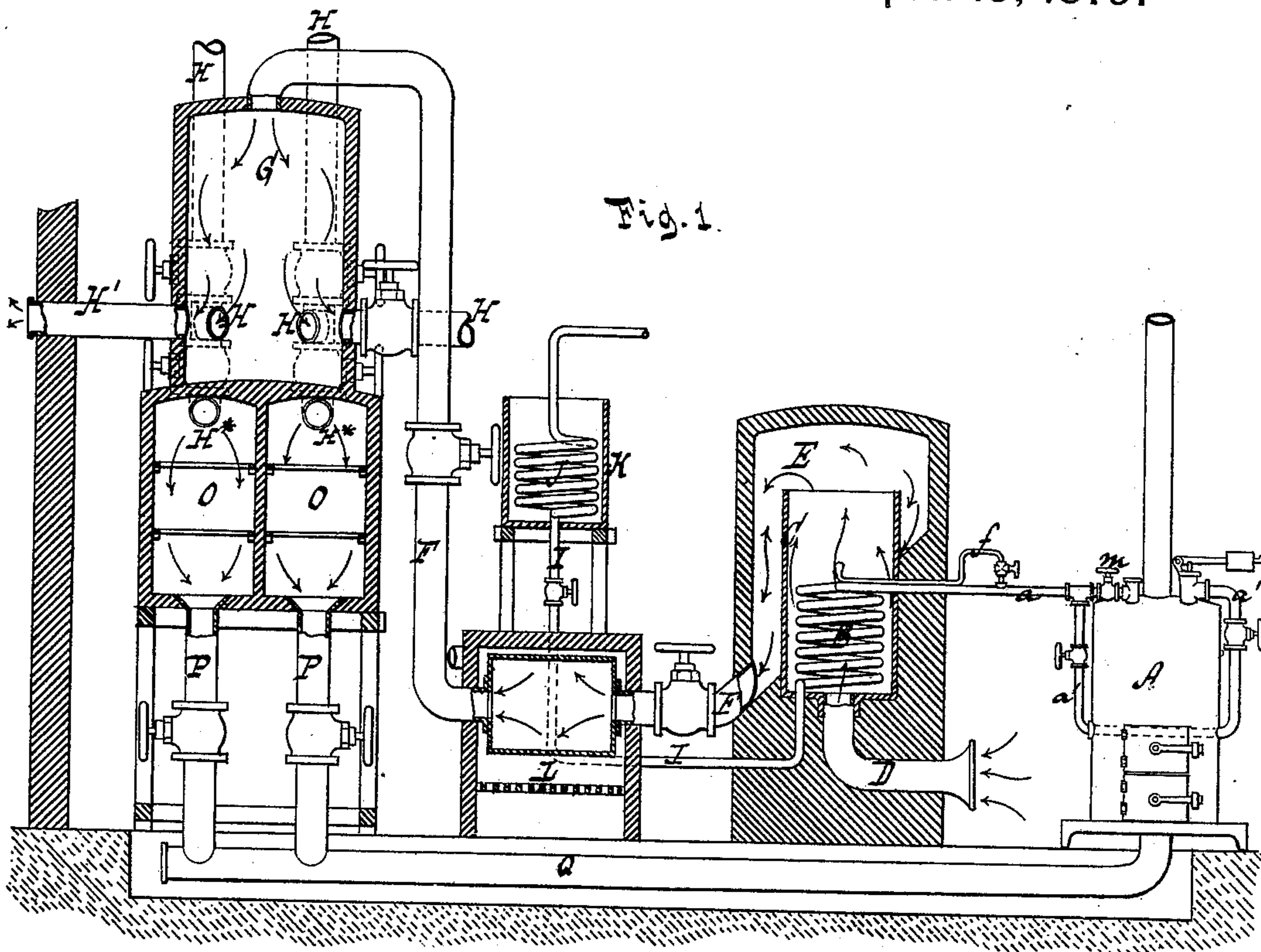


W. PICKHARDT.
Air Heating and Cooking Apparatus.
No. 214,443. Patented April 15, 1879.



Witnesses
Otto Dufeland
William Miller.

Inventor
Wilhelm Pickhardt
by
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his attorneys.

UNITED STATES PATENT OFFICE.

WILHELM PICKHARDT, OF NEW YORK, N. Y.

IMPROVEMENT IN AIR-HEATING AND COOKING APPARATUS.

Specification forming part of Letters Patent No. **214,443**, dated April 15, 1879; application filed February 27, 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 Air-Heating and Cooking Apparatus, which invention is fully described 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.

Similar letters indicate corresponding parts.

This invention relates to certain improvements on an air-heating apparatus for which Letters Patent have been granted to me February 18, 1879; and its object is to adapt said air-heating apparatus also for the purpose of cooking, frying, and baking.

My present improvement consists in the combination of a superheater with a steam-generator, an air-heating chamber, a hot-air-collecting chamber, a steam-coil (one or more) situated in the heating-chamber, a steam-supply pipe extending from the generator to the coil and passing through the superheater, an air-supply pipe which leads into the heating-chamber, an air-conducting pipe extending from the heating-chamber to the collecting-chamber, and a series of hot-air-distributing pipes emanating from the collecting-chamber, so that by passing superheated steam through the coil or coils in the heating-chamber the temperature of the air can be raised to the degree requisite for cooking, frying, and baking. With the hot-air-conducting pipe is combined a furnace, by which a portion of said pipe can be exposed to the direct action of a fire and the temperature of the air can be increased to any desired degree. The air-distributing pipes are provided with branch pipes communicating with suitable ovens, so that the heated air from the collecting-chamber can be conveniently used for cooking, frying or baking. The air-escape pipes which lead from said ovens connect with a common flue that extends beneath the grate of the steam-generator, so that the heat still contained in the air which escapes from the ovens can be utilized for heating the water in the generator.

In the example shown in the drawings, the letter A designates a steam-generator, the steam-space of which connects by a pipe, *a*,

with the 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, which is open at the top and connects 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 steam-coil, J, situated in a water-tank, K. From the steam-pipe *a* extends a small pipe, *f*, into the upper part of the cylinder C, so that whenever it may appear desirable the hot air in this 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 pipe, H'.

If 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 chamber E, whence it is forced down through the annular space between the cylinder C and the 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 pipe D and heated in the chamber E, is driven downward for the purpose of obtaining a uniform draft or current of heated air in the several distributing-pipes.

If desired, the cylinder C in the air-heating chamber E can be omitted and the coil B placed

directly into 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 heat the air in my apparatus to the degree requisite for cooking, frying, or baking, 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 other 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.

If superheated steam is to be used, the stop-valve *m* of the steam-pipe *a* and also the stop-valve of the pipe *f* are closed.

For the purpose of still further increasing the temperature of the air, the conducting-pipe F 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.

In the example shown in the drawings, the ovens O, for cooking, frying, and baking, are situated beneath the collecting-chamber G, and the distributing-pipes H are provided with branches H*, which extend into the upper parts of said ovens. Each of these ovens is furnished with an escape-pipe, P, and all these escape-pipes connect with a flue, Q, which serves to conduct the heated air escaping from the ovens beneath the grate of the steam-generator, so as to utilize the heat contained in this air for heating the water in the generator. One end of the flue Q may, however, be made to open into the sewer or the chimney, so that if the air escaping from the ovens is too moist to be conducted beneath the grate of the generator it can be passed off through the sewer or chimney.

The ovens O, instead of being placed beneath the collecting-chamber, may be erected in any convenient position.

The distributing-pipes H, their branch pipes H*, and the escape-pipes P of the several ovens are provided with suitable valves for control-

ling the direction of the currents. The pipe F is also provided with suitable valves for controlling the passage of air to the collecting-chamber.

The temperature of the air can be observed by suitably arranged thermometers. (Not shown in the drawings.)

The particular advantages of this air-heating apparatus are, that the heated air passing from the same into the various rooms or compartments is as pure and moist as the atmospheric air; that this air is not contaminated by smoke, dust, or ashes; that a uniform temperature is produced in all the rooms or compartments; that the temperature of the air can be readily raised to the degree requisite for cooking, frying, and baking, and that the operation of the apparatus requires a comparatively small quantity of fuel.

I disclaim everything shown and described in my Patent of February 18, 1879.

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

1. The combination, with the superheating steam-pipe *a'*, steam-coil B, air-supply pipe D, heating-chamber E, hot-air-conducting pipe F, and collecting-chamber G, of means for superheating the steam, substantially as and for the purpose set forth.

2. The combination, with the heating-chamber E, hot-air-conducting pipe F, and collecting-chamber G, of a furnace, L, for raising the temperature of the air in the conducting-pipe before it enters the collecting-chamber, substantially as described.

3. The combination, with the heating-chamber E, hot-air-conducting pipe F, collecting-chamber G, and apparatus for superheating the steam used for heating the air in the heating-chamber, of one or more ovens, O, substantially as and for the purpose set forth.

4. The combination, with the escape-pipes P, emanating from the ovens O, of a flue, Q, leading beneath the grate of the steam-generator, substantially as and for the purpose described.

In testimony that I claim the foregoing I have hereunto set my hand and seal this 18th day of February, 1879.

WM. PICKHARDT. [L. S.]

Witnesses:

W. HAUFF,

E. F. KASTENHUBER.

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