(No Model.) 2 Sheets—Sheet 1.

R. WIRTH, J. NEUMANN & J. HILLENBRAND.

FURNACE.

No. 536,249. Patented Mar. 26, 1895.

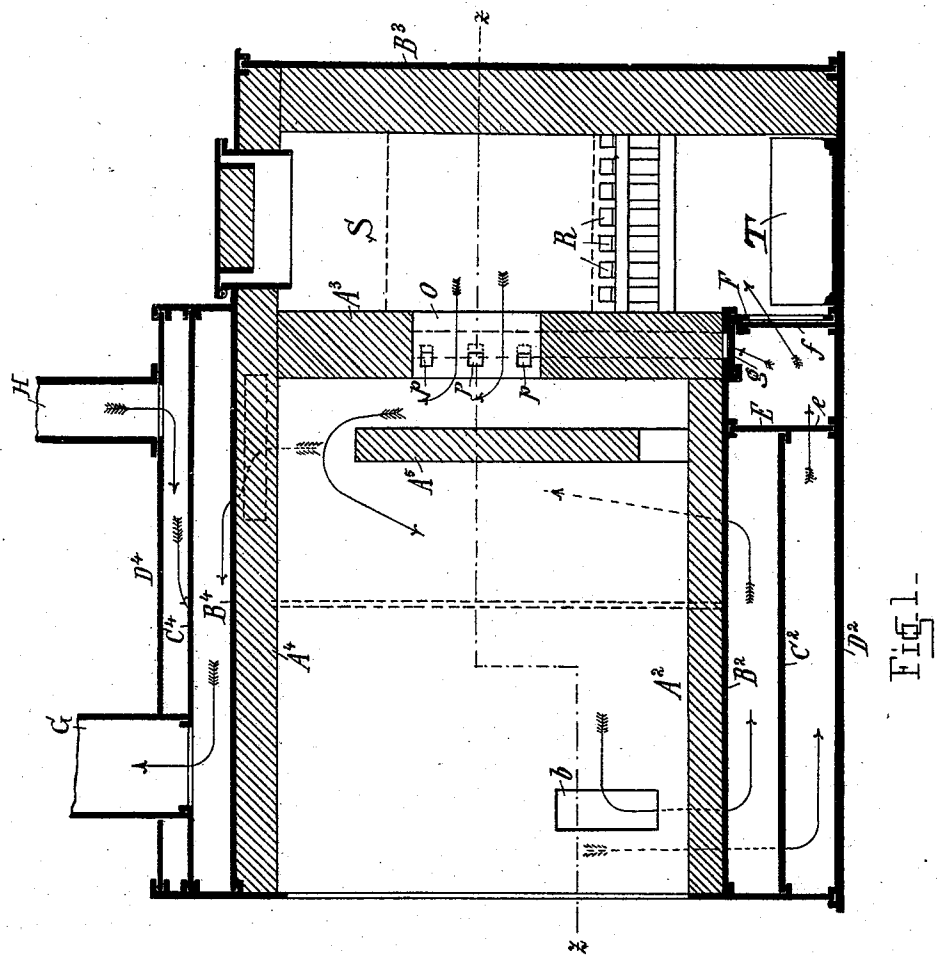

Fig. 1.

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

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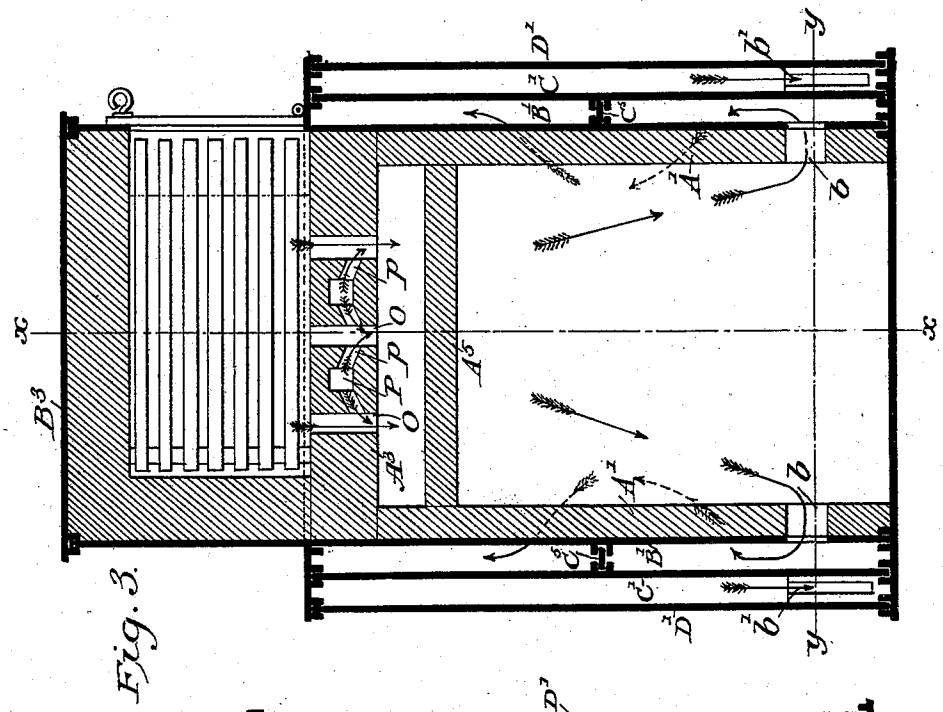

Fig. 3.

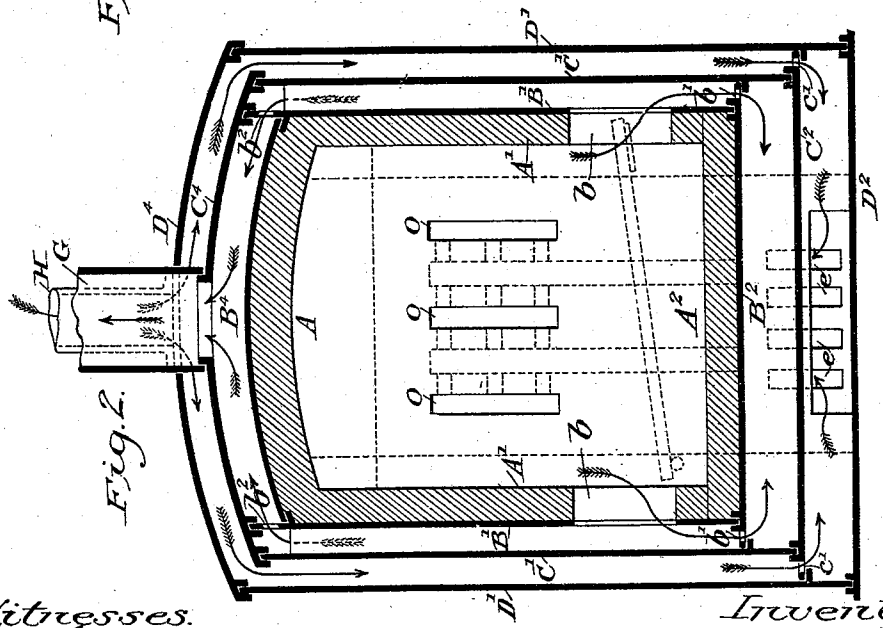

Fig. 2.

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UNITED STATES PATENT OFFICE.

RICHARD WIRTH, OF FRANKFORT-ON-THE-MAIN, AND JOHANN NEUMANN AND JULIUS HILLENBRAND, OF MANNHEIM, ASSIGNORS TO DANIEL KEGLER, OF MANNHEIM, GERMANY.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 536,249, dated March 26, 1895.

Application filed June 9, 1894. Serial No. 514,086. (No model.)

To all whom it may concern:

Be it known that we, RICHARD WIRTH, a resident of Frankfort-on-the-Main, Kingdom of Prussia, and JOHANN NEUMANN and JULIUS HILLENBRAND, residents of Mannheim, Grand Duchy of Baden, Germany, subjects of the Emperor of Germany, have invented certain new and useful Improvements in Furnaces, of which the following is a specification.

This invention relates to a heating, annealing, or muffle furnace, in which coke is used as fuel. This furnace is intended chiefly for enameling, but it may be used also for heating a great many articles produced at temperatures reaching 1,200° centigrade.

The heating chamber consists as usual of refractory lining held in a frame of cast iron plates, and behind this chamber is placed the furnace from which the furnace gases enter the chamber through openings in the back wall thereof behind a screen or baffle that extends nearly to the top of the chamber and pass out through openings in the side walls near the front and bottom into a surrounding casing or flue from which they escape only after having circulated around the side walls, the bottom and the top of the said chamber. Air under pressure is supplied at the top of an outer casing or flue which surrounds the inner casing, circulates around the top, sides, and bottom of the inner casing, by which it is heated, and enters a chamber from which it may be supplied under the control of valves either beneath the fire-grate, or through passages which lead into the opening in the back wall, where it mixes with the furnace gases and insures their complete combustion.

Reference is to be had to the accompanying drawings, forming part of this specification, wherein—

Figures 1 and 2 represent vertical cross-sections, on lines X—X, Y—Y, respectively, of Fig. 3 which represents a horizontal section on line Z—Z, Fig. 1.

The heating chamber A is constructed of fire-clay slabs A', A^2, A^3, A^4, which are held together by iron plates B, B', B^2, B^4. The furnace is constructed of fire-clay slabs supported by the plates B', B^4, by the end and base plates B^3, and D^2. The furnace gases enter the heating chamber A through apertures O in the wall A^3, at which point they are mixed with the heated air issuing from the orifices p whereby complete combustion is effected. A fire-clay baffle A^5, is placed opposite the openings O whereby the gases are deflected against the top of the heating chamber, part of them passing under the baffle A^5. The latter also prevents particles of coke which are carried along with the gases from flying about within the chamber and becoming deposited on the articles placed in the oven.

The hot gases pass out through the openings b made near the front in the side walls of the chamber into the inner flue surrounding the said chamber and inclosed by the iron plates C', C', C^2, and C^4. The vertical partitions C^5, divide the side flues into two parts so that the hot gases entering the flue at the openings b pass down through the openings b', into the bottom flue, thence horizontally into the rear part of the side flues and then upward through the openings b^2, into the top flue, and then horizontally forward into the chimney G. The inner flue is surrounded by the air heating inlet passages or flues inclosed between the casing of the inner flues and the iron plates D', D', D^2, and D^4, forming the outer casing. The air blast entering at H passes as shown by the arrows, through the outer top flue, thence down the outer side flues, and through the openings c', into the outer bottom flue, whence the now heated air passes through the openings e in the plate E into the chamber inclosed by the plates F, B^2, E, and D^2. By opening the regulator f in the plate F the heated air can be admitted beneath the inclined grate R and by opening the regulator g it passes up the air passage P and emerges at the orifices p in the opening O where it mixes with the heating gases. A water tank T is placed under the grate.

We claim—

1. In a furnace, the combination of a heating chamber, a fire-box or combustion chamber communicating therewith, a flue chamber sur-

rounding the heating chamber, openings in the side walls of said heating chamber near the front end, said openings communicating with the flue-chamber, and a chimney leading from the flue chamber at the top of the furnace; substantially as described.

2. In a furnace, the combination of a heating chamber, a fire-box or combustion chamber communicating therewith, a screen or baffle erected in the heating chamber and adapted to deflect the gases into the upper portion of the same, a flue chamber surrounding said heating chamber, openings in the side walls of the lower part of said heating chamber near the front end, said openings leading into the flue chamber, and a chimney leading from the flue chamber at the top of the furnace; substantially as described.

3. In a furnace, the combination of a heating chamber, a fire-box or combustion chamber communicating therewith at one end, a flue-chamber surrounding the heating chamber, openings in the side walls of said heating chamber near the front end, said openings communicating with the flue-chamber, an air-heating chamber surrounding the flue-chamber, and openings leading from said air-heating chamber into the combustion chamber below the grate; substantially as described.

4. In a furnace, the combination of a heating chamber, a fire-box or combustion chamber communicating therewith at one end, a flue chamber surrounding the heating chamber, openings in the side walls of said heating chamber near the front end, said openings communicating with the flue chamber, an air-heating chamber surrounding the flue chamber, and openings leading from said air-heating chamber into the throat-way between the said combustion chamber and the heating chamber; substantially as described.

5. In a furnace, the combination of a heating chamber, a fire-box or combustion chamber communicating therewith at one end, a screen or baffle erected in the heating chamber in front of the opening leading from the combustion chamber and adapted to deflect the gases into the upper portion of the heating chamber, a flue-chamber surrounding said heating chamber, openings in the side walls of the lower part of the heating chamber near the end opposite the combustion chamber, said openings leading into the flue chamber, an air-heating chamber surrounding the flue chamber, valved openings leading from said air-heating chamber into the combustion chamber beneath the grate, and into the throat-way between the said combustion chamber and the heating chamber, an inlet in the top of the air-heating chamber for air under pressure, and a chimney leading from the flue-chamber at the top of the furnace; substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

RICHARD WIRTH.
JOHANN NEUMANN.
JULIUS HILLENBRAND.

Witnesses for Richard Wirth:
FRIEDRICH QUEHL,
CARL ROTT.
Witnesses for Johann Neumann:
FRITZ MEYER,
E. H. L. MUMMENHOFF.
Witnesses for Julius Hillenbrand:
FRITZ MEYER,
F. ENGLER.