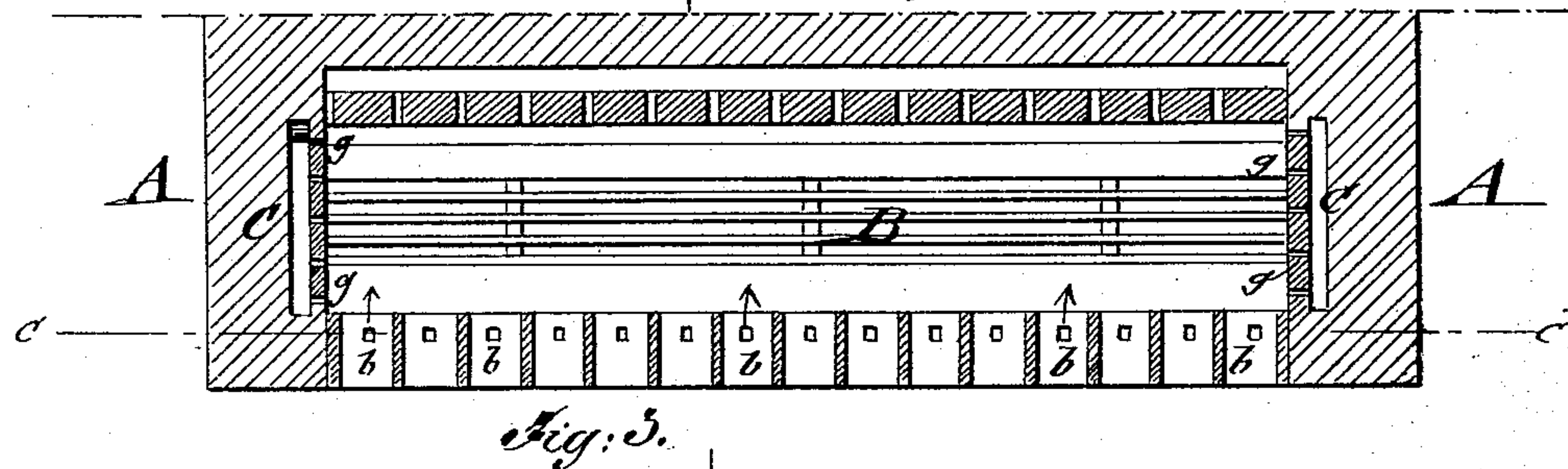
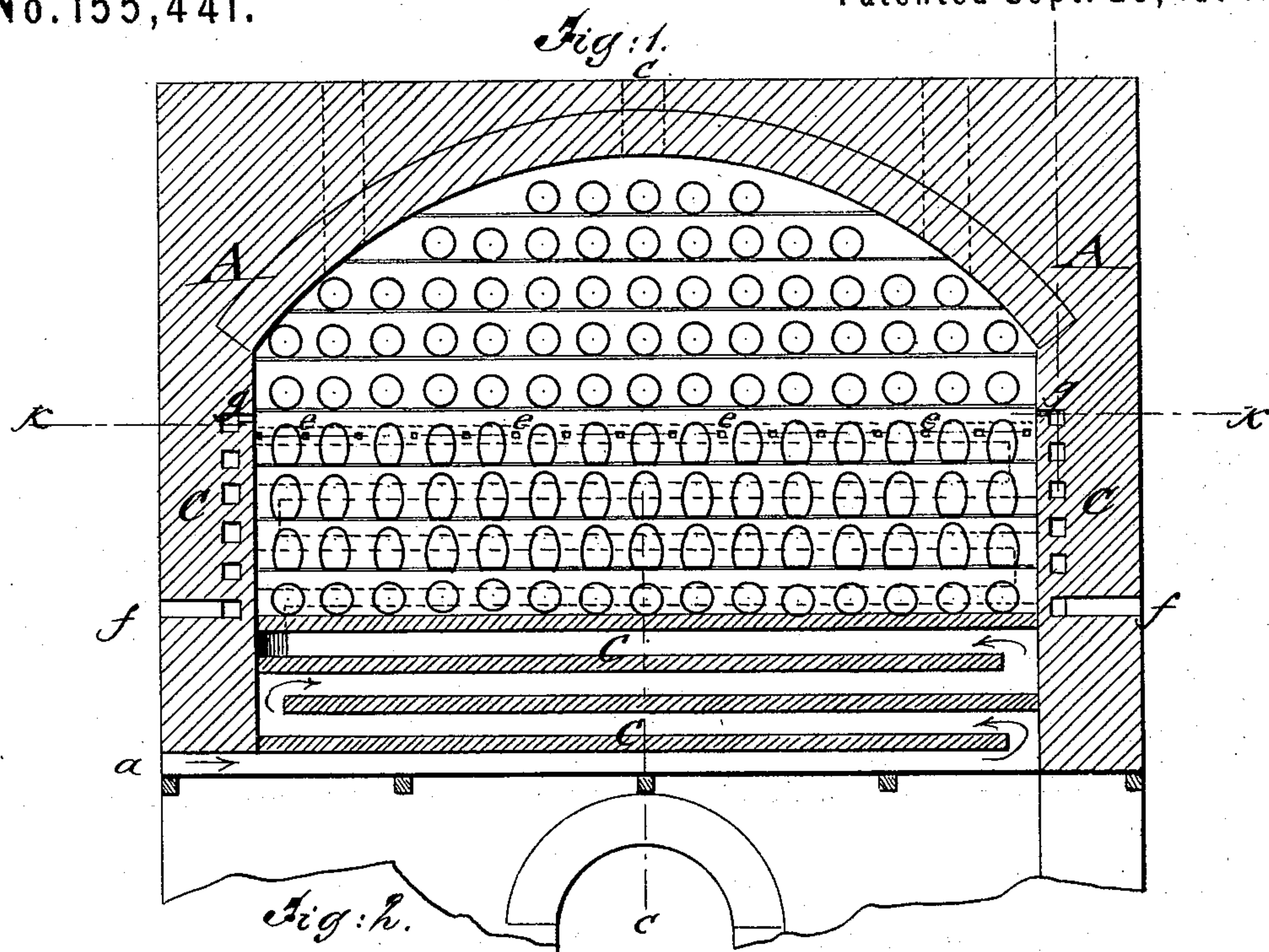


T. HIERTZ.  
Belgian Zinc Furnaces.

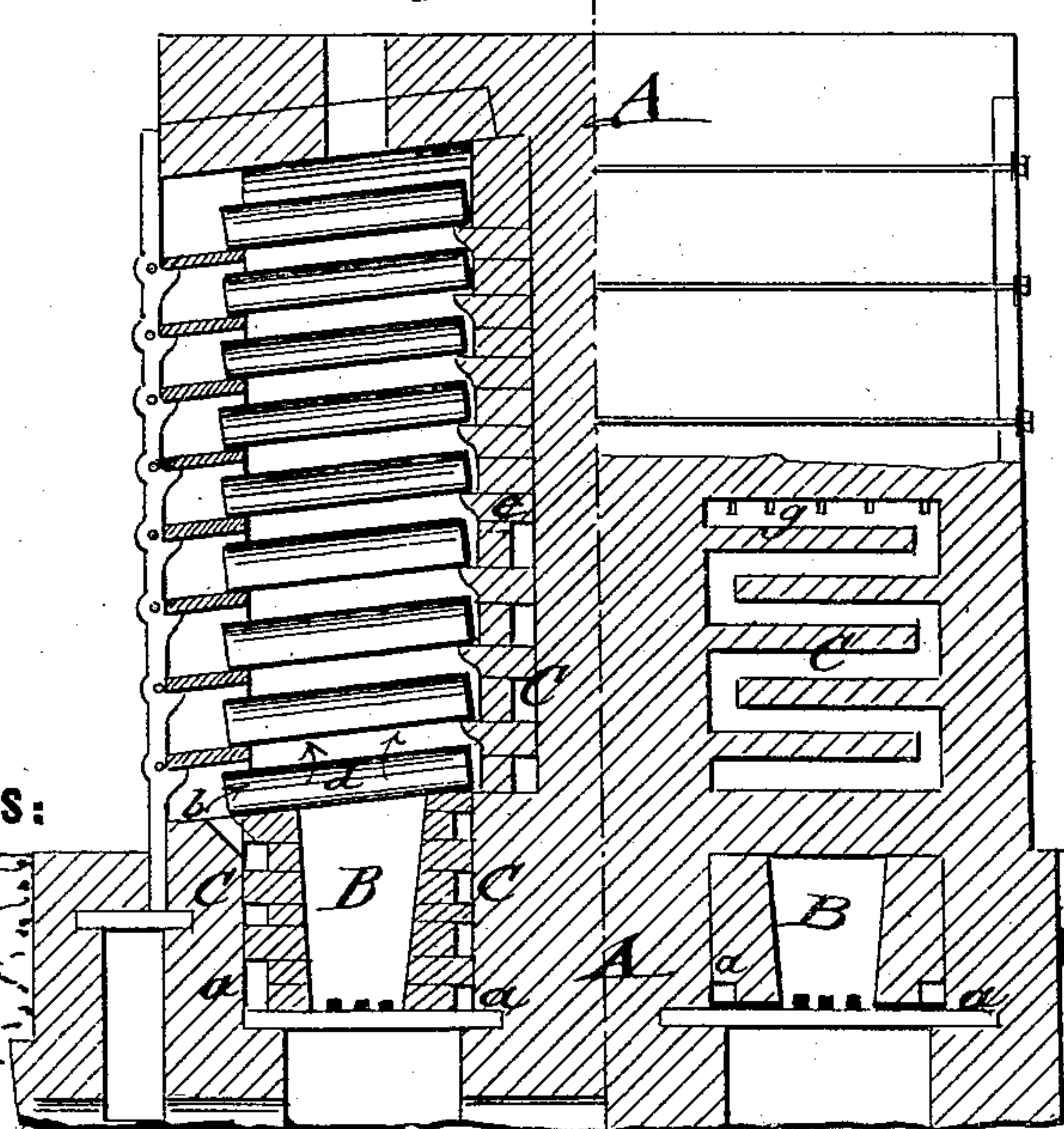
No. 155,441.

Patented Sept. 29, 1874.



WITNESSES:

*Chas. Nida  
Belguick*



INVENTOR:

*T. Hertz*

ATTORNEYS.



# UNITED STATES PATENT OFFICE.

THEODORE HIERTZ, OF ST. LOUIS, MISSOURI.

## IMPROVEMENT IN BELGIAN ZINC-FURNACES.

Specification forming part of Letters Patent No. **155,441**, dated September 29, 1874; application filed August 1, 1874.

*To all whom it may concern:*

Be it known that I, THEODORE HIERTZ, of St. Louis, in the county of St. Louis and State of Missouri, have invented a new and useful Improvement in Zinc-Furnaces, of which the following is a specification:

In the accompanying drawing, Figure 1 represents a vertical longitudinal section of my improved zinc-furnace on the line *c c*, Fig. 2; Fig. 2, a horizontal section of the same on line *k k*, Fig. 1; Fig. 3, a vertical transverse section on the line *x x*, Fig. 1, showing arrangement of double furnace.

Similar letters of reference indicate corresponding parts.

My invention relates to improvements in zinc-furnaces, by which a fuller combustion of the fire-gases under admission of heated air and a more uniform heat over the whole furnace is obtained, so that the upper retorts are reduced nearly at the same time as the lower retorts. A considerable saving in the consumption of fuel is thereby produced, and the lining, by the admission of air and the more equal distribution of heat, kept cooler, and less liable to burn out too soon, so as to require expense for repairing.

The disadvantage of the high Belgian furnace consisted in the fact that, in order to have heat enough for the reduction of the ores in the upper retorts, the lower ores were exposed to an excessive temperature, which caused the too rapid deterioration and destruction of the furnace-lining and the retorts.

My invention is intended to obviate these defects; and consists in the arrangement of a series of flues in the front, rear, and side lining of the furnace for drawing in cold air near the lower part of the same, heating it up during the passage through the flues, and introducing it at about the middle of the height of the furnace through small apertures in the lining to the interior to mingle well, and thoroughly consume the gases of combustion.

In the drawing, A represents a zinc-furnace with a suitable number of retorts, arranged in the usual manner, in tiers above each other. Two of these furnaces are generally placed adjoining each other, with a common rear wall of suitable strength. The fire-place B extends in longitudinal direction through the furnace

below the retorts, the lowermost tier of retorts or "cannons" being not charged with ore, but serving for the purpose of introducing a quantity of heated air to the fire from the flues arranged in the front lining. These flues C are arranged in longitudinal direction in the front part, the cold air being introduced through a bottom aperture, *a*, of the furnace, and gradually heated up in the passage through the flues until discharged through the issuing-apertures *b* in front of the cannons. The heated air passes then into the cannons, and through top aperture *d* of the same to the fire. The cannons may, however, be entirely dispensed with, which requires the connection of the issuing-apertures *b*, with extension brick flues or pipes for discharging the heated air at greater height into the fire, and preventing the apertures from getting choked up by small pieces of coal or cinders. The front space between the pillars up to the height of the cannons would be required to be filled with common fire-brick, and suitable holes for cleaning out the air-flues. A series of similar flues, C, is arranged in the rear lining of the furnace, and the heated air issues through small apertures *e* at about half the height of the furnace. The air, in passing through the flues, keeps the lining cooler, and therefore more durable, while it gets heated to such a degree that it mingles instantly with the fire-gases at the height of the issuing-holes, and produces their almost complete combustion, so that the temperature of the upper part of the furnace is increased, and made nearly uniform with that in the lower part nearer to the fire-place, the ore in the upper retorts reduced at about the same time as the ore in the lower retorts, and thus the productive capacity of the furnace considerably enhanced under the saving of fuel, time, and labor. The side walls of the furnace are also constructed with flues in the lining. The cold air enters through front or side apertures *f* at suitable height, passes up, and issues in heated state through side apertures *g* at about the height of the rear apertures, as indicated in Figs 1 and 3.

The furnace may be built at less expense for material, but at greater expense for labor, so that the aggregate cost is about the same as that of the old style of furnaces. The heat

is regulated by closing the draft-holes in the fire-place, and by suitable direct cold-air holes at the height of the issuing-apertures for admitting the full control of the interior of the furnace. The retorts are supported on retort-bearing tiles in inclined position, in the usual manner.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

A zinc-furnace constructed with air-flues in

the lining of the front, rear, and side walls, for introducing cold air, heating it up, and issuing it at suitable height into the interior of the furnace for the more thorough combustion of the fuel, and a uniform degree of temperature throughout the furnace, substantially in the manner and for the purpose set forth.

THEODORE HIERTZ.

Witnesses:

C. C. HARTMAN,  
ADOLPH E. SCHMIDT.