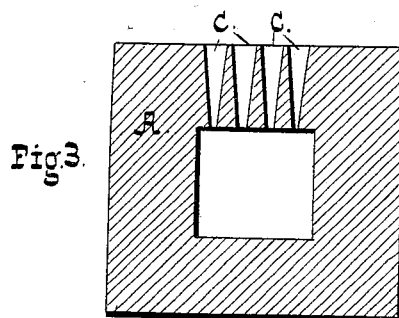
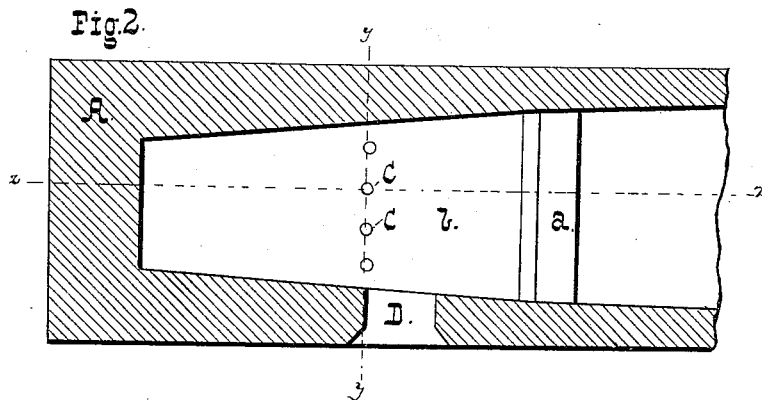
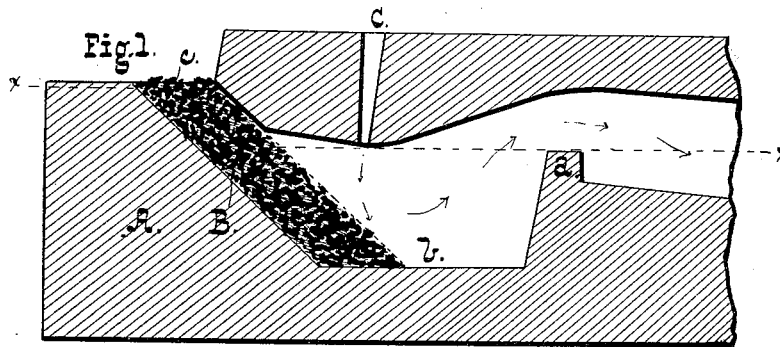


(No Model.)

E. TOURANGIN.  
REVERBERATORY FURNACE.

No. 265,348.

Patented Oct. 3, 1882.



WITNESSES.

W. A. Buttram  
J. H. Barclay

INVENTOR

E. Tourangin.

By

R. D. Williams

ATTORNEY.

# UNITED STATES PATENT OFFICE.

ERNEST TOURANGIN, OF SALBRIS, (LOIR ET CHER,) FRANCE, ASSIGNOR TO  
DEXTER H. WALKER AND LOUIS DURAND, BOTH OF NEW YORK, N. Y.

## REVERBERATORY FURNACE.

SPECIFICATION forming part of Letters Patent No. 265,348, dated October 3, 1882.

Application filed December 9, 1881. (No model.) Patented in France June 26, 1879.

*To all whom it may concern:*

Be it known that I, ERNEST TOURANGIN, of Salbris, (Loiret Cher,) Republic of France, have invented certain new and useful Improvements in Reverberatory Furnaces; and I hereby declare the same to be fully, clearly, and exactly described as follows, reference being had to the accompanying drawings, in which—

Figure 1 is a central longitudinal sectional view of that part of the furnace to which my invention relates, the section being on the line *z z* of Fig. 2. Fig. 2 is a sectional view on line *x x* of Fig. 1, and Fig. 3 a sectional view on line *y y* of Fig. 2.

My invention relates to what are known as "reverberatory" furnaces; and it has for its object to remedy certain defects in existing forms of apparatus of the same general class. In such furnaces the fuel is generally burned upon a grate at one end, the flames, gases, and products of combustion being led over the bridge-wall to the body of the furnace, where the material to be heated is placed. The salient objections to this form of apparatus are as follows: If the bed of coal upon the grate is too deep, carbonic oxide is produced, lowering the temperature greatly by the absorption of latent heat, and if the bed of coal is too thin unconsumed air will pass it, also lowering the temperature and producing an oxidizing-flame. Furthermore, a great loss of fuel arises from the passage of unconsumed carbon between the grate-bars and into the ash-pit. Finally, the coal being introduced from above and the air at the bottom of the bed of fuel, quantities of valuable gas are disengaged from the coal and are lost.

In the furnace about to be described all these defects are obviated. The coal is introduced over an inclined plane at an angle of about forty-five degrees, and the air is thrown downward in a sheet extending across the entire bed to within about sixteen centimeters of its bottom, consuming any hydrocarbon gases evolved from the fuel, and none of the fuel is wasted.

In the drawings, A is the furnace, having bridge-wall *a* and hearth *b*. The fuel is fed in at *c* upon the inclined surface B, and feeds

downward as it is consumed. C C are the tuyeres, through which a blast of air is delivered upon the bed of fuel, near its base, and D is an opening through which the ashes and refuse are removed. It is normally luted with clay.

In operation the fuel burns near the base of the incline and cokes above it. The combustion is supported by the air-blast through the tuyeres C, which also consumes any gases given off by the coal, and the flames play, as usual, over the bridge-wall to the furnace. The combustion is susceptible of the nicest regulation, and the quality of the flames may be altered as desired. Should the coal coke, so as not to descend the incline by gravity, an iron rod is introduced through the opening D, and the fuel is thereby raked down to the hearth. Ordinarily a metallic oxide—such as oxide of iron—is added to the fuel in order to liquefy the silicious cinders, the slag being tapped off from time to time at D.

The furnace being devoid of a grate, no unconsumed fuel escapes, and the sole source of air to support combustion being the tuyeres the mass of coal burns from the top, whereby any gases evolved from the coal are caused to traverse an incandescent bed of fuel, and are converted into fixed gases before they reach the air which supports their combustion. The upper surface of the chute is parallel to the lower, so as to be completely closed by the fuel and prevent escape of gas.

I am aware that fuel has been delivered to the grates or hearths of furnaces through inclined chutes, and also that the air for combustion has been passed into a bed of fuel lying upon an inclined surface from below. I am further aware that the grate itself has been inclined to form a fuel-chute. My invention differs from such devices in that the gases from the coal are wholly consumed, and no loss of unconsumed carbon can occur.

I am also aware of English Patents Nos. 2,383 of 1854 and 2,425 of 1863, in which are shown an air-blast directed downwardly upon a bed of fuel and a grateless fuel-chamber having a downward blast, and such I do not claim; but

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

5 In a reverberatory furnace, a grateless combustion-chamber having an inclined fuel-chute with parallel upper and lower walls, and a series of tuyeres located in the roof of the combustion-chamber, as described, whereby a blast may be directed downward upon the base of the fuel, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ERNEST TOURANGIN.

Witnesses:

ROBT. M. HOOPER,  
E. GAGES.