No. 736,929. PATENTED AUG. 25, 1903.

E. C. BRICE.

ROASTING FURNACE.

APPLICATION FILED OCT. 7, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

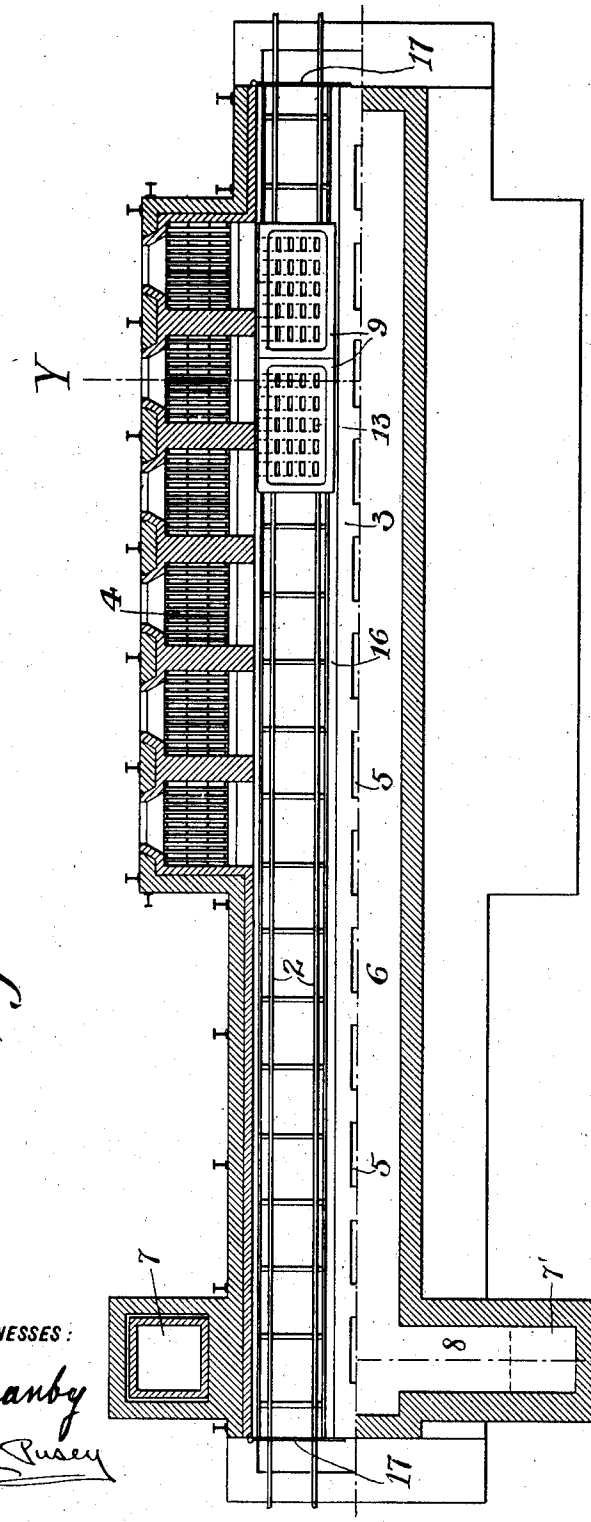


Fig. 1.

WITNESSES:

H. H. Canby

Walter C. Pusey

INVENTOR:

Edward C. Brice,

BY

Joshua Pusey,

ATTORNEY.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 736,929. PATENTED AUG. 25, 1903.

E. C. BRICE.

ROASTING FURNACE.

APPLICATION FILED OCT. 7, 1902.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.

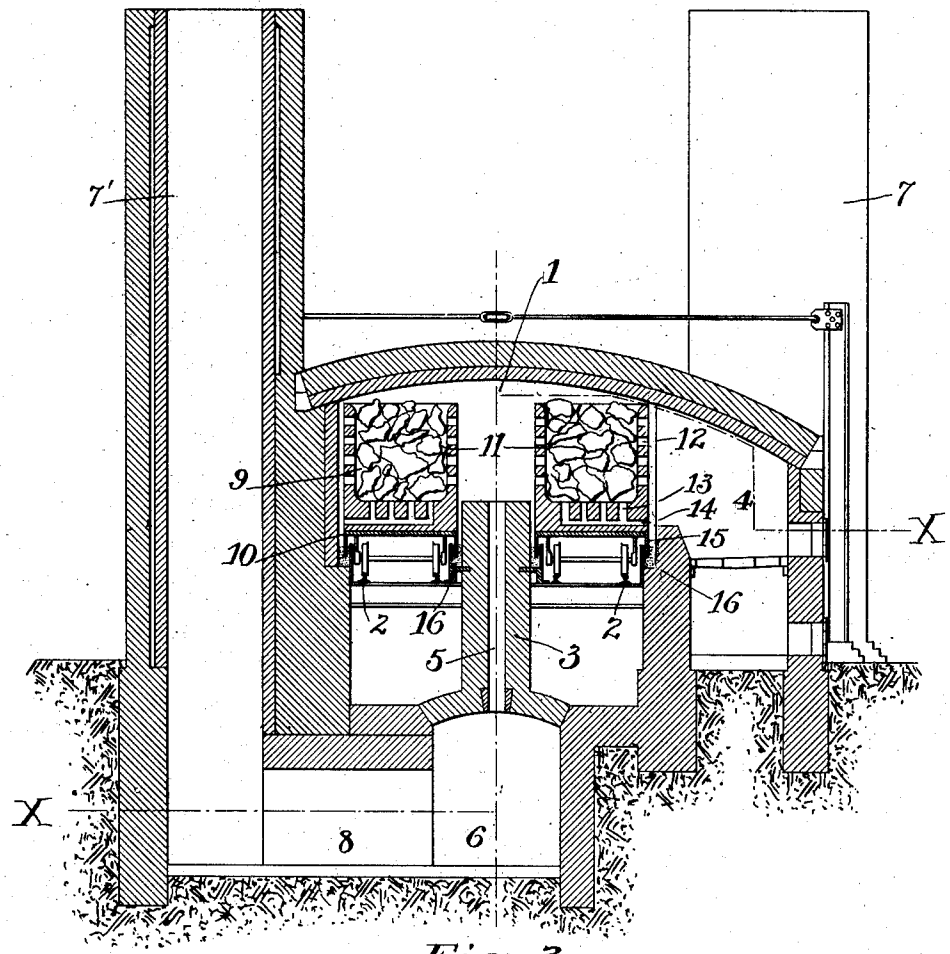
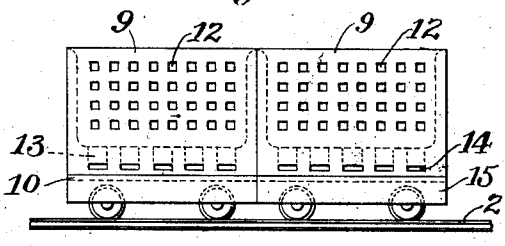


Fig. 3.



WITNESSES:

H. H. Canby

Walter C. Pusey

INVENTOR:

Edward C. Brice

BY

Joshua Pusey

ATTORNEY.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 736,929. Patented August 25, 1903.

UNITED STATES PATENT OFFICE.

EDWARD C. BRICE, OF COLWYN, PENNSYLVANIA.

ROASTING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 736,929, dated August 25, 1903.

Application filed October 7, 1902. Serial No. 126,316. (No model.)

To all whom it may concern:

Be it known that I, EDWARD C. BRICE, a citizen of the United States, residing at Colwyn, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Roasting-Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, of which—

Figure 1 is a sectional plan view of my furnace, being taken on the line X X, Fig. 2. Fig. 2 is a sectional end elevation, being taken on the line Y Y, Fig. 1. Fig. 3 is a side elevation of two of the cars.

The object of this invention is to provide an improved furnace for roasting ores or burning lime, &c., which shall be simple in construction, efficient in operation, and economical of fuel.

The invention relates to the peculiar construction of the furnace and of the cars or trucks for containing the material to be treated, the furnace being adapted for the cars and the cars for use in connection with the furnace, as hereinafter described and particularly pointed out.

In this furnace the roasting takes place within a tunnel with which the fire-boxes communicate, the material being contained in cars upon a trackway within the tunnel. While the tunnel may have but a single trackway, I usually, for purposes of economy, make the same with two trackways, as shown in the accompanying drawings.

Referring to the said drawings, 1 designates the tunnel of the furnace, throughout the length of which extend two parallel trackways 2 2, that rest upon cross-beams supported at one end by the side walls of the tunnel and at the other by a central vertical wall 3, that divides the lower part of the tunnel into two divisions. The part of the tunnel-space above the line of the bottom of the wheeled trucks or cars upon the trackways I shall hereinafter refer to as the "roasting-chamber." At one side of the tunnel is a series of fire-boxes 4 of usual construction that communicate directly with the roasting-chamber, and there is a similar series of fire-boxes (not shown) at the opposite side of the tunnel that communicate with the side of the chamber. Passage-ways 5 through the before-mentioned wall 3 lead from the roasting-chamber to a common flue 6, that communicates by a passage-way (not shown) with the smoke-stack 7 at one side of the end of the structure farthest from the fire-boxes and by a similar passage-way 8 with a smoke-stack 7′ on the opposite side of the same end of the structure.

Each of the cars 9, two of which only are shown in Fig. 1 on one of the trackways and one on each trackway in Fig. 2, has a platform 10, upon which rests the body or receptacle 11 for containing the material in pieces or lumps to be treated—ore or limestone, for example. The walls of said receptacle, including the bottoms thereof, are constructed of suitable refractory material, such as burnt fire-clay. The side walls are provided with numerous openings 12 and the bottom with a series of vertical openings 13, whose lower ends communicate with horizontal transverse passage-ways 14, open at the side of the car next to the fire-boxes and closed on the opposite or inner side. The upper end of the side wall of the cars nearest the fire-boxes is of such height, as shown, as to come closely adjacent—that is, just sufficient for clearance—to the top of the tunnel, which is preferably of the arched form shown in Fig. 2. The cars are provided with depending side plates or flanges 15, Fig. 2, that extend into troughs 16, containing sand—a well-known device—and the ends of the platforms of the cars of the train upon the trackways are made to abut closely together. Thus the roasting-chamber is practically sealed from the underlying part of the tunnel during the roasting or burning operation.

Having described the construction of my invention, I shall now describe the mode of operation thereof, as follows: The cars laden with the ore or other material to be roasted are entered into the tunnel upon the trackways from the end farthest from the smoke-stacks until the length of the tunnel is filled to its full capacity, the ends of the platforms of successive cars abutting, as before mentioned. The usual doors 17 at the ends of the tunnel are closed, the fuel having been lighted and the furnace heated up, and the roasting operation begins. The gases and

products of combustion seeking to escape into the smoke-stacks and having no other outlet, a part thereof pass through the openings 12 of the side of the receptacle 11 next to the fire-boxes and through the interstices of the material with which the receptacle is filled. Another portion of the gases, &c., enters the passage-ways 14 and rises thence through the openings 13 of the bottoms of the receptacle 11. A portion of these currents passes up through the material and escapes therefrom at the top, and a portion escapes through the openings 12 of the inner side wall of the receptacle. In flowing through the mass of material these hot gases, &c., impart an intense heat thereto, resulting finally in the roasting or burning thereof. The gases, &c., escape through the passage-ways 5 of the vertical wall 3 into the underlying flue 6 and thence into the smoke-stacks. The material having been roasted or burned, the cars are withdrawn from the furnace.

It will be observed that the sides of the train of cars next the fire-boxes constitute a continuous (perforated) bridge-wall between the fire-boxes and the roasting-chamber.

I remark that either one of the smoke-stacks may be dispensed with, in which case the remaining one would be of suitable enlarged capacity. Also should it be desired to construct a furnace having a single trackway the wall 3 would be the outer wall of the tunnel and extend up to the roof of the latter, the passage-ways 5 being retained therein. I further remark that other means than that hereinbefore mentioned for preventing ingress of air into the roasting-chamber may be employed—as, for example, by an air-tight flooring upon which the trackways may rest. In such case the part of the tunnel beneath the trackways would be dispensed with, the purpose of that part which is open at the ends being merely for keeping the trackway and the lower portion of the cars cool and also as a passage-way for workmen to conveniently make repairs to the trackways, &c., if necesssary.

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

1. A roasting-furnace comprising the tunnel, the trackway therein, fire-boxes communicating with the upper part of said tunnel, and the passage-ways communicating between the latter and the smoke-stack, in combination with the series of cars on said trackway having the receptacle of refractory material, the sides of said receptacles having openings therethrough, and the bottom portion thereof having the lateral passage-ways and the vertical passage-ways communicating therewith, the sides of said receptacles adjacent to the fire-boxes extending close to the roof of the tunnel, substantially as and for the purpose set forth.

2. A roasting-furnace comprising the tunnel, the two trackways therein, the vertical wall between said trackways, and having the passage-ways communicating with the smoke stack or stacks, the fire-boxes on opposite sides of the furnace and communicating with the upper part of the tunnel, in combination with the series of cars on said trackways, having the receptacles of refractory material, the sides of said receptacles having openings therethrough, and the bottom portion thereof having the lateral passage-ways and the vertical openings communicating therewith, the sides of said receptacles adjacent to the fire-boxes extending close to the roof of the tunnel, substantially as and for the purpose set forth.

In testimony whereof I have hereunto affixed my signature this 20th day of September, A. D. 1902.

EDWARD C. BRICE.

Witnesses:
JOHN M. CAMPBELL,
WALTER C. PUSEY.