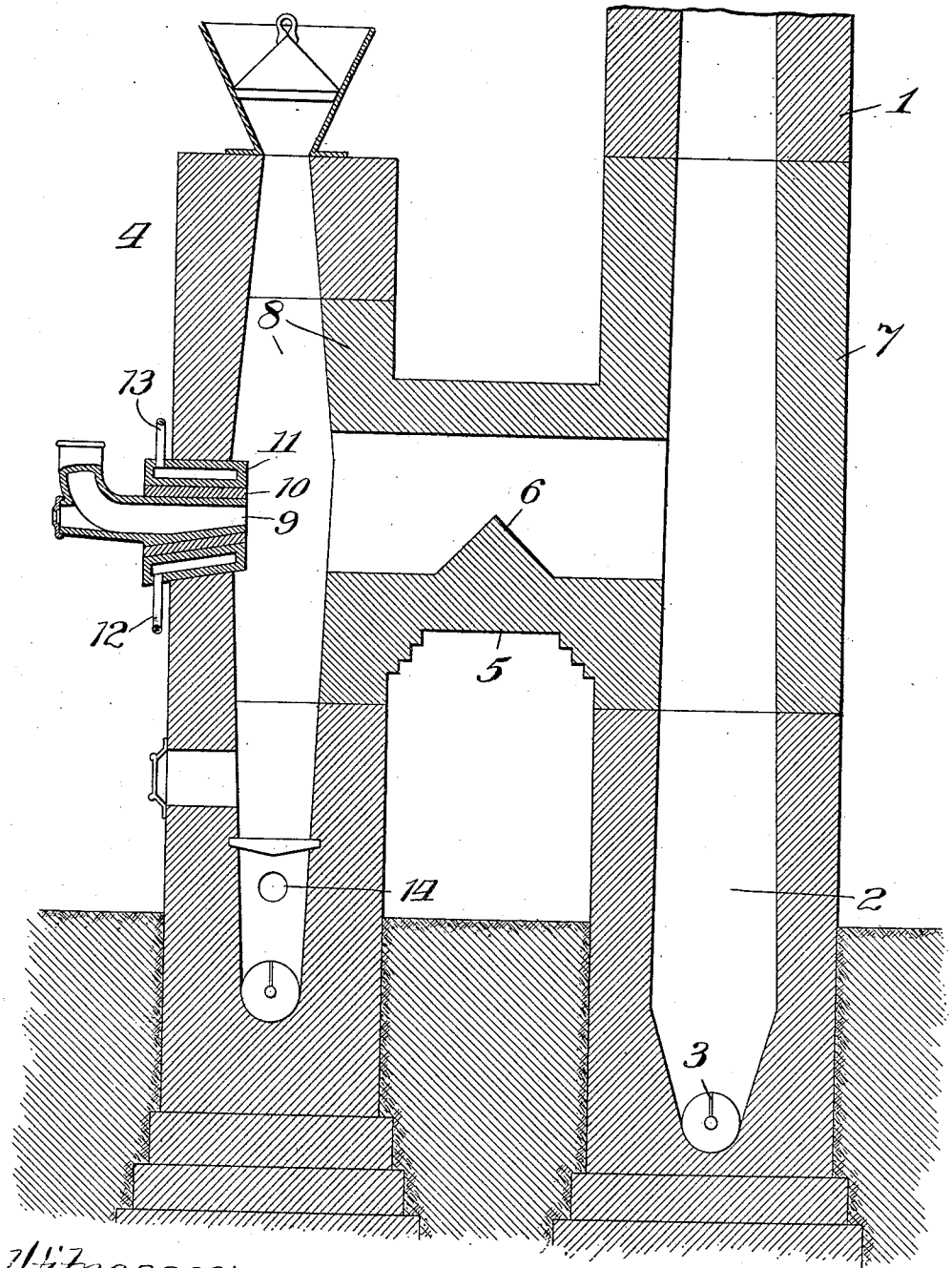
No. 890,229. PATENTED JUNE 9, 1908.

J. T. JONES.

ORE REDUCING FURNACE.

APPLICATION FILED DEC. 23, 1907.



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UNITED STATES PATENT OFFICE.

JOHN T. JONES, OF IRON MOUNTAIN, MICHIGAN, ASSIGNOR OF ONE-HALF TO GEORGE A. ST. CLAIR, OF DULUTH, MINNESOTA.

ORE-REDUCING FURNACE.

No. 890,229. Specification of Letters Patent. Patented June 9, 1908.

Application filed December 23, 1907. Serial No. 407,768.

To all whom it may concern:

Be it known that I, JOHN T. JONES, a citizen of the United States, residing at Iron Mountain, in the county of Dickinson and State of Michigan, have invented a new and useful Improvement in Ore-Reducing Furnaces, of which the following is a specification.

The object of my invention is to provide a construction of ore-reducing furnace whereby it shall be rendered practically indestructible under the intense heat to which it is subjected when such highly refractory ores are treated in it as those for example producing the ferro-alloy.

The accompanying drawing illustrates my improved furnace by a view in vertical sectional elevation, with the upper portion of the stack broken away.

The general construction of the illustrated furnace is the same as that shown and described in U. S. Patent No. 866,280 granted to me September 17, 1907, involving an ore-stack 1 rising to a height of a hundred feet, more or less, above a cooling-chamber 2 in its base-portion containing a conveyer 3 and a carbonaceous-fuel-burning furnace 4 communicating from about midway between its upper and lower ends with the stack near its base through a neck-like flue 5 containing a species of central bridge-wall 6, having inclined sides to tend to prevent the escape of solid material from the stack into the furnace and from the furnace into the stack. The structure is, for the most part, formed of or lined with suitable refractory brick, preferably magnesite brick, but I form that portion which is subjected to the greatest intensity of heat, particularly the neck 5, of carbonaceous material which is practically infusible in the atmosphere of the hot carbonic-oxid gases from the furnace to which it is subjected. By preference, I form of the same carbonaceous material the section 7 of the stack, which is the "bosh" section or portion nearest the flue-neck, and also the portion 8, nearest the latter, of the furnace-wall to extend taperingly partway about the same, as indicated. In the front brick-portion of the furnace, thus between the ends of the tapering section 8, is provided a twyer 9, projecting a short distance into the furnace-chamber coincidently with the flue 5, and surrounded in the furnace-wall by a tapering sleeve 10 of heat-insulating material, such as magnesite, the sleeve being inclosed in a water-jacket 11 in contact with the brick of the wall and provided with the inlet-pipe 12 and outlet-pipe 13 for circulating the cooling-water through it.

The carbonaceous material employed for the parts 5, 7 and 8 may be solid blocks of graphite, or a mixture of pulverized graphite in the proportion of about ten per cent. and crushed coke in the proportion of about ninety per cent., with a suitable binder, as coal-tar, the mixture being compacted into solid form, as by hydraulic pressure, and then baked.

To operate the furnace the fuel-chamber is filled with suitable coal, which is ignited and raised by the air-blast through the port 14 to incandescence to the part of the fuel-bed adjacent to the inlet-end of the flue, above which the hydrocarbons are distilled by the heat from the coal and drawn with the gases from the incandescent portion of the bed into and mixed with them in the flue, whence they discharge into the stack, passing upwardly through the latter and through the ore with which it is filled, to discharge from its upper end. The air forced thereafter through the fuel-bed by the twyer 9 should be preparatorily heated, as by passing it through an ordinary checker-chamber heating-device, to raise it to a temperature of from two to three thousand degrees Fahrenheit. The construction of the twyer prevents this highly heated air from coming into direct contact with its metal walls and it projects sufficiently far into the fuel-chamber to prevent rebounding of the blast against the brick-wall portion of the furnace 4 surrounding the twyer.

In my improved furnace, constructed as described with the proportions of carbonaceous material, I have used an intensity of heat sufficient to melt very refractory ores, without injury to the structure.

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

1. An ore-furnace comprising an ore-stack, a carbonaceous-fuel-burning furnace, and a flue composed of solid carbonaceous material connecting the fuel-chamber with said stack, for the purpose set forth.

2. An ore-furnace comprising an ore-stack, a carbonaceous-fuel-burning furnace having a section of its wall composed of solid carbonaceous material, and a flue composed of

like material connecting said section of the furnace-wall with said stack, for the purpose set forth.

3. An ore-furnace comprising an ore-stack, a carbonaceous-fuel-burning furnace and a connecting flue between them, the bosh-section of said stack, the flue and the furnace-wall at the connection therewith of the flue being composed of solid carbonaceous material, for the purpose set forth.

4. An ore-furnace comprising an ore-stack, a carbonaceous-fuel-burning furnace having a section of its wall composed of solid carbonaceous material, a flue of like material connecting said section of the furnace-wall with said stack, and a water-jacketed heat-insulated twyer projecting into the furnace-chamber through and beyond the inner surface of the wall thereof at said flue, for the purpose set forth.

JOHN T. JONES.

In presence of:
K. M. CORNWALL,
R. A. SCHAEFER.