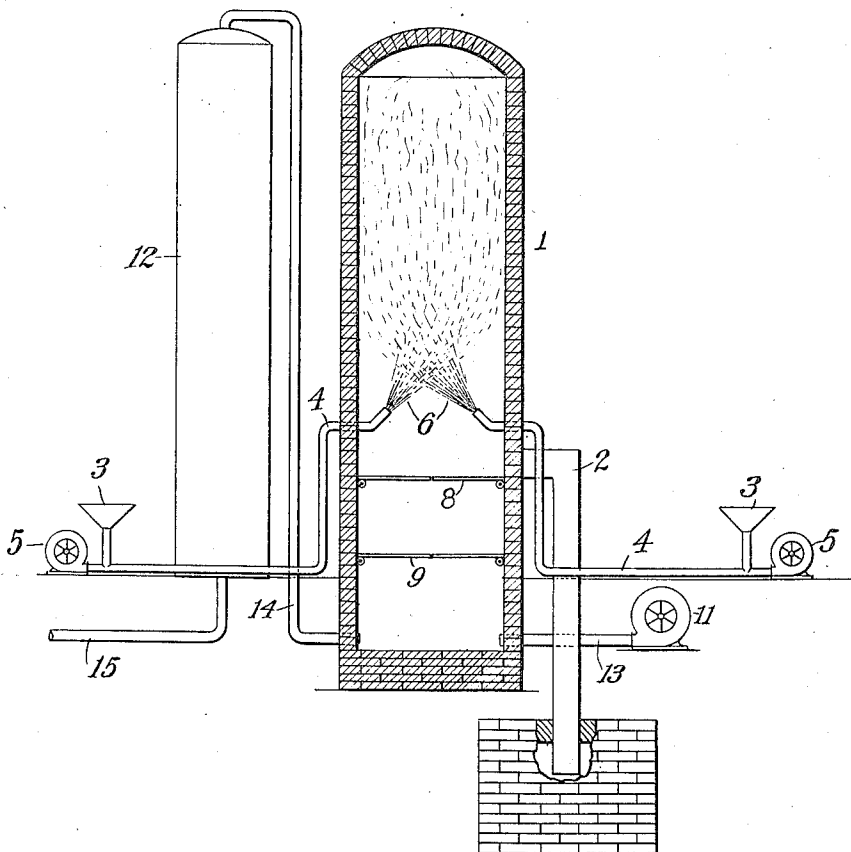


J. W. THOMAS.
FURNACE.
APPLICATION FILED MAY 13, 1912.

1,084,175.

Patented Jan. 13, 1914.



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UNITED STATES PATENT OFFICE.

JOHN W. THOMAS, OF POTTSVILLE, PENNSYLVANIA.

FURNACE.

1,084,175.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN W. THOMAS, a citizen of the United States, residing at Pottsville, in the county of Schuylkill, State of Pennsylvania, have invented certain new and useful Improvements in Furnaces, of which the following is a specification.

My invention relates more particularly to furnaces for the treating of various finely divided materials in which powdered, gaseous, or liquid fuel is supplied thereto under pressure.

The object of my invention is to subject the finely divided material to the required degree of heat in a state of suspension, thereby enabling each particle of material to be suitably treated in the desired manner, and thereby minimizing the amount of fuel required; the suspended state of the finely divided material enabling the application of the heat to be made directly to the material, thereby confining the heat and minimizing the losses due to radiation.

In order that my invention may be fully understood, reference is made to the accompanying drawing, which is a diagrammatic and partly sectional view illustrating one embodiment of my invention.

The invention is not confined to the specific apparatus shown, for it is obvious that other types may be constructed involving the essential features of this invention. And my invention may moreover be used with any suitably powdered carbonaceous material, or with gas or oil serving for the fuel. Also numerous finely divided materials may be treated by such an apparatus as for example calcareous materials, magnesite, flue dust, fine ore, etc. A preferred fuel however, is finely powdered coal or coal dust and the following description will be confined to such a fuel.

The furnace 1, may be any type of furnace or retort. It is shown, however, as being closed and having a flue 2. A plurality of supply sources 3, for containing the powdered raw material and powdered coal are in communication with the interior of the furnace as by means of the connections 4. The raw material and coal may be fed to these supply sources by any convenient means, and in order that the best results may be obtained the raw material and coal should be dry. One source of series of supply sources may be used exclusively for the

raw material, and the other source or series of supply sources may be used for the powdered coal. Or if desired, the raw material and a portion of the powdered coal required for firing purposes may be previously intermingled in predetermined quantities and thus fed to one series of supply sources, the other series of supply sources serving as an additional means for delivering fuel to the furnace if desired. In any case, it will be understood that the supply of raw material and fuel, together with the amount of air required to support combustion is always under control, and either one or all the various elements entering the furnace can be varied to suit furnace conditions.

The substances may be fed to the furnace in any desired manner, as for instance, by gravity or as shown, by positive means as the blowers 5. These blowers may also be used as in the present instance for supplying a suitable amount of air required to support combustion.

The connections 4, are illustrated as entering the furnace at the same elevation as shown by the jets 6, but it is understood that the relative positions of the material and fuel supply sources can be changed to suit the operation, the object being to admit the fuel and the material to the furnace in such a manner that the material may be subjected to the furnace temperature during the entire period that the material may be held in suspension, or in partial suspension in the furnace.

I have shown a preferred means for making the action of my apparatus continuous and for removing the final product as it accumulates at the bottom. The sintered or fused material after passing through the heated zone drops upon a cooling trap 8 which opens at a suitable time to permit the accumulation to pass below where it is further cooled. Another similar trap may be provided as the trap 9 for further cooling and to more completely separate the upper portion of the furnace from the exit or lower end. A convenient way of removing the material is as shown, by providing a blower 11 and a receptacle 12 connected to the base of the furnace by suitable piping 13 and 14 as shown. The blower forces the material into the pipe 13 and from there to the receptacle where it can be further treated and then carried off by pipe 15.

Having thus described my invention, I claim:—

1. An apparatus for treating finely divided material in a dry state, comprising
5 a furnace having a fusion chamber, a pair of oppositely disposed upwardly and inwardly directing jets spaced apart in said chamber, said chamber entirely inclosed
10 above said jets, means for driving the divided material through one of said jets into said inclosed chamber, and means for driving
15 a divided solid fuel through the other of said jets into the divided material, the pressure from said driving means maintaining said solids in position to be burned
20 while commingled in a temporary state of suspension.

2. An apparatus for treating finely divided material in a dry state, comprising a
20 furnace having a fusion chamber, a pair of

oppositely disposed upwardly and inwardly directing jets spaced apart in said chamber, said chamber entirely inclosed above said jets, means for driving the divided material through one of said jets into said inclosed chamber, means for driving a divided solid fuel through the other of said jets into the divided material, the pressure from said driving means maintaining said solids in position to be burned while commingled
25 in a temporary state of suspension; a cooling chamber below said fusion chamber and a flue leading from said fusion chamber below said jets.

This specification signed and witnessed
30 this 11th day of May, A. D., 1912.

JOHN W. THOMAS.

Witnesses:

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