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PATENTED MAR. 24, 1903.

C. A. DOREMUS.
METALLURGICAL AND CHEMICAL FURNACE.
APPLICATION FILED OCT. 20, 1899.

NO MODEL.

Fig. 1.

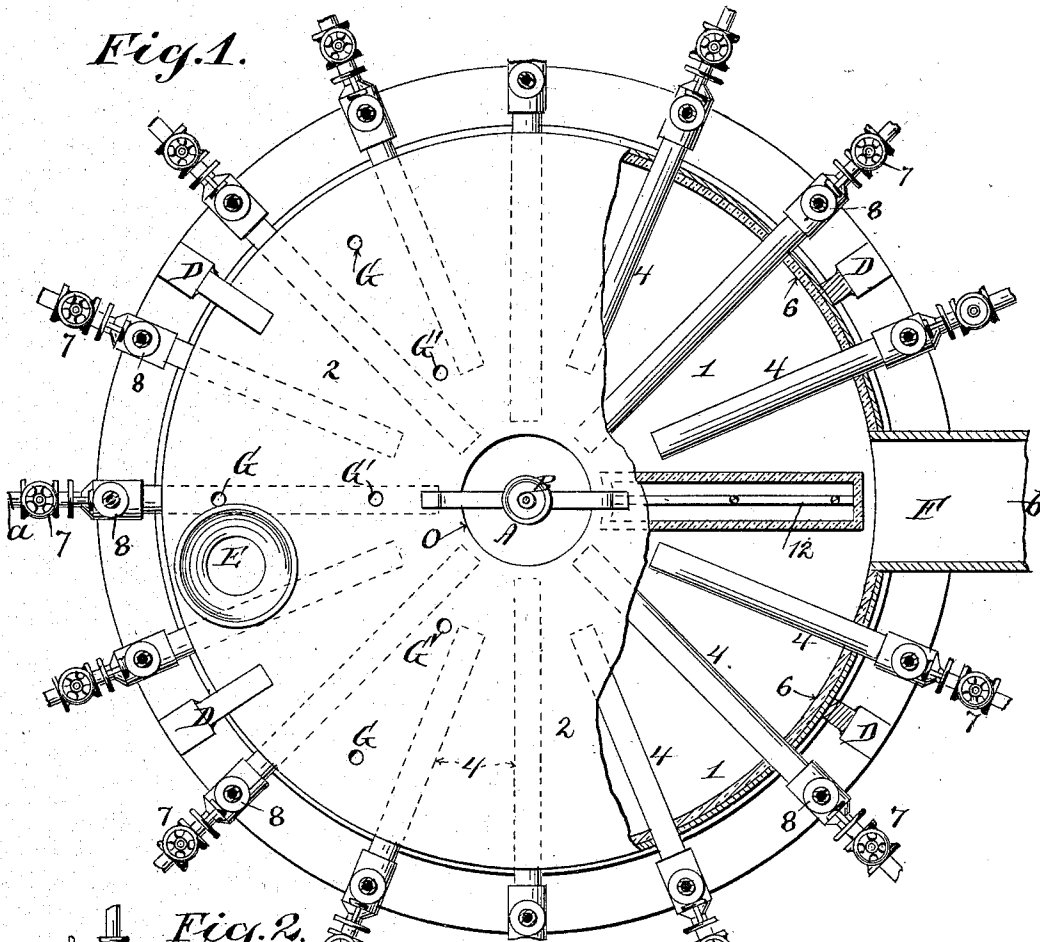


Fig. 2.

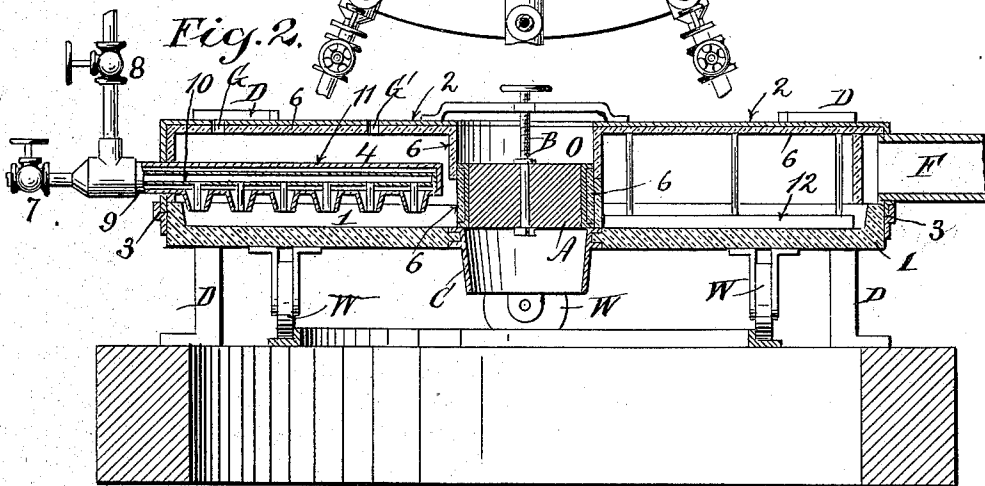
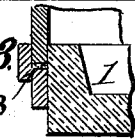


Fig. 3.



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METALLURGICAL AND CHEMICAL FURNACE.

SPECIFICATION forming part of Letters Patent No. 723,251, dated March 24, 1903.

Application filed October 20, 1899. Serial No. 734,167. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. DOREMUS, a citizen of the United States, residing in the city of New-York, borough of Manhattan, county and State of New York, have invented a new and useful Metallurgical and Chemical Furnace, of which the following is a specification, reference being had to the accompanying drawings, in which similar characters refer to similar parts.

Figure 1 is a plan of my device, and Fig. 2 a cross-section on the line *a b*. Fig. 3 is a detail in section, showing the groove in which my furnace-dome fits loosely, the joint being rendered gas-tight by suitable powdery material, as also shown therein.

My improved furnace is constructed as follows:

The circular box or hearth 1 is mounted on wheels *W* and is rotated by the aid of suitable gears about a vertical axis. The box is provided with a central opening *O*, which is closed during the furnacing by the movable ring *A*, while for discharging the product this ring is raised by the screw *B*, permitting the product to be pushed out through the chute *C* into any proper receptacle placed in the pit below.

The dome 2 of the furnace is supported by the standards *D*. The outer vertical flange of the dome fits into a groove 3, which is filled with sand or with some other material to be furnished in powdered form, thus making a gas-tight joint. The dome has a central vertical flange of circular shape, which extends down far enough to make a gas-tight joint when the ring *A* is lowered. The dome is provided with a charging-hole capable of being closed with a cap and with orifices on its outer vertical side for the admission of burners 4. There is also an opening at *F* for the exhaust-gases.

The bed and dome of the furnace may be lined with fire-brick or other tiles 6, and the movable ring *A* is then also lined with similar material.

The burners 4, one of which is shown in cross-section in Fig. 2, consist of concentric tubes having nozzles projecting from them. The inner and outer tubes are fed through the globe-valves 7 and 8, respectively. The inner tube 10 carries the air-supply or other

supporter of combustion, while the outer one, 11, carries the fuel, such as gas or fuel and air mixed. In the latter case a "mixer" is needed at the point of entrance of the gas to the pipe, or a regulated supply of air may be admitted with the gas through a third globe-valve jointed to the supply-pipe and the valve 8. Oxygen may be substituted for air as the supporter of combustion. As many burners may be inserted as are deemed necessary for the heating of the charge. The angle at which the flames shall strike on the charge is regulated at the joint 9. If it is desired to stir the charge, rakes may be suspended from the dome, as shown at 12.

The material or the mixture of materials is fed into the charging-hole *E* and by the action of the revolution of the box 1 and of the stirrers 2 is spread evenly over the bottom. The flames striking the surface bring the material to the desired temperature and cause the chemical changes to be brought about. Any gases thus produced escape with the products of combustion by the exhaust *F* and are taken care of as desired.

Either oxidizing or reducing flames may be obtained by the proper regulation of the valves 7 and 8 and by the admission of air, if need be, through small holes *G G'* in the dome.

I desire to particularly mention the chemical effect of the products of combustion, especially that of the vapor of water on the charge in addition to the oxidizing or reducing action of the flames ordinarily obtained. In the case of the water it suffers decomposition, the oxygen remaining in the product of the furnacing, while the hydrogen forms volatile products. This action of the vapor of water may be sufficient to obviate the use of steam in certain operations and has the advantage of being superheated.

By spreading the material over the floor of the furnace and by dividing the gas or other fuel burned into many jets or flames the surface where the chemical action can take place is very great, while the disadvantage of dusting, as would occur in a revolving cylindrical furnace, is done away with.

By slight alterations my furnace may be made continuous in action.

I do not confine myself to the particular form of burner shown or to any particular

fuel or supporter of its combustion. For ordinary use natural or artificial gas may be used, while very high temperatures can be obtained by the burning of acetylene with oxygen. Liquid or finely-powdered solid fuel may also be used. The temperature of the burner is kept down by the current of cool air and gas passing through them to reach the nozzles. The charge may be brought to a high temperature on its surface without the burners or the lining being damaged.

Having described my invention and set forth the method of operating the same, what I claim, and desire to secure by Letters Patent, is—

1. A metallurgical and chemical furnace which consists of a horizontally-rotating covered hearth, on which the materials to be treated are spread, and burners placed radially within the furnace and extending over the surface of the hearth in such position as to project the flames issuing from them upon the hearth, substantially as described.

2. A metallurgical and chemical furnace which consists of a rotating covered hearth on which the materials to be treated are spread, and burners placed radially to the axis of rotation, within the furnace and extending over the surface of the hearth in such position as to project the flames issuing from them upon the hearth, substantially as described.

3. A metallurgical and chemical furnace, comprising a rotating hearth provided with a

stationary dome, means for sealing the joint between the hearth and the dome, and with suitable inlet and outlets for discharging finished product and gaseous exhaust, and with burners arranged within the furnace radially to the axis of rotation and extending over the surface of the hearth in such position as to project the flames issuing from them upon the hearth and with means connected with the burners whereby the flames may be made either oxidizing, reducing, or neutral in character, substantially as described.

4. The combination of the rotating furnace-hearth with a stationary dome supported above the hearth, means for sealing the joint between the hearth and the dome, and burners arranged within the furnace radially to the axis of rotation and extending over the surface of the hearth in such position as to project the flames issuing from them upon the hearth, suitable valves for regulating the supply of fuel and air to the burners, stirrers for mixing the charge in the furnace, an inlet for charging the material, an outlet for discharging the same, an outlet for exhaust-gases, and air-holes about the furnace for the admission of air, substantially as described.

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Witnesses:

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