

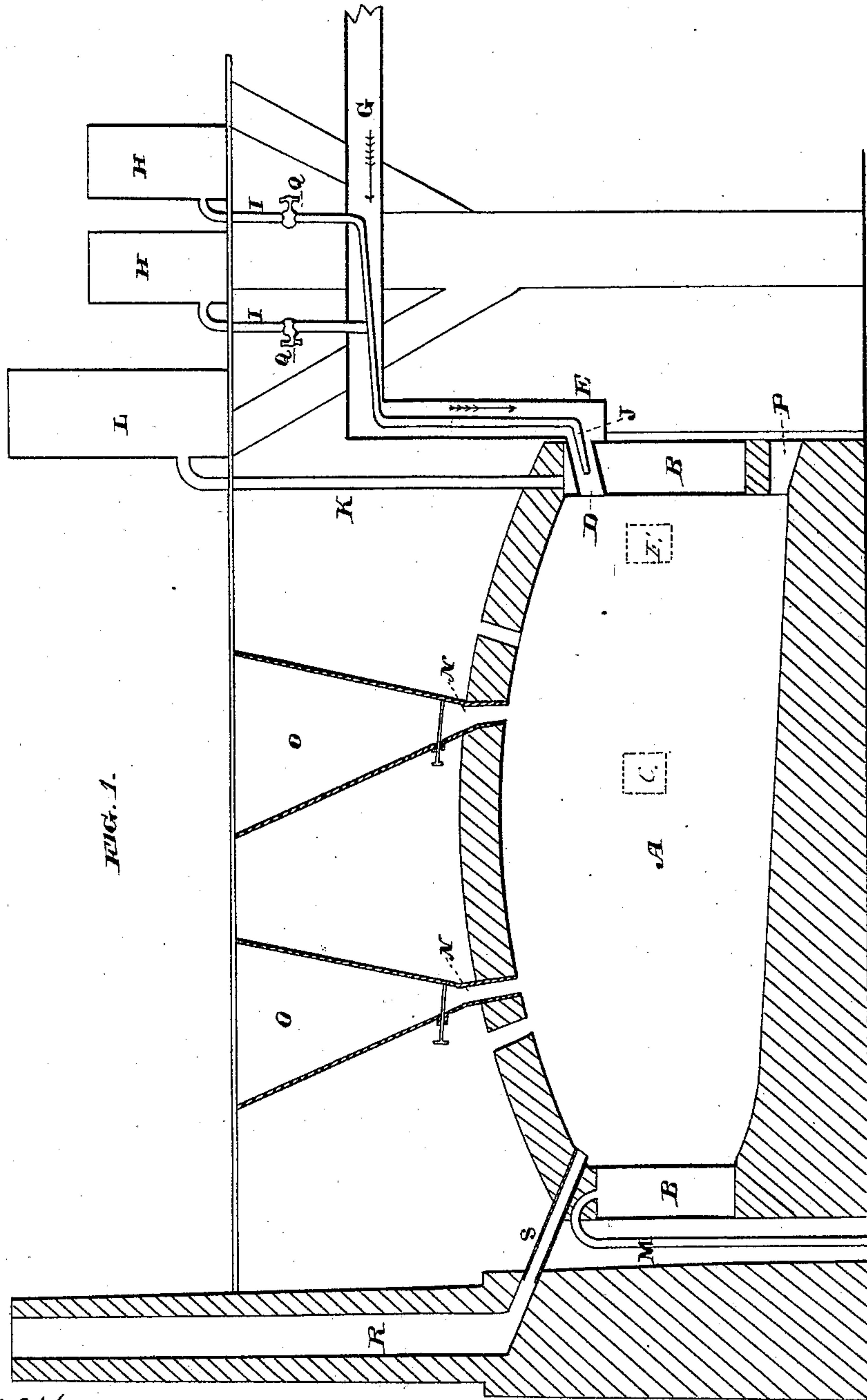
(No Model.)

2 Sheets—Sheet 1.

J. H. CANAVAN.
REVERBERATORY FURNACE.

No. 285,462.

Patented Sept. 25, 1883.



Witnesses,
Geo. H. Strong
J. H. Strong

Inventor
J. H. Canavan
Dewey & Co
Attorneys

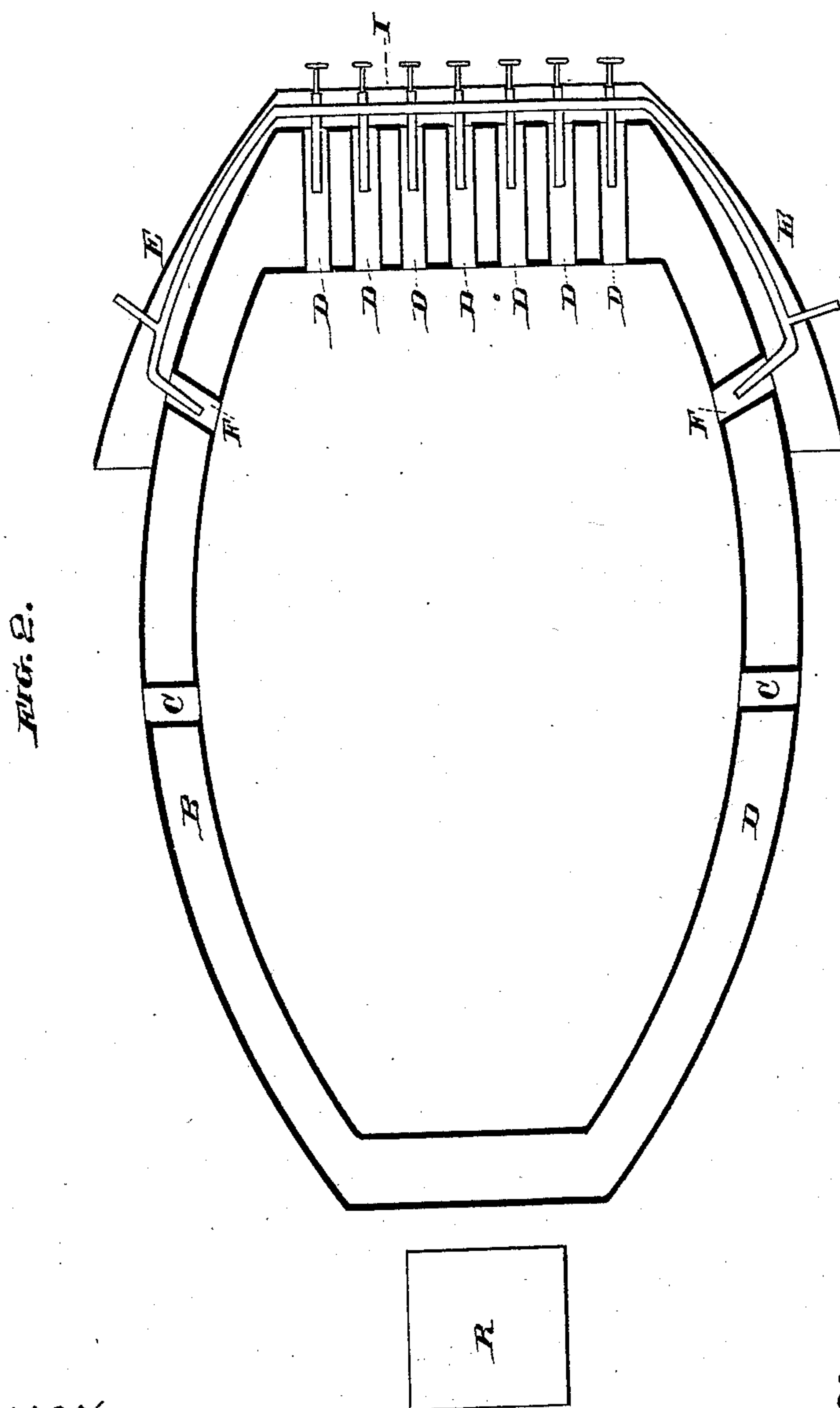
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UNITED STATES PATENT OFFICE.

JOHN HENRY CANAVAN, OF GLOBE, ARIZONA TERRITORY.

REVERBERATORY FURNACE.

SPECIFICATION forming part of Letters Patent No. 285,462, dated September 25, 1883.

Application filed May 26, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. CANAVAN, of Globe, county of Gila, Territory of Arizona, have invented an Improved Reverberatory Furnace; and I hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to certain improvements in reverberatory furnaces to be used for smelting purposes; and it consists of an oval-shaped inclined floor with an arched crown or roof and a surrounding water-jacket, together with a partially-inclosing wind-box, with tuyeres and oil or petroleum jet tubes opening into the same, and in certain details of construction, all of which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section, showing the interior of the furnace, the blast, oil, and water pipes, tanks, and tuyeres. Fig. 2 is a horizontal section, showing the arrangement of the wind-box, tuyeres, and oil-pipes.

A is the floor of my furnace, which is preferably inclined, as shown, and is made oval in shape. In the present case I have shown it in the proportion of fifteen feet long, nine feet in its greatest width, and five feet wide at the front and four feet at the rear end. Around the sides is a water-jacket, B, made of boiler-iron, which extends up to the crown, or about two feet, while the remainder of the height (about three feet) is filled in with clay and coke-dust. Openings C are left through the water-jacket for slag-taps. The bottom may be made of fine quartz or sand. Across the front are a series of tuyeres, D, seven being shown in the present case. These tuyeres receive air from the wind-box E, which also extends around upon each side from the front, as shown, and other tuyeres, F, open into the furnace at this point. Air is supplied from any suitable blower or blast apparatus through the blast-pipe G.

R is the chimney, and S the escape-flue of the furnace.

At a proper height are placed oil-tanks H, from which pipes I lead down, and have discharge-pipes J entering the tuyeres a short distance, so as to deliver the oil at a point from which it may be carried into the furnace by the blast, thus producing an intense heat.

The water-jacket B is supplied with water through a pipe, K, from a tank, L, and an overflow-pipe, M, at the opposite end carries off the surplus.

The crown of the furnace may be made of asbestos or brick, and has two passages, N, leading from hoppers O above, through which the ore is fed into the furnace.

This furnace is suitable for smelting ores of lead, copper, and silver, and is operated as follows: The inside of the furnace is lined up from the bottom with common clay. About five bushels of charcoal is put in and fired. The blower is started and the oil turned on, and a few minutes afterward the charge is let down. In about three hours the clay lining will be destroyed, and its place taken by a coating of slag about half an inch thick all around the jacket, which prevents the chilling of the remainder of the contents of the furnace. The slag-tap opens into the furnace about two inches below the top of the water-jacket, and is kept open, so that slag will be running all the time when the furnace is in blast, there being a slag-well upon the outside. The furnace will thus be kept full of slag to within two inches of the top, the charges of ore being let down at intervals into the molten slag and copper, there being added about five per cent. of charcoal to deoxidize the metal. When sufficient metal has accumulated in the furnace—say five hundred pounds—it may be drawn off into molds through the opening P.

A furnace of the size herein described is capable of reducing from ninety to one hundred and fifty tons of ore in twenty-four hours.

A main stop-valve, Q, controls the flow of oil from the tank, and each tuyere has also a valve by which it may be cut off or regulated independent of the others.

With this arrangement the heat in the furnace may be raised in a few minutes from 500° to 4,000°.

This mode of supplying air and oil may also be applied to brick-furnaces by having the tuyeres and wind-box set on the outside of the brick, or it may be applied to melting or heating furnaces in copper or in iron rolling mills.

I am aware that smelting-furnaces having a surrounding water-jacket, and also furnaces having two series of tuyeres for introducing

different kinds of combustible gases, are old, and such I do not wish to be understood as claiming, broadly, as of my invention.

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

1. In a horizontal reverberatory furnace, the surrounding water-jacket B, with its supply and overflow pipes K and M, and the slag-
10 openings C, tuyeres D and F, and the metal-discharge opening P, all arranged with relation to each other substantially as herein described.

2. The improvement in horizontal reverberatory furnaces, consisting of a surrounding wa-
15 ter-jacket with supply and discharge pipes, and a series of tuyeres opening through the front and sides, as shown, together with the feed-openings in the roof and discharge-openings, substantially as herein described.

3. In a horizontal reverberatory furnace, the
20 inclosing water-jacket extending upward from the bottom to a point above the line of the molten material, and having slag-discharge openings at this level, and a metal-discharge
25 opening at the bottom, and openings in the crown to supply ore, in combination with the tuyeres at the front and sides, a connected wind-box or blast-pipe, and oil-pipes with dis-
charge-nozzles opening within said tuyeres,
30 substantially as herein described.

In witness whereof I hereunto set my hand.

JOHN HENRY CANAVAN.

Witnesses:

FRED A. UPTON,

CHRIS. W. MOREING.