

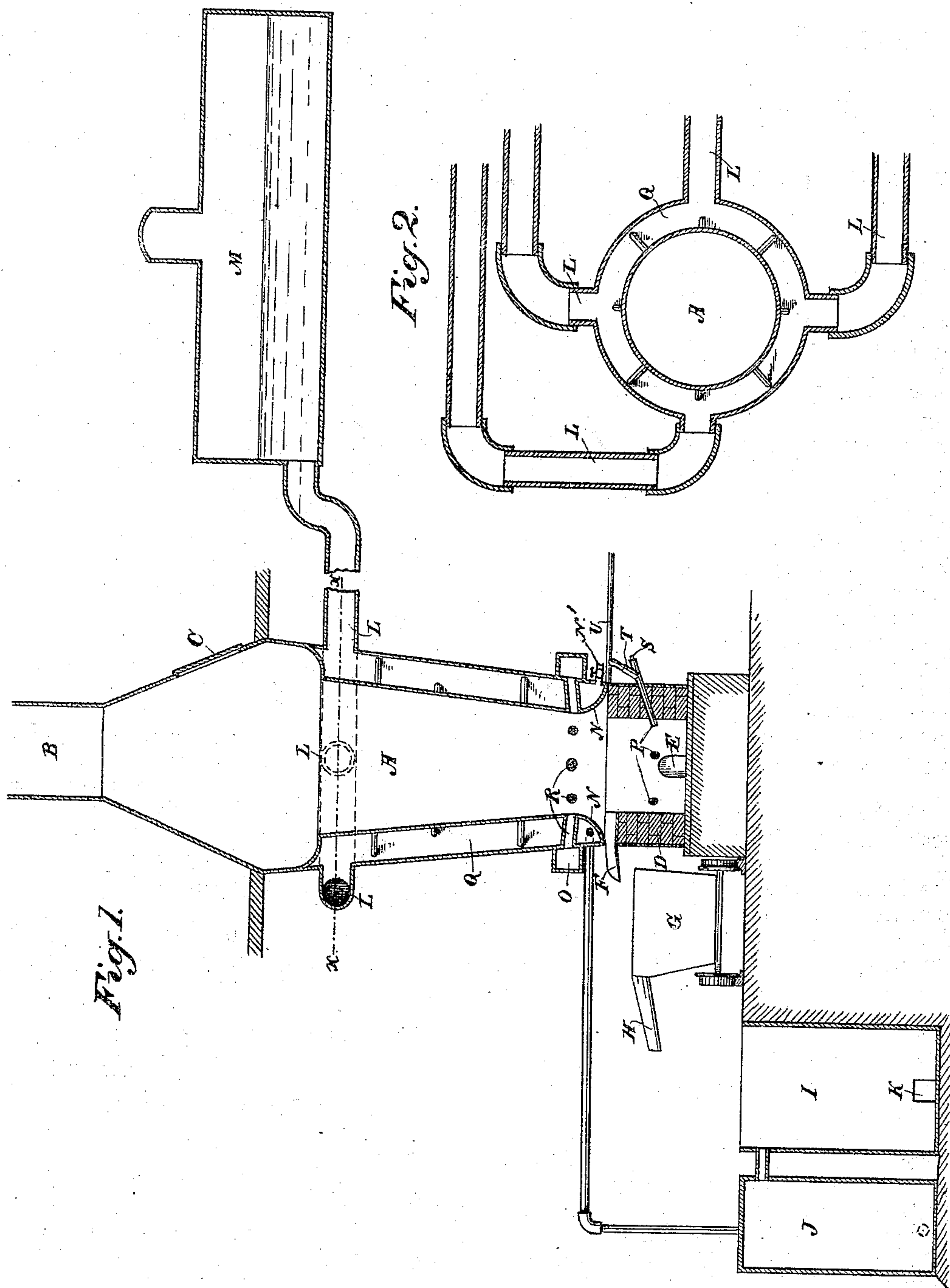
(No Model.)

J. L. GIROUX.

STEAM GENERATOR AND SMELTING FURNACE.

No. 500,886.

Patented July 4, 1893.



Witnesses,
J. H. Hourse
J. F. Aschbeck.

Inventor,
Joseph L. Giroux
By Deucey & Co.
attys

UNITED STATES PATENT OFFICE.

JOSEPH L. GIROUX, OF JEROME, ARIZONA TERRITORY.

STEAM-GENERATOR AND SMELTING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 500,886, dated July 4, 1893.

Application filed January 4, 1893. Serial No. 457,281. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH L. GIROUX, a citizen of the United States, residing at Jerome, Yavapai county, Territory of Arizona, have invented an Improvement in Steam-Generators and Smelting-Furnaces; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a combined smelting furnace and steam generator, and it consists in certain details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a vertical sectional elevation of the furnace showing its attachments. Fig. 2 is a horizontal section through $x-x$ of Fig. 1.

The object of my invention is to combine with a smelting furnace devices for generating steam whereby the heat employed in smelting the ore is utilized in producing steam power to be used to drive engines and other machinery.

A is a furnace of any suitable or usual construction having the stack B and feed door at C.

The body of the furnace is composed of concentric outer and inner walls. The outer wall is preferably made of boiler iron, and the inner wall is made of heavy copper, and the two are connected together by numerous stays to resist the pressure which is generated between the two.

D is the brick lining of the crucible in the lower part of the furnace and upon which it is supported.

E is the bullion tap from which the metal is drawn off, and F is the slag tap through which the melted slag is discharged.

G is a settling pot into which the slag is discharged from the slag tap, and H is an overflow pipe which delivers the slag after the pot is full.

I is a water tank so situated with reference to the discharge pipe H that the slag falls into the water tank where it becomes disintegrated and granulated, and sinks to the bottom. The water is thus heated and displaced and flows over into the tank J situated beside the tank I, and from this tank the heated water is pumped into the jacket surrounding the furnace, being delivered around the bottom and rising as it is heated. Whenever a sufficient

amount of slag has been received into the tank I, it is discharged by opening the gate K when the water will wash the granulated slag out.

The tank I is designed to hold about five hundred gallons of water and by the discharge of about one hundred gallons, the slag will be cleared out of it at any time.

From the upper part of the jacket Q which surrounds the furnace, four large pipes L lead to a boiler M. This boiler is situated at such an elevation with relation to the water jacket of the furnace, that the latter will always be kept full of water, and it and the boiler are constantly supplied to retain the proper level in the boiler by means of the pump before described, the water being heated so that it is delivered into the water jacket at very near boiling point. By means of the large connecting pipes L, a free discharge of steam into the boiler is permitted without its carrying the water with it. The lower part of the inner jacket is curved as shown at N, so that the space at the bottom of the jacket is shaped to easily deliver and discharge through a valved outlet N' any sediment when the jacket is to be washed out.

O is the air drum surrounding the furnace and having six or more tuyeres R opening therefrom into the furnace in the usual manner.

I have shown additional small tuyeres P about one inch in diameter passing through the brick lining of the crucible by which a supplemental blast may be introduced, thus making the smelting more rapid. By this arrangement I am enabled to provide one or more steam boilers with any desired steam pressure and keep it up as long as the furnace is in operation, while at the same time the slag is easily disposed of. It serves to heat the water before the latter is introduced into the water jacket and the labor of removing the slag from the furnace is dispensed with. The small tuyeres P are connected with an air compressor which will give an air pressure of about ten pounds, while the blast drum from which air is delivered through the tuyeres R, is supplied from a blower which will give a pressure of about ten ounces. The reason for this is that the air from the tuyeres R is delivered among the loose ore and fuel and easily

passes through it, but the air from the small tuyeres P is delivered directly into the melted metal within the crucible and must, therefore, have sufficient pressure to overcome that of the metal, and prevent the latter from entering the tuyeres. The air enters the tuyeres P from the branch T of a Y-shaped pipe connecting therewith, and this pipe connects through a pipe U with a compressor not shown. The other branch of the Y pipe is so formed as to stand in line with the tuyeres P, and is normally closed by a wooden plug S. By having this pipe so placed it enables the operator to insert a rod to clear away any obstruction in the tuyeres by removing the plug, and if the air pressure should fail, the metal would flow up and burn the plugs out so that the molten metal could flow out freely and not become chilled and hardened within the pipe, which would cause much delay and trouble.

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

1. A smelting furnace and steam generator, consisting of a water-jacketed furnace having a slag spout in its lower portion, one or more steam boilers above the level of the steam jacket and in connection therewith, a water containing receiver into which the slag spout discharges, and connections therefrom to the water-jacket whereby the heated slag is utilized to heat the water preparatory to being supplied to the furnace.

2. A smelting furnace and steam generator consisting of a furnace with a surrounding

water-jacket, a means for heating water by the discharge of slag from the furnace and for conducting said water to the jacket, one or more boilers above the jacket and one or more pipes connecting the upper part of the jacket with the boilers, substantially as herein described.

3. The smelting furnace having a water jacket surrounding it, one or more boilers situated above the level of the upper part of the jacket and pipes connecting the lower parts of the boilers with the upper part of the jacket, and a water tank adapted to receive the slag discharged directly from the slag spout of the furnace or through a settling pot and overflow, whereby the slag is granulated and the water is heated preparatory to being supplied to the furnace and boiler, substantially as herein described.

4. A smelting furnace consisting of the body and crucible with slag and metal discharge gates, air blast tuyeres opening into the ore chamber, supplemental tuyeres opening into the crucibles, and Y pipes connected therewith, one branch of each of which is connected with a source of air supply, and the other has a wooden plug at its outer end, in line with the tuyere pipe, substantially as herein described.

In witness whereof I have hereunto set my hand.

JOSEPH L. GIROUX.

Witnesses:

MYRON CORY,
G. W. HULL.