

No. 718,756.

PATENTED JAN. 20, 1903.

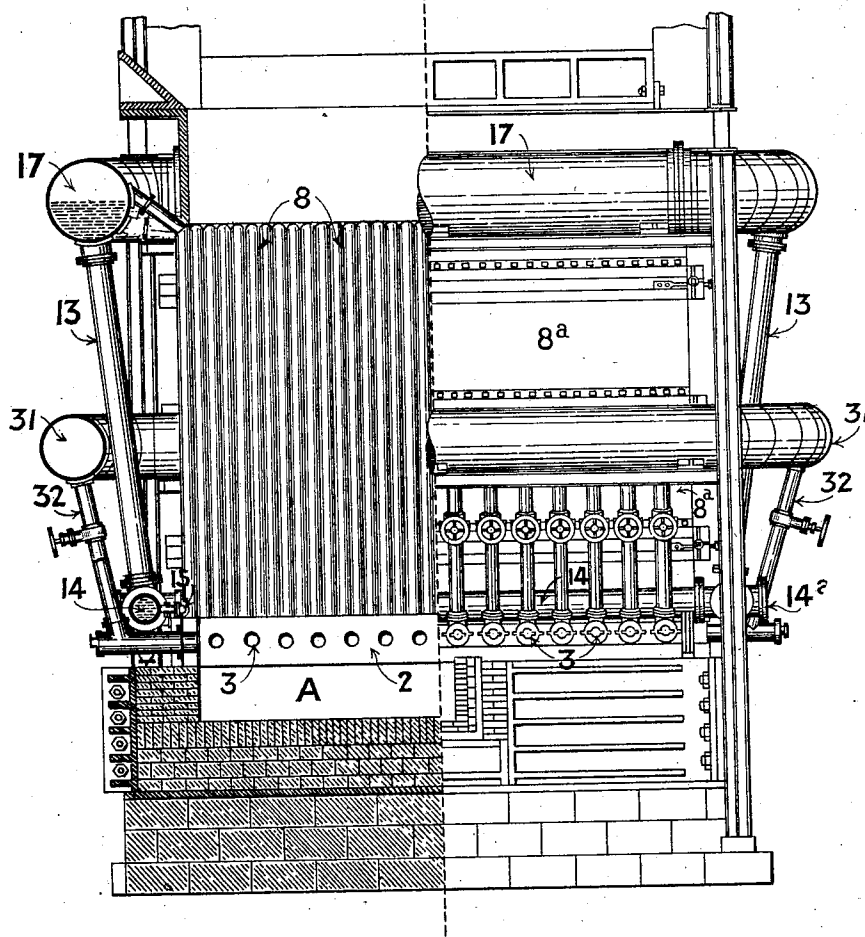
J. L. GIROUX.
STEAM GENERATING FURNACE.

APPLICATION FILED SEPT. 17, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

Fig.1



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2 SHEETS—SHEET 2.

Fig. 2

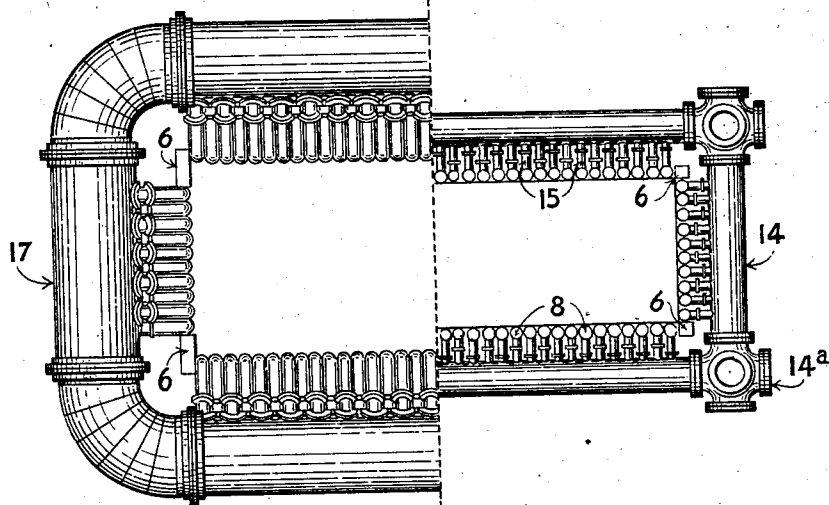
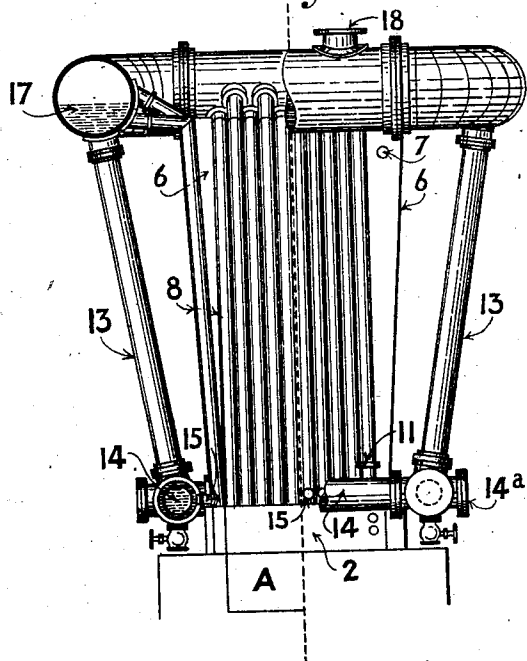


Fig. 3



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UNITED STATES PATENT OFFICE.

JOSEPH L. GIROUX, OF JEROME, ARIZONA TERRITORY.

STEAM-GENERATING FURNACE.

SPECIFICATION forming part of Letters Patent No. 718,756, dated January 20, 1903.

Application filed September 17, 1902. Serial No. 123,697. (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, county of Yavapai, Territory of Arizona, have invented an Improvement in Steam-Generating Furnaces; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a combination furnace and steam-generator in which a crucible occupies the lower part of the furnace, and above this, in conjunction with suitably-constructed water-jackets, are arranged a series of vertically-disposed water-tubes surrounding and inclosed by sheets of steel, said tubes having their lower ends connected with a feed and supply pipe and the upper ends connected with a steam-drum, into which the steam is collected. The rectangular water-jackets are connected by upwardly-extending corner jackets with the storage-tank, into which the water is delivered and from which it is returned through suitable connections and delivered into the feed-pipe which supplies the vertical tubes.

My present invention is an improvement upon a similar furnace for which a patent was allowed to me June 5, 1902, Serial No. 102,724, and comprises details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 shows side elevation and longitudinal side section. Fig. 2 shows plan view of top bends of tubes and connections with steam-drum and plan view of connections of lower ends of tubes with feed-pipe. Fig. 3 shows circulatory system.

A is a crucible having iron exterior walls and a lining of fire-bricks, this being supported upon a suitable base.

As shown in the present drawings, the furnace is made rectangular in shape, having a greater length than width, and may be of a size suitable for the amount of work it is designed to do. Above the crucible is a rectangular water-jacket section 2, which in the present case is made about half the depth of the jacket shown in my former patent. Through each corner of this section 2 sections 6 extend upwardly and connect with a storage-tank (not here shown) through suitable passages, as at 7, so that water may circulate

from said tank through the rectangular jackets, and while maintaining a comparatively low temperature of these jackets the water will be heated, so that it can be taken from the storage-tanks and delivered into the tubes 8, which surround the furnace proper above the jackets.

Around the lower part of the furnace and approximately in the plane of the lower end of the pipes 8 is a feed-pipe 14, into which the water is delivered from the storage-tank through feed connection at 11 by means of pump or other suitable means. This feed-pipe 14 is of sufficient dimensions to carry all the water necessary for the supply of the tubes 8 and completely surrounds the furnace, as shown. The ends of the feed-pipe 14 connect with couplings 14^a, which are made in the form of crosses, two of the openings of which serve for the connections of the pipes 14, which are secured by flanges bolted thereto or in other suitable manner. The other two exterior openings are normally closed by caps bolted to the flanges of the crosses, and these openings being in line with the pipes 14 the latter can be inspected and cleaned by removing the caps at any time.

Above the upper ends of the pipes 8 is a large steam-drum 17, which also surrounds the upper part of the furnace. Connection is made between the pipe 14 and the steam-drum 17 by pipes 13, which are here shown as having their lower ends connected with the crosses 14^a at the corners of the furnace and the upper ends suitably connected with the steam-drum 17. Each tube 8 is connected by a small feed-pipe 15 with the main pipe 14, and the upper ends of these tubes are connected with the steam-drum 17. The connections between the drum 17 and the upper ends of the tube 8 may be "staggered," as shown in the drawings, or set with every other one above or below the center, or, if preferred, the connections can all be placed in one line on the center or above or below, the object being in any event to provide for a free circulation through the tubes into the drum 17, thence returning through the pipes 13 into the feed-pipe 14, and thence through the connections 15 into the lower ends of the pipes 8.

From the top of the steam-drum 17 a con-

nection 18 carries the steam to another drum or to an engine or other part where the steam is to be utilized.

The tubes 8 are surrounded and inclosed outside by sheets of steel 8^a, which serve to 5 confine the heat and gases and prevent their escape through the narrow spaces between the tubes. The sheets extend from the water-jacket 2 to the pipes 16 at the top and are 10 perforated or cut out at the bottom to admit the pipes 15.

Air is furnished to the ore and fuel within the furnace by an air-supply pipe 31, which is suitably supported and surrounds the furnace, as shown. Air from this pipe is conveyed 15 through pipes 32 to the twyers 3, which open through the water-jackets and discharge into the interior of the furnace, as previously described.

In my present invention I have simplified my furnace by omitting the pipe which was formerly shown intermediate between the storage-tank and the feed-pipe, and with it I have dispensed with the connecting-pipes, 20 thus simplifying the apparatus and insuring a more direct and better circulation of water through the pipes and steam-drum.

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

1. The combination in a smelting-furnace of a crucible, a rectangular water-jacket located above the crucible, a series of vertically-disposed pipes surrounding the furnace 35 above the jackets, a water-supply feed-pipe surrounding the lower part of the furnace and a steam-drum surrounding the upper part, open connections between the tubes and the feed-pipe and steam-drum whereby constant circulation is effected.

2. The combination in a smelting-furnace of a crucible, rectangular water-jackets located above said crucible, twyers extending through the jacket to the interior of the furnace, a main air-supply pipe surrounding the furnace, pipes connecting with each of the twyers and with said air-supply pipe, pipes 45 through which water is circulated to and from the water-jacket, vertically-disposed pipes surrounding the furnace above the jacket, a feed-pipe surrounding the lower portion of said vertical pipes and having connection with each, means for supplying said feed-pipe with water from the circulating system 50 of the water-jacket, and means for circulating the water through said vertical pipes.

3. The combination in a smelting-furnace of a crucible, a superposed water-jacket having twyers and air-supply therethrough, and 60 means for circulating water through the

jacket and a containing-reservoir, vertical pipes surrounding the furnace above the jacket, an exterior feed-pipe surrounding the lower portion and a steam-drum surrounding the upper portion of said pipes, connections 65 between the feed-pipe and the lower ends of the vertical pipes and connections between the upper end of said vertical pipes and the steam-drum, and direct connections between the steam-drum and the feed-pipe whereby 70 circulation is effected.

4. The combination in a smelting-furnace of a crucible, a superposed water-jacket, vertical tubes located above and surrounding the interior of the furnace, a steam-drum with 75 which the upper ends of said tubes connect, a feed-water pipe surrounding and connecting with the lower ends of the tubes, angular connections with which the feed-water-pipe sections are united at the corners, said 80 connections having openings on the top and pipes leading therefrom and connecting with the steam-drum.

5. In a smelting-furnace and steam-generator, the vertical pipes, a rectangularly-disposed feed-water pipe surrounding the lower 85 ends of said pipes, coupling-sections located at the corners of the rectangle with which adjacent ends of the feed-water pipe are connected, said sections having exterior open- 90 ings in line with each of the pipe-sections and caps by which they are closed.

6. A smelting-furnace having vertical pipes surrounding the body thereof, a feed-water supply, a steam-drum, connections between 95 the lower ends of said pipes and feed-water supply and between the upper ends of the pipes and the steam-drum, and steel sheets surrounding and inclosing the vertical pipes as herein described. 100

7. The combination in a smelting-furnace of a crucible, a water-jacket section surrounding the furnace above the crucible, means for circulating the water to and from said sections, vertically-disposed water-tubes surrounding the furnace above the jacket, a feed- 105 water pipe surrounding the lower part of said tubes and pipes connecting each tube with said feed-water pipe, a steam-drum surrounding the upper part of the furnace and pipes 110 connecting the upper end of each tube with said steam-drum and corner-pipes by which said steam-drum is connected directly with the feed-pipe below.

In witness whereof I have hereunto set my 115 hand.

JOSEPH L. GIROUX.

Witnesses:

H. J. ALLEN,
TED H. DOCKER.