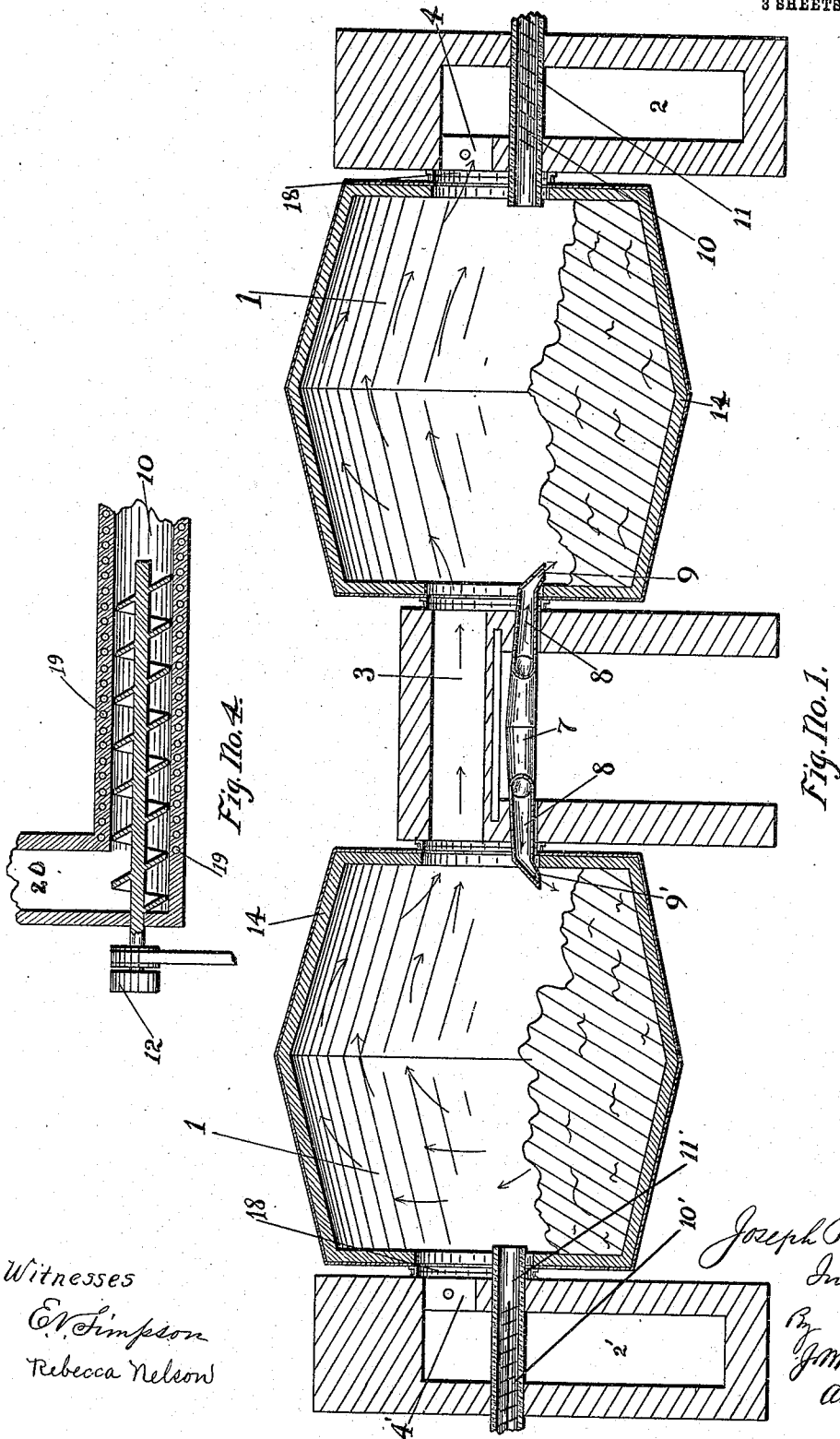


937,030.

J. P. WELCH.
SMELTER FURNACE.
APPLICATION FILED FEB. 23, 1909.

Patented Oct. 12, 1909.
3 SHEETS—SHEET 1.



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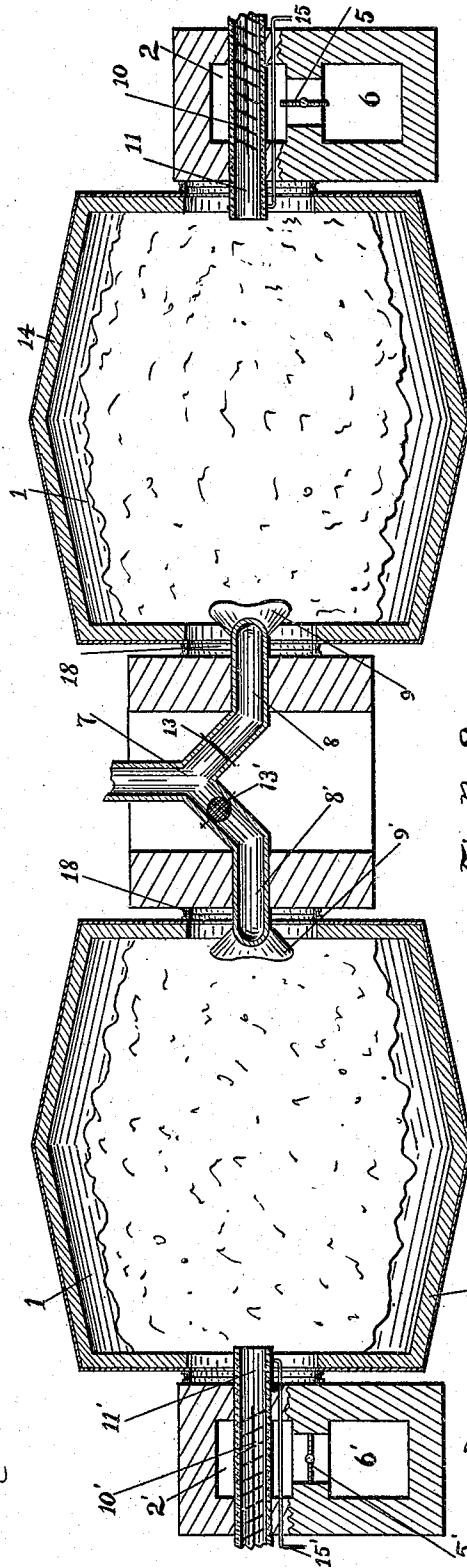


Fig. No. 2.

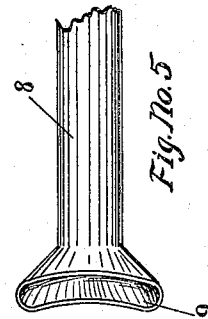


Fig. No. 5.

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3 SHEETS—SHEET 3.

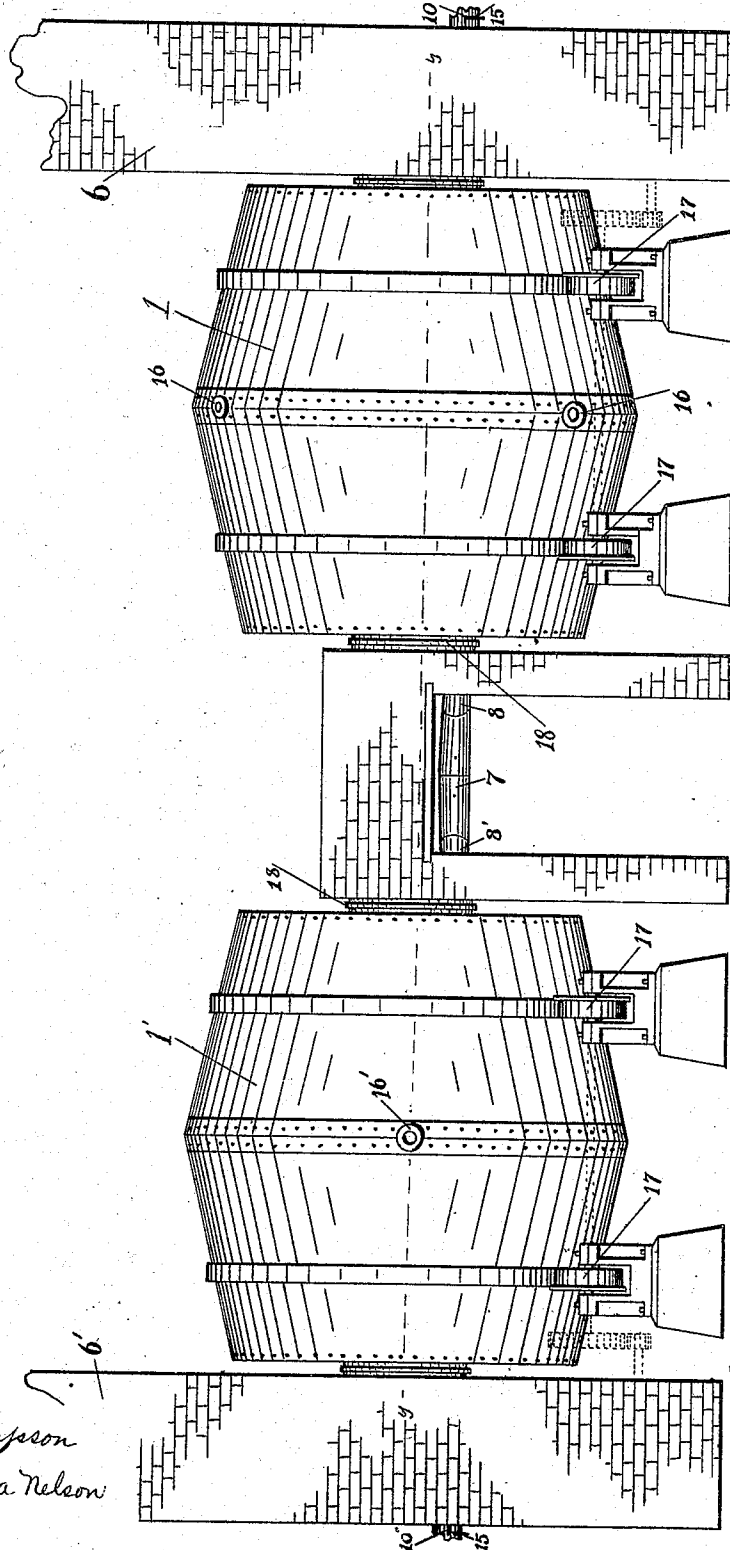


Fig. No. 3.

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UNITED STATES PATENT OFFICE.

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SMELTER-FURNACE.

937,030.

Specification of Letters Patent.

Patented Oct. 12, 1909.

Application filed February 23, 1909. Serial No. 479,628.

To all whom it may concern:

Be it known that I, JOSEPH P. WELCH, a citizen of the United States, residing at Salt Lake City, in the county of Salt Lake and State of Utah, have invented certain new and useful Improvements in Smelter-Furnaces, of which the following is a specification.

The object of my invention is to provide a device for feeding ore into a revolving furnace so that the operation of the furnace may be continuous, and to so construct the device that it will not be injured by the heat necessary to smelt ore in said furnace. This I do by the device illustrated by the accompanying drawings in which similar numerals of reference indicate like parts throughout the several figures.

Figure 1 is a vertical section of the device. Fig. 2 is a horizontal section of same on line y, y Fig. 3. Fig. 3 is an elevation of two revoluble furnaces showing the device in place. Fig. 4 is a detail section of the ore feeder. Fig. 5 is an inverted plan view of the deflector.

I have illustrated and will describe the furnace in which my device is used in order that its construction and use may be more readily understood.

I am aware that furnaces of the revolving type have been built and are being used, but so far as known the devices used to feed ore into them are entirely different from my invention.

The furnaces 1 and 1' are built in pairs and are constructed alike except as to the position they occupy to the stacks and to the fuel and ore ingress, one being to the left and the other to the right. They are built of steel and lined with fire brick 14, and are tubular in form and have tap holes 16 and 16' in their circumferential walls. They each rest on power driven trunnioned rollers 17, and are alined upon flat friction bands 45 detachably secured on the circumference of said furnaces. At opposite ends of the furnaces are built the stacks 6 and 6' each having near the bottom a short vertical flue 2 adjacent thereto with a lateral connection in which is provided a damper 5. From the end of each furnace to the stack 2 on that side, is the horizontal flue 4 or 4'. Between the furnaces and in line with the said flues 4 and 4' is the connecting flue 3. An annular opening 18 is provided in each end of

each furnace. The ends of the flues adjacent to the furnaces are so constructed that they enter the said annular openings 18. Beneath the flues 4, and 4' and within said annular openings 18 are inserted one end of the water-jacketed ore feed pipes 11, 11', one to each furnace.

To provide water in the ore feed pipes 11 and 11', a water pipe 15 is inserted into the end of the spirally disposed water orifice 19, that is provided in the wall of each of said ore feed pipes, and another water pipe 15' is inserted near the other end of each of said ore feed pipes and into the other end of said spirally disposed water orifice 19, and in that way assuring a continuous flow of water through said ore feed pipes. The said ore feed pipes 11 and 11' are provided within with power driven screws or conveyers 10, 10'. The other end of said water-jacketed ore feed pipes 11 and 11' extend to and are connected with the ore chutes 20. The said screw conveyers 10 and 10' do not extend quite to the inner end of the ore feed pipes; the purpose being to provide at all times a cushion or bank of ore that will in a measure protect the screws or conveyers.

Beneath the connecting flue 3 and entering each of the furnaces is the fuel and air pipe 7. Fuel and air is supplied through one pipe until near the furnaces, where a Y is provided in said pipe, one arm of which enters one furnace and the other arm the other furnace. Dampers 13 and 13' are provided, one in each of the said arms. Detachably secured on the end of each of said arms is a nozzle 8 that enters the furnace. On the end of which nozzle 8 is provided a deflector 9. The purpose being to deflect and direct the introduced fuel and air so that combustion takes place where the greatest heat is required.

In operation, fires having been started in the furnaces, power is then applied to the trunnioned rollers 17 and the furnaces are revolved slowly. Ore is introduced by the screw conveyer 10' into furnace 1' and fuel is introduced, (finely pulverized if coal) through the fuel and air pipe 7, by closing the damper 13. The damper in the stack 6' having previously been closed, this directs the heat as deflected by the deflector 9' onto and over the introduced ore, while the same is being agitated and turned by the revolution of the furnace 1'. When sufficient heat

has been applied to melt the ore, it is drawn off as slag or melted mineral through the openings or tap holes 16'. The heat is directed, as indicated and shown by arrows, through the connecting flue 3 and into the other furnace 1, where the ore therein, having previously been introduced, is subjected to the heat thereof, which is sufficient to roast or partially smelt in that furnace. The damper in the stack on that side being open allows the smoke to exit through the stack 6. During the operation of drawing off the slag and melted mineral from furnace 1', the damper 13' in the fuel pipe 7 is closed and the damper 13 in the fuel pipe is opened. The damper in the stack 6 is closed, and the damper in the stack 6' is opened. This direction of the fuel subjects the ore in furnace 1 to the extreme heat and the ore in furnace 1' to the secondary heat. The improvements and my invention being the deflector of the fuel and air, onto the ores, and the water-jacketed feeding device, enabling the continuous operation of the furnace.

Having thus described my device, I desire to secure by Letters Patent—

1. In a device of the class described the combination of two revoluble furnaces, fuel pipes which are provided with nozzles each

having a deflected end that is inserted within one end of said furnaces through an annular opening therein, a water-jacketed screw conveyer provided in an annular opening at the other end of said furnaces, and a flue connecting said furnaces, as and for the purposes described.

2. In a device of the class described the combination of two revoluble furnaces with annular openings in each end, water-jacketed screw conveyers entering one end of each of said furnaces, with fuel nozzles having deflected ends entering through the said annular openings in the other end of said furnaces and means for directing the draft therein, as and for the purposes described.

3. In a device of the class described in combination with two revoluble furnaces having annular openings in each end thereof, water-jacketed screw conveyers inserted through said annular openings at one end, and fuel nozzles having deflectors thereon inserted at the other end, with means for directing the drafts in said furnaces.

In testimony whereof I have affixed my signature in presence of two witnesses.

JOSEPH P. WELCH.

Witnesses:

J. J. SNIDER,
LOGAN R. CULVER.