

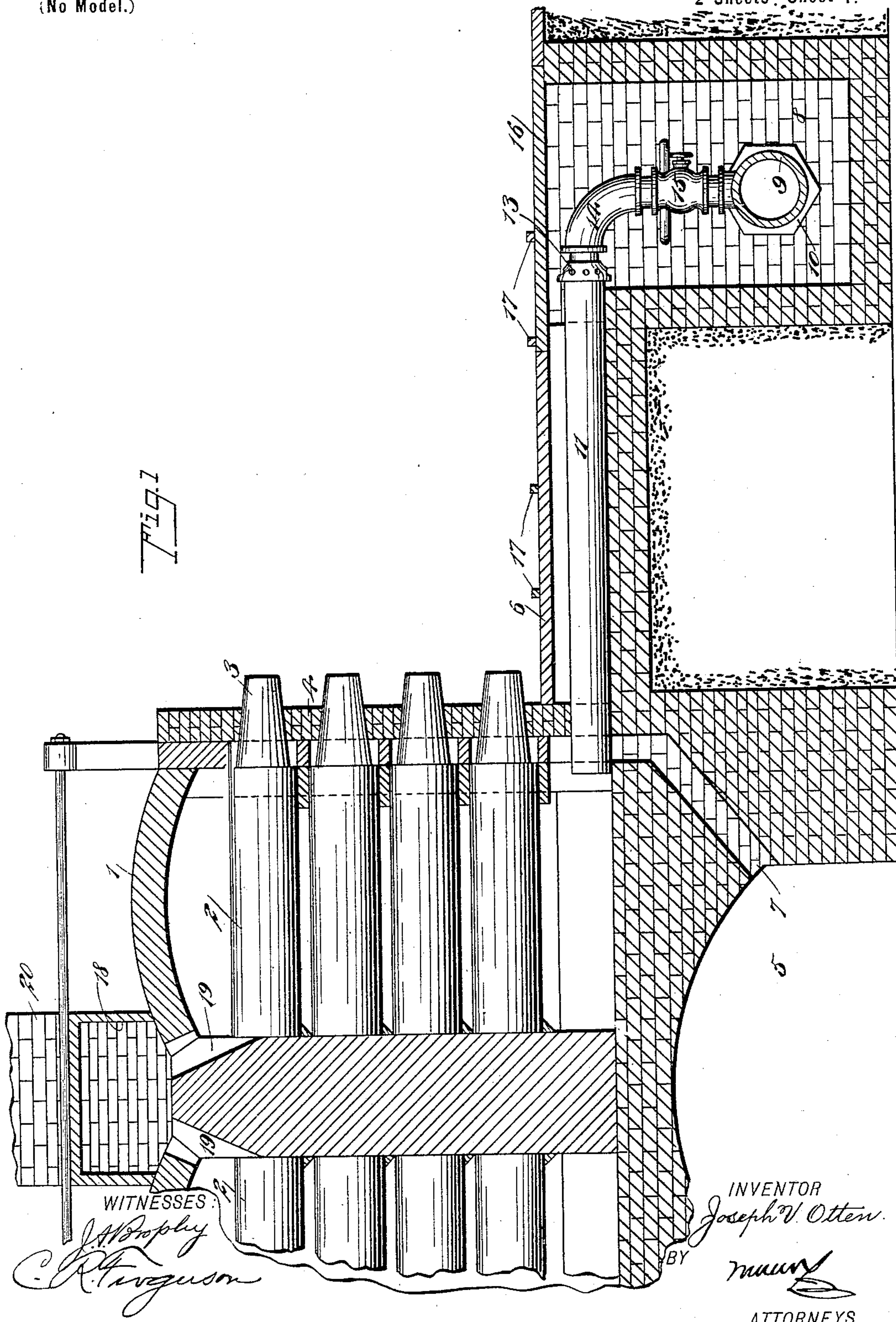
No. 633,035.

Patented Sept. 12, 1899.

J. V. OTTEN.
SMELTING FURNACE.
(Application filed Feb. 3, 1899.)

(No Model.)

2 Sheets—Sheet 1.



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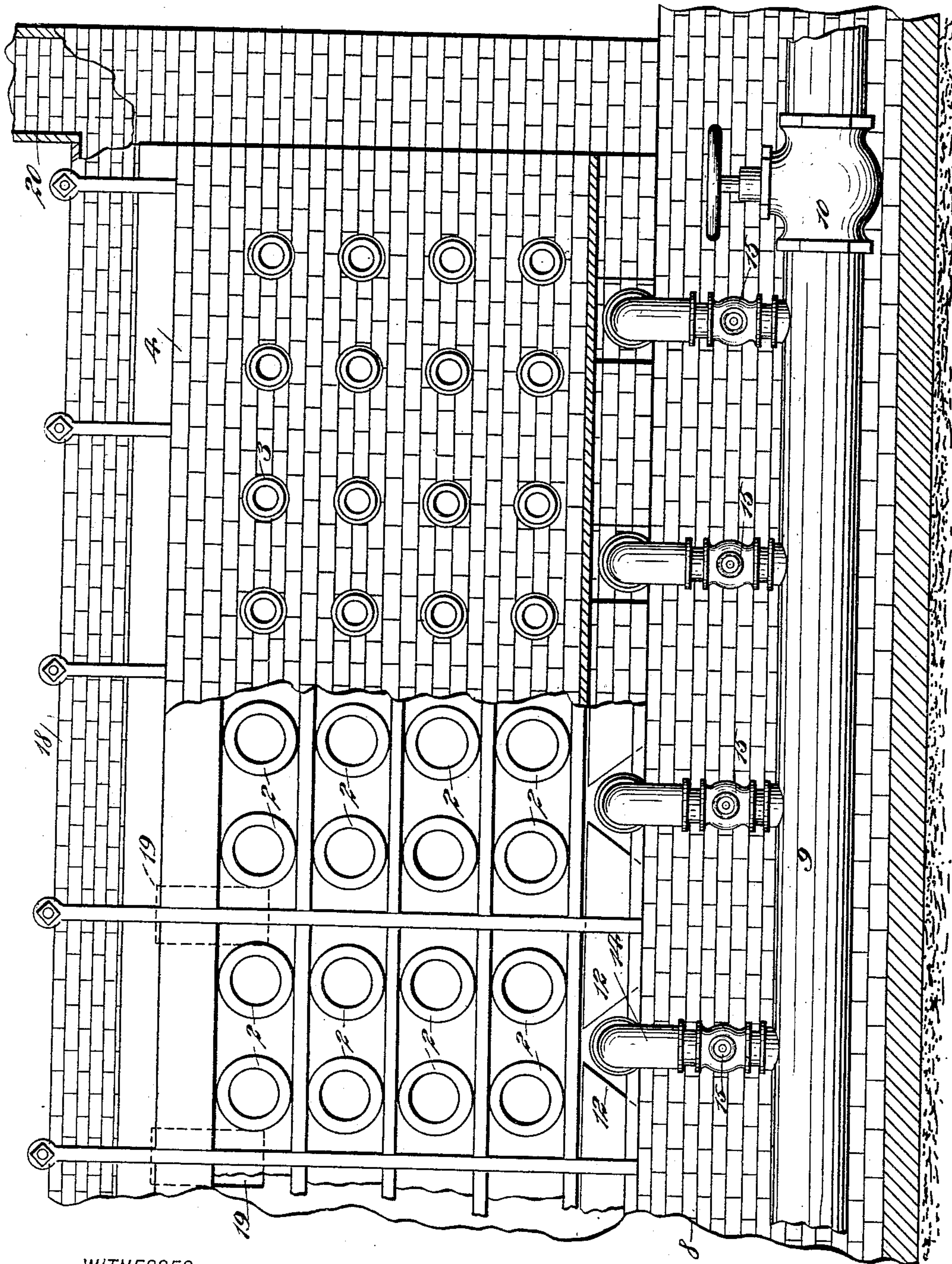
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WITNESSES:

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Fig. 2

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UNITED STATES PATENT OFFICE.

JOSEPH VICTOR OTTEN, OF IOLA, KANSAS.

SMELTING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 633,035, dated September 12, 1899.

Application filed February 3, 1899. Serial No. 704,382. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH VICTOR OTTEN, of Iola, in the county of Allen and State of Kansas, have invented a new and Improved Smelting-Furnace, of which the following is a full, clear, and exact description.

This invention relates more particularly to improvements in zinc-smelting furnaces in which natural gas is used as a fuel.

10 In the general method of using natural gas for fuel in zinc-smelting there is an enormous waste of gas and considerable expense attached for manipulation—that is, the furnaces as now constructed require a power
15 plant, with its attendant expense of maintenance, for driving large blowers to produce artificial draft for the purpose of consuming the gas; but such result is far from being accomplished, as evidenced by the volumes
20 of smoke emitted from the chimneys and the condensation of carbon upon the retorts. Besides, a high-salaried man is required to tend the gas and air supply, which is derived from separate sources. If there is an excess of
25 gas, there will be a deposit of carbon, and if air is in excess there is caused a premature failure of the retorts by the blowpipe action of the intensely-hot flame at each air-opening. In the furnaces as now built the gas is
30 introduced undiluted at one end and the air is forced in in varying quantities through openings in the front wall of the furnace, and at these openings is where the blowpipe action is produced. The chimney is placed at
35 the opposite end from where the gas enters, the object being to consume all the gas, but with the result above mentioned.

An object of my present invention is to reduce the cost of construction and operation
40 of the smelting-furnaces by so constructing them that the use of a blower plant is made unnecessary, as I find that natural gas has enough initial pressure (about three hundred and fifty pounds to the square inch) to draw
45 in all the air necessary through properly-constructed burners for its perfect combustion.

A further result or object of my construction of furnace is to produce a soft glowing flame heat in the retort-chamber and avoiding all blowpipe action, and, further, to so
50 arrange the flue-openings that the heated gases pass between and around each bank of

retorts before passing out at the flue-opening, which is opposite from the side of retorts where the heat is introduced.

I will describe a smelting-furnace embodying my invention and then point out the novel features in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, 60 in which similar characters of reference indicate corresponding parts in both figures.

Figure 1 is a transverse vertical section of a smelting-furnace embodying my invention, and Fig. 2 is a partial section and partial ele- 65 vation thereof.

Referring to the drawings, 1 designates a furnace, which may be of any desired length and in which the retorts 2 are arranged in tiers, the said retorts having their condensers 70 3 extended outward through the front wall 4 of the furnace. These retorts are of the usual construction and need not be further described.

Underneath the furnace is a cellar 5 for receiving ashes and the like, which may be discharged from the platform 6 at the lower portion and at the front of the furnace through chutes 7. Arranged in a subway 8 and extended lengthwise of the furnace is a high- 80 pressure gas-pipe 9, provided at its inlet end with a regulating-valve 10, by means of which the entrance of gas may be regulated to equalize the pressure through the several burners 11. The burners 11 pass through the front 85 wall between inclined surfaces of deflector-blocks 12, arranged within the furnace. The opening between the deflector-blocks is so arranged as to direct the gas upward between adjacent tiers of retorts 2. At the outer ends 90 of the burners are air-inlets 13, and the shells in which the air-inlets are formed are connected by pipes 14 with the main pressure-pipe 9, and each pipe 14 is provided with a valve 15, so that the supply through any of 95 the burners may be cut off, as desired. On the top of the subway is a removable cover 16, which conveniently may be made in sections, so that a section may be lifted when it is desired to reach one of the valves 15 or to reach the controlling-valve 10. On the cover or on the platform suitable tracks 17 are arranged for the movement of small cars. 100

Extended along the top of the furnace is a

main flue 18, which communicates at intervals with the interior of the furnace through flue-openings 19, and at one end the flue 18 communicates with a take-off or chimney 20.

5 It will be seen that the flue-openings 19 are located at the opposite side of a tier of retorts to that at which the gas enters, so that the flame will be caused to circulate freely around and between the several retorts before
10 it passes into the main flue and discharges through the chimney.

In operation the gas under pressure passing through the burners will draw a supply of air through the openings 13, causing a
15 thorough mixture of said gas and air as it is discharged from the burner, thus promoting and insuring complete combustion.

It is obvious that the structural arrangement of the parts as here shown and described
20 may be departed from to a considerable extent without affecting my invention, a main feature of which is the automatic means for providing the air-supply.

While I have mentioned the furnace as particularly adapted for the use of natural gas,
25 it is obvious that artificial gas may be used.

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

30 1. A smelting-furnace provided with retorts arranged in pairs side by side and in tiers, one retort above the other, a main gas-pipe, a controlling-valve in said gas-pipe, burners communicating with said gas-pipe and extending into the interior of the furnace below
35 the front ends of the retorts, and located in line between the retorts of each pair of tiers, the said burners being provided with air-inlets, and a flue extending along the upper
40 portion of the furnace adjacent to the rear ends of the retorts and provided with flue-openings located between adjacent pairs of tiers of retorts, the said flue-openings being located at the opposite side of the retorts to
45 that at which the heat is applied, substantially as specified.

2. A smelting-furnace, provided with tiers of retorts arranged therein, a flue extending along the upper portion of the furnace and
50 communicating with the chimney, the said flue communicating with the interior of the furnace through flue-openings at one side of the tiers of retorts, a main gas-pipe, burners extending from said main gas-pipe into the
55 furnace at the sides of the retorts opposite that of the flue-openings, deflector-blocks within the furnace between which the burners pass, the said blocks having inclined surfaces to direct the heated gases upward between adjacent tiers of retorts, and means for
60 admitting air to said burners, substantially as specified.

3. In a zinc-smelting furnace, a main flue extending along the top of the furnace, retorts arranged in the furnace in tiers, a main

gas-pipe arranged in a subway forward of the furnace, a controlling-valve in said pipe, gas-burners extending into a chamber in the furnace below the retorts and having valve-controlled connection with the gas-pipe, the said
70 burners being provided at their outer ends with means for admitting air, and deflector-blocks arranged within the furnace and having inclined surfaces between which the gas-burners pass, the said deflecting-surfaces directing the heated gases upward between adjacent tiers of retorts, the main flue being provided with flue-openings communicating with the upper part of the furnace the said
75 flue-openings being located at the opposite side of a tier of retorts to that at which the gas enters, substantially as specified. 80

4. In a zinc-smelting furnace, retorts arranged in the furnace in tiers, a flue at the upper part of the furnace and provided with
85 openings located between adjacent pairs of tiers, gas-burners extending into a chamber below the retorts and located in line between the retorts of each pair, the said burners having shells at their outer ends provided with
90 air-inlets whereby the gas under pressure passing through said burners will draw in the necessary air, a pipe for receiving gas under pressure, arranged in a subway and provided with a regulating-valve, and pipes provided
95 with valves and connecting the said shells of the burners with the main gas-receiving pipe, substantially as described.

5. A smelting-furnace provided with retorts arranged therein in tiers, a flue extending along the upper portion of the furnace above the inner ends of the retorts, and communicating with the interior of the furnace through flue-openings at one side of the tiers of retorts, and burners extending into the
105 furnace below the outer ends of the retorts and arranged at the sides of the retorts opposite that of the flue-openings, the flue-openings and burners being arranged alternately between the tiers of retorts, the said furnace being provided with deflectors having inclined surfaces between which the burners extend
110 substantially as set forth.

6. A smelting-furnace, having retorts arranged therein, in tiers, a main gas-pipe, a
115 controlling-valve in said pipe, and burners communicating with said gas-pipe and provided with air-inlets, the said burners extending into combustion-chambers located below the retort-chamber proper, the combustion-chambers having inclined side walls converging upward, and opening at the top between adjacent tiers of retorts whereby the retorts are protected from the intense heat of the gas-flame as it issues from the burners, substantially
125 as described.

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Witnesses:

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