

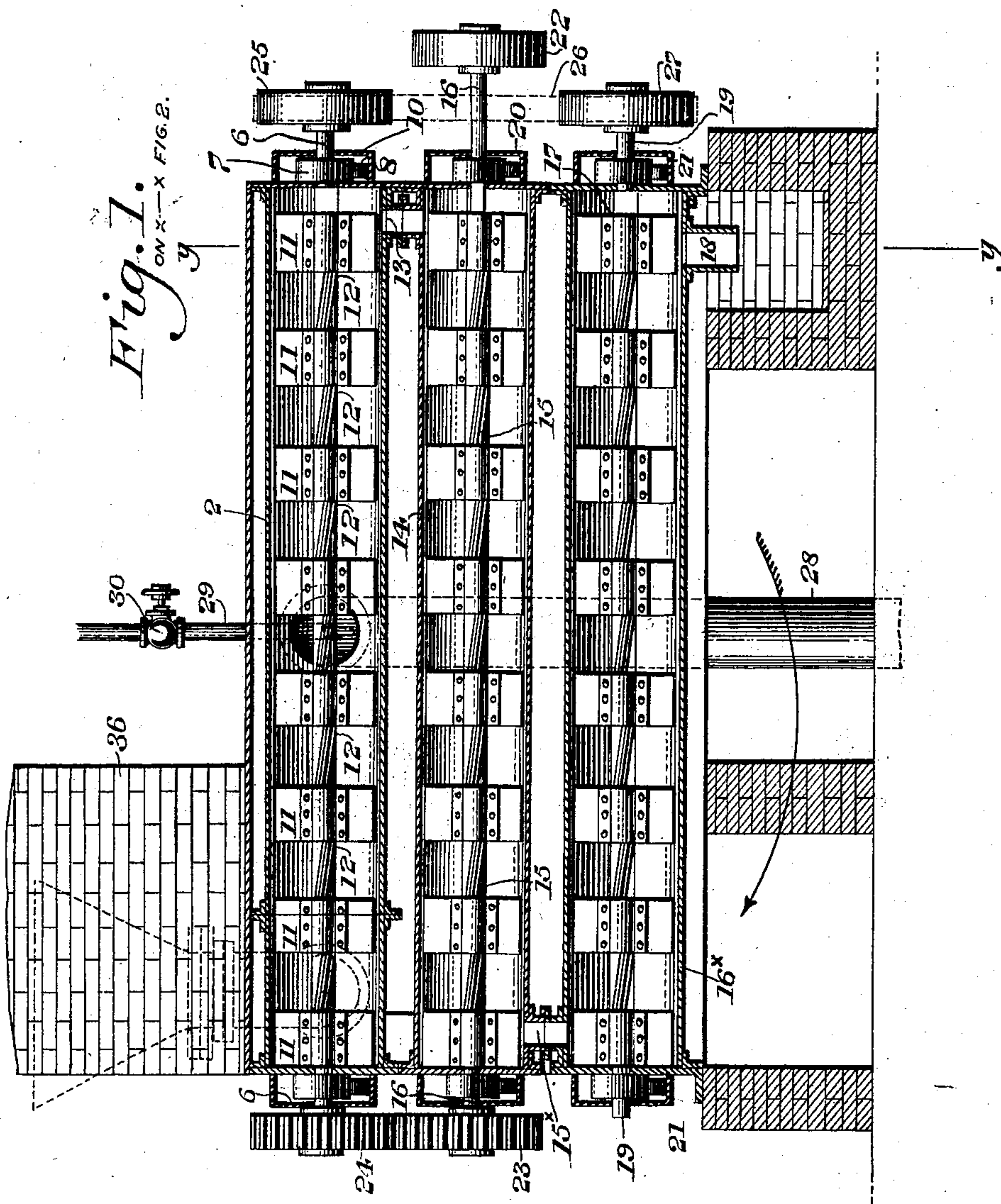
No. 724,942.

PATENTED APR. 7, 1903.

G. F. RENDALL.
ORE ROASTING FURNACE.
APPLICATION FILED JUNE 7, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses

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L. Bourville.

Inventor

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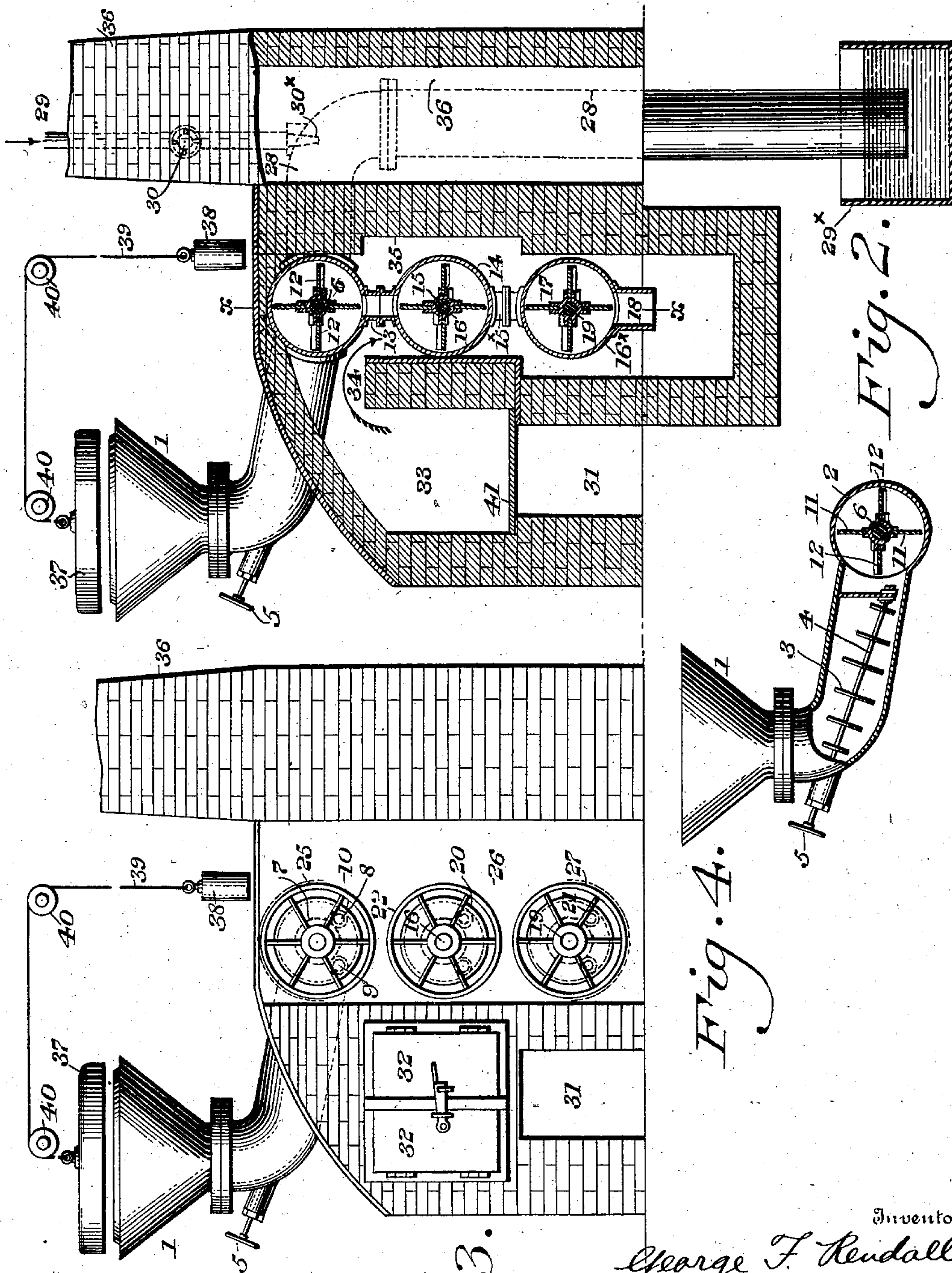
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Fig. 3.

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UNITED STATES PATENT OFFICE.

GEORGE F. RENDALL, OF NEW YORK, N. Y.

ORE-ROASTING FURNACE.

SPECIFICATION forming part of Letters Patent No. 724,942, dated April 7, 1903.

Application filed June 7, 1902. Serial No. 110,602. (No model.)

To all whom it may concern:

Be it known that I, GEORGE FREDERICK RENDALL, a subject of the King of Great Britain, residing in the city, county, and State of New York, have invented a new and useful Improvement in Ore-Roasting Furnaces, of which the following is a specification.

My invention consists of an improved construction of an ore-roasting furnace wherein the ore is treated in an expeditious and economical manner; and it consists of the novel features of construction, which will be hereinafter fully set forth, and pointed out in the claims.

Figure 1 represents a longitudinal sectional view of an ore-roasting furnace embodying my invention, the section being taken on line *xx*, Fig. 2. Fig. 2 represents a section on line *yy*, Fig. 1. Fig. 3 represents an end elevation of Fig. 1. Fig. 4 represents a sectional view showing the hopper and its adjuncts.

Similar numerals of reference indicate corresponding parts in the figures.

1 designates the hopper of the furnace, into which any kind of ore suitably crushed and containing volatile material is introduced, said ore being forced into the upper retort 2 by any suitable conveyer, as 3, mounted on the shaft 4, which is journaled into suitable bearings and actuated, when desired, by the hand-wheel or other device 5. The ore upon entering the upper retort 2 is propelled longitudinally thereof, in the present instance from left to right, as seen in Fig. 1, by means of a conveyer or agitator consisting of the shaft 6, which has suitable bearings in the ends of said retort and which is further provided with ball-bearings consisting of the large roller 7, which rests upon the smaller rollers 8 and 9, which latter freely revolve in a suitable case 10, this construction of ball-bearings being employed at each end of the shaft 6, and as the construction of each is substantially the same a description of one will suffice for all.

The shaft 6 is provided with a series of wings or blades 11 and 12, which are arranged in staggered order, as will be understood from Figs. 1 and 2, it being understood that the blades 12 are turned axially slightly with respect to the shaft 6, as will be understood from Fig. 1, whereby the ore is propelled and

agitated and not permitted to settle at any one point, whereby matting is prevented. The ore is propelled from left to right in the present instance, as seen in Fig. 1, until it reaches the opening 13, through which it passes into the retort 14 and is propelled from right to left therein by an agitator and conveyer 15, mounted on the shaft 16 and constructed substantially like the agitator seen in the retort 2. The ore on reaching the left-hand end of the retort 14 is propelled through the opening 15^x into the retort 16^x, wherein it is propelled from left to right by the agitator or conveyer 17, mounted on the shaft 19, until it reaches the discharge-opening 18, where it is received and withdrawn by any suitable means. The shafts 16 and 19 are provided with ball-bearing devices at each end 20 and 21, respectively, which are of the same general construction as the ball-bearing devices described with reference to the shaft 6, said shafts and their adjuncts being operated by means of power applied to the pulley 22, wherefrom it will be seen that the rotation of the shaft 16 is transmitted to the gear 23, thence to the gear 24, thence to the shaft 6, and from the pulley 25, mounted thereon, by suitable power-transmission devices 26 to the pulley 27, whereby the shaft 19 and its adjuncts are rotated, it being apparent that the direction of rotation of said shafts and their adjuncts is such that the ore will be caused to travel in the directions stated, and that, furthermore, any suitable power-transmission devices may be employed other than those shown.

28 designates a pipe leading downwardly out of the upper retort 2 and having a steam-blast discharged thereinto from the pipe 29 through the nozzle 30^x, said pipe 29 having a suitable valve 30. This steam-blast creates a draft in the pipe 28, whereby the sulfurous gases are withdrawn and a current of induced oxygen is created through the retorts, said pipe 28 discharging into a suitable water or other liquid seal 29^x.

The source of heat for my improved furnace may be coal, coke, gas, or any of the petroleum products. In the present instance I have shown the retorts as being heated in a suitable reverberatory furnace, wherein 41 designates the grate-bars, 31 the ash-pit, and

32 the firing-doors, the products of combustion passing from the chamber 33 through the throat 34 and thence downwardly through the flue 35 to the stack 36 by suitable flues and passages, which I have not deemed it necessary to describe in detail, since their construction will be familiar to those skilled in this art.

If desired, the hopper 1 may be provided with a cover 37, which may be counterbalanced by the weight 38, connected to said cover by the connection 39, which passes over the pulleys 40.

The operation will be readily understood. The material to be treated is introduced into the retort through the hopper and is propelled along the same and in its passage is thoroughly heated by reason of the products of condensation from the chamber 33 passing around the same, the ore passing through the opening 13 and into the retort 14, where a similar operation occurs, the ore being still heated, and from thence it passes through the opening 15^x into the retort 16^x, and from thence passes through the discharge-opening 18 in any suitable receptacle, the steam-blast meanwhile being operated in the pipe 28, creating a draft therein which draws off the sulfurous gases, which are carried to a suitable water-receptacle or liquid seal 29^x, it being seen that by this operation the ore is thoroughly reduced to a proper condition for operation and for permitting the escape of the gases therefrom, since the same is thoroughly agitated and heated as above described.

It will be evident that changes may be made by those skilled in this art which will come within the scope of my invention, and I do not, therefore, desire to be limited in every instance to the exact construction herein shown and described.

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

1. In an ore-roasting furnace, a retort, a

conveyer suitably mounted therein, means for rotating said conveyer, a second retort situated adjacent said first-mentioned retort, a passage forming a communication between the interior of said retorts, a conveyer in the second-mentioned retort, means for rotating said conveyer in an opposite direction from the line of travel of the conveyer in the first-mentioned retort, a pipe leading downwardly from the uppermost retort near its mid-length, a steam-blast located to discharge directly into the vertical portion of said pipe and a nozzle on the end of the steam-blast pipe within the pipe leading from the uppermost retort.

2. In an ore-roasting furnace, a hopper, a retort, a conveyer suitably mounted therein, means for conducting the ores from the hopper to the retort, means for rotating the conveyer, a second retort situated adjacent said first-mentioned retort, casings around said retorts, roller-bearings in said casings for the shafts of the conveyers, a conveyer within the second retort, means for rotating said conveyer in an opposite direction in the line of travel of the conveyer in the first-mentioned retort, a third retort communicating with the second retort at the end opposite its communication with the first retort, a conveyer in the last-mentioned retort having its shaft mounted on roller-bearings, means for driving said conveyer in a direction opposite to the line of travel of the conveyer in the second-mentioned retort, passages forming communication between the interior of said retorts at alternately opposite ends, a pipe leading downwardly from the uppermost retort near its mid-length, a steam-blast located to discharge directly into the vertical portion of said pipe, and a nozzle on the end of the steam-blast pipe within said pipe leading from the uppermost retort.

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Witnesses:

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