

No. 820,088.

PATENTED MAY 8, 1906.

J. W. BOILEAU.  
ORE ROASTER.

APPLICATION FILED JUNE 13, 1903.

2 SHEETS—SHEET 1.

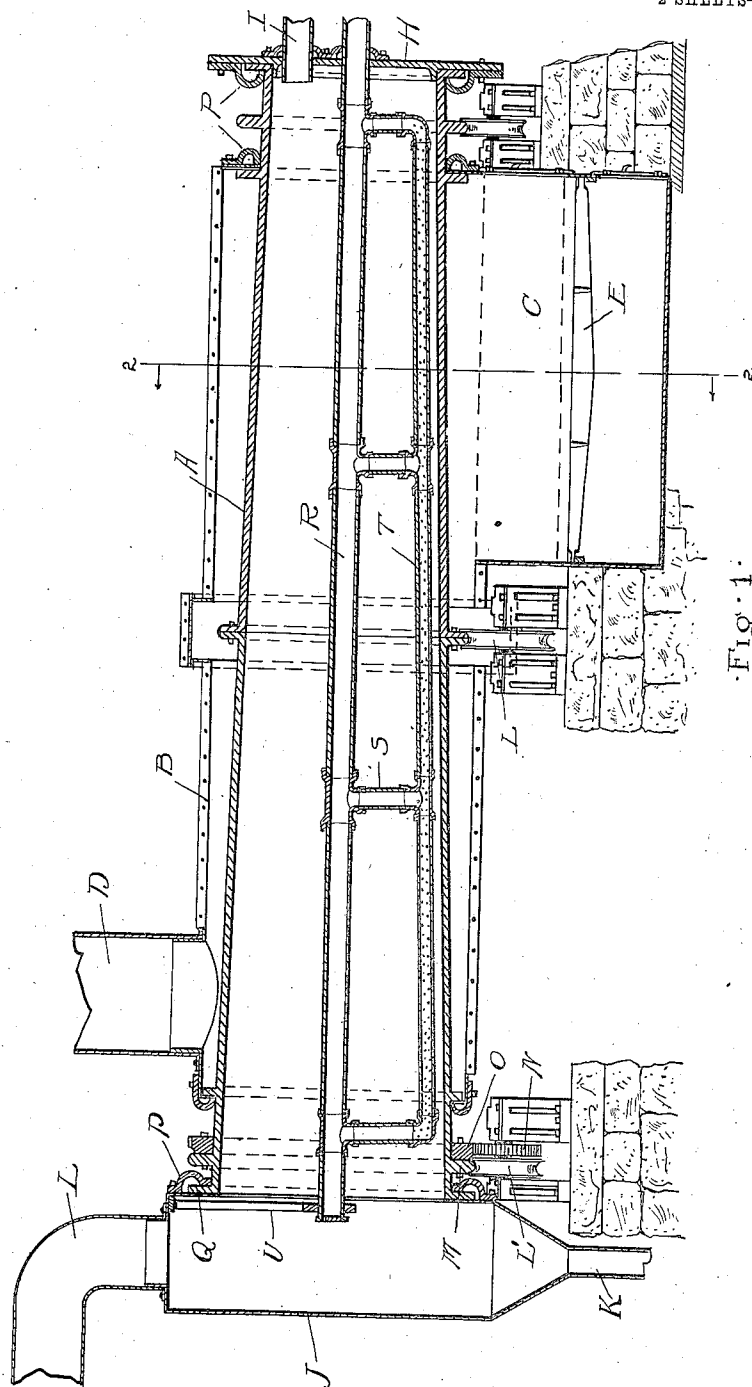


Fig. 1.

WITNESSES  
*Geo. H. Crook*  
*Geo. P. Barry*

BY

INVENTOR  
JAMES W. BOILEAU.  
*James Whittemore*  
ATT'Y.

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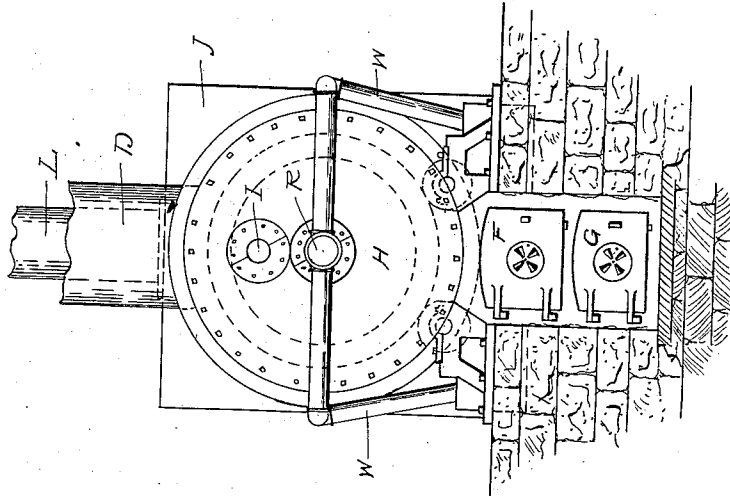


Fig. 3.

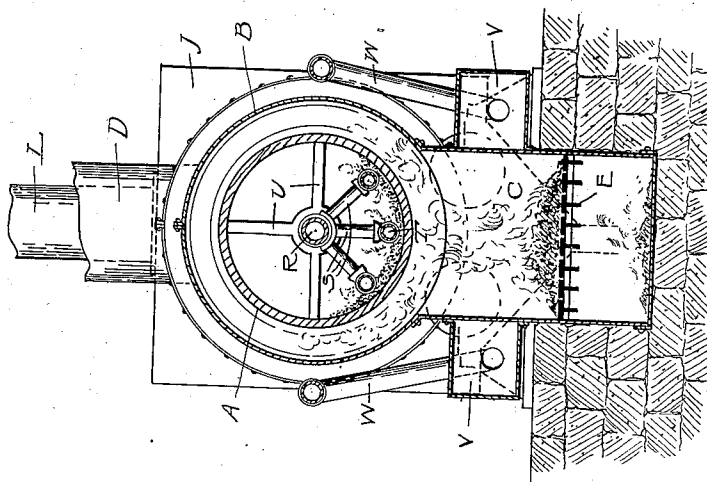


Fig. 2.

WITNESSES

*Geo. H. Grove*  
*Jas. P. Barry*

INVENTOR

JAMES W. BOILEAU.

BY

*James Whittemore*  
ATT'Y.

# UNITED STATES PATENT OFFICE.

JAMES W. BOILEAU, OF DETROIT, MICHIGAN, ASSIGNOR TO LOUIS C. SHERWOOD, OF DETROIT, MICHIGAN.

## ORE-ROASTER.

BEST AVAILABLE COPY

No. 820,088.

Specification of Letters Patent.

Patented May 8, 1906.

Application filed June 13, 1903. Serial No. 161,247.

*To all whom it may concern:*

Be it known that I, JAMES W. BOILEAU, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Ore-Roasters, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to apparatus intended for use in the roasting of ores.

It is the object of the invention to obtain a construction in which the ore is heated in a closed retort by external heating means and is at the same time subjected to internal treatment by a gaseous medium which acts chemically thereon.

The invention consists in the peculiar construction of a revoluble retort arranged within a heating-chamber and provided with an internal perforated conduit through which the gaseous medium for treating the ore is introduced.

The invention further consists in the construction and arrangement by which the gas for internal treatment is generated by the heat of the furnace, which also heats the retort, and, further, in the peculiar construction, arrangement, and combination of parts, as hereinafter described and claimed.

In the drawings, Figure 1 is a longitudinal section through the apparatus. Fig. 2 is a cross-section thereof, and Fig. 3 is an end elevation.

In the present state of the art it is common to provide apparatus for roasting ore in which the ore is fed through a revoluble casing and is simultaneously subjected to heat within the casing. It is also common to heat the ore in a revoluble retort by applying the heat externally. In the first type of apparatus the internal flame or heated products of combustion may be used both for the purpose of heating and also for the chemical action thereof on the ore. With the second type of apparatus the ore is uniformly heated by the flame, but is not chemically acted upon.

The apparatus which forms the subject-matter of this invention combines the advantages of both types of apparatus above referred to, first, by heating the ore chiefly by the external heating means, and, second, by

providing for the introduction into the retort of gases for the chemical treatment.

In the construction shown in the drawings, A is the revoluble cylindrical casing, having a substantially horizontal axis of rotation and tapered sufficiently to produce the feeding of the ore from one end to the other of the casing.

B is an outer case or jacket surrounding the cylinder A and provided at one end with the combustion-chamber C and at the opposite end with a connection D to the stack.

E is a grate within the chamber C, and F and G are respectively fuel and ash doors for said furnace.

The revoluble cylinder A is opened at each end; but the outer end is closed by a stationary plate H.

I is an inlet-spout passing through the plate H and adapted to introduce the ore into the cylinder. At the opposite end of the cylinder is a stationary casing J, having at its lower end the discharge-spout K, through which the ore will be delivered after dropping from the cylinder.

L is a conduit connected to the upper end of the casing J and adapted to convey the gases from said chamber and the cylinder A to a collecting apparatus. (Not shown.)

The cylinder A is supported, preferably, upon the antifriction-rollers L', which engage with annular flanges M at the ends and one or more intermediate points in the cylinder. The cylinder is revolved by the engagement of a pinion N with an annular rack O.

To permit of the free rotation of the cylinder and at the same time to form a tight joint with the head H and casing J, packing-rings P are used, which engage with flanges Q on the cylinder. Similar rings are arranged at opposite ends of the outer jacket and engage with similar flanges on the cylinder.

R is a conduit passing longitudinally through the cylinder A, preferably in the line of the axis thereof. The inner end of this conduit is capped, while the outer end passes through the head H.

S represents a plurality of distributing-pipes depending from the conduit R within the cylinder, and T represents longitudinally-extending perforated pipes connected to said distributing-pipes. I preferably employ a number of the perforated pipes T, which are

arranged in parallelism and equidistant from the axis of the cylinder, as shown in Fig. 2. The inner end of the conduit R may be supported by suitable means, such as the depending bracket U on the casing J.

For supplying the gas to the conduit R the generators V are arranged adjacent to the furnace-chamber C, preferably upon opposite sides thereof. These retorts are adapted to receive any suitable material for the generation of the particular gas or gases which it is desired to use in the chemical treatment of the ore.

The apparatus being constructed as shown and described, in operation the combustion of the fuel within the furnace-chamber C will heat the cylinder A. At the same time the cylinder A is revolved through the medium of the pinion N and rack O and the ore is fed into the upper end of the cylinder through the chute I. The heat within the furnace-chamber will also be communicated to the retorts V, vaporizing or gasifying the material contained therein, which gases are conveyed through a connecting-conduit W to the conduit R. From the latter the gases are distributed through the pipes S to the perforated pipes T, where they will escape through the apertures in said pipe, and in case a combustible gas is used will burn in contact with the ore on the bottom of the cylinder.

It will be evident from the operation as above described that the ore will be slowly fed through the cylinder A and during this movement will first be thoroughly heated by the external heat applied to the cylinder and will then be subjected to the actuation of the gases issuing from the pipes T. The result is that a perfectly uniform treatment is given to all portions of the ore, which after leaving the lower end of the cylinder pass out through the spout K, while the gaseous products are conveyed through the pipe L.

One advantage of this form of apparatus is that a comparatively small quantity of gas is required for the chemical treatment of the ore whereas in apparatus of the type in which the ore is roasted solely by the flame requiring a relatively large amount of gas. Thus expensive materials may be used for generating the gas for the conduit R which could not be used for heating the ore.

Another object of the present type of apparatus is that the arrangement of the retorts V adjacent to the furnace-chamber will cause the simultaneous heating of the ore and generation of gases for its chemical treatment.

What I claim as my invention is—

1. A roaster comprising a retort, a furnace for heating the same externally a receptacle arranged outside of but adjacent to the wall

of the furnace and means for simultaneously introducing within said retort a gaseous agent generated within said receptacle for chemically treating the material roasted.

2. A roaster comprising a rotary retort, a surrounding cylindrical casing having at one end a combustion-chamber whereby the products of combustion may surround said retort, a conduit extending centrally through said retort and having apertured branches communicating with the interior surface of the retort, gas-generators secured respectively to the outer surface of the sides of the casing surrounding the combustion-chamber, said generators having communication with said conduit.

3. A roaster comprising a rotary retort revolvable about a substantially horizontal axis, a surrounding combustion-chamber, generators associated with the opposite sides of said combustion-chamber, and a conduit communicating with said generators and extending into said retort having jet-apertures directed against the material on the bottom of said retort.

4. A roaster comprising a rotary retort, tapering from its forward smaller end rearwardly, a combustion-chamber arranged adjacent said smaller end and terminating at its upper portion in an elongated rearwardly-extending cylindrical casing surrounding the retort, and directing the products of combustion around the latter, rectangular gas-generators arranged at the respective sides of the combustion-chamber whereby the heat therefrom will generate the gas in said generators, and conduits connected to the generators, said conduits being connected at their upper ends and terminating in an apertured elongated conduit extending centrally within said retort.

5. A roaster comprising a rotary retort, a combustion-chamber having a portion surrounding the retort, whereby the products of combustion will pass therearound, a gas-generator attached to the outer surface of the wall of the combustion-chamber, said wall of the combustion-chamber constituting one wall of the gas-generator, whereby the material in said generator will be in direct contact with the wall of the combustion-chamber to be generated thereby, and a conduit connected to the generator and terminating in an apertured elongated conduit extending centrally within said retort.

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

JAMES W. BOILEAU.

Witnesses:

JAS. P. BARRY,  
H. C. SMITH.