

No. 721,478.

PATENTED FEB. 24, 1903.

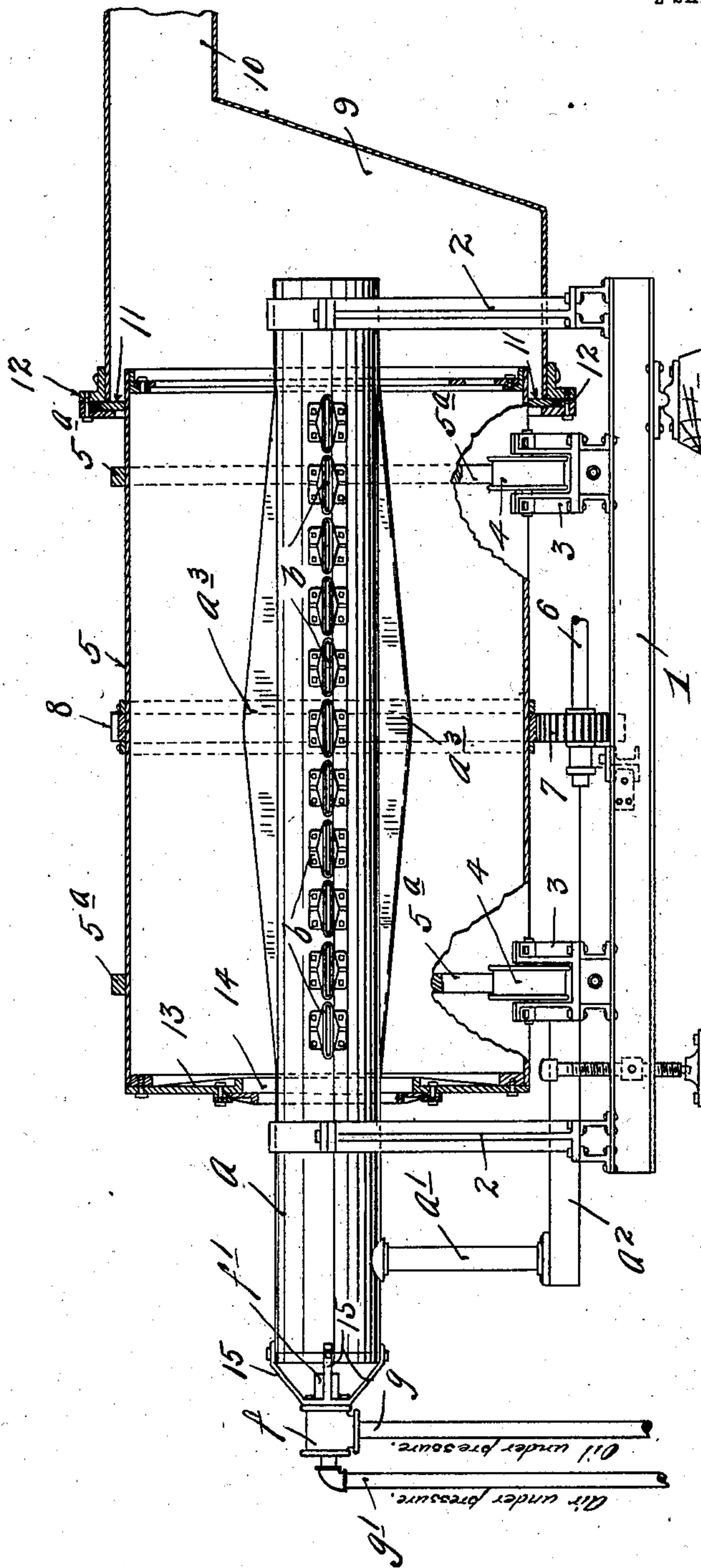
J. C. TELLER.  
APPARATUS FOR GENERATING AND BURNING GAS.

APPLICATION FILED MAY 6, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.



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John C. Teller.  
By his Attorneys,  
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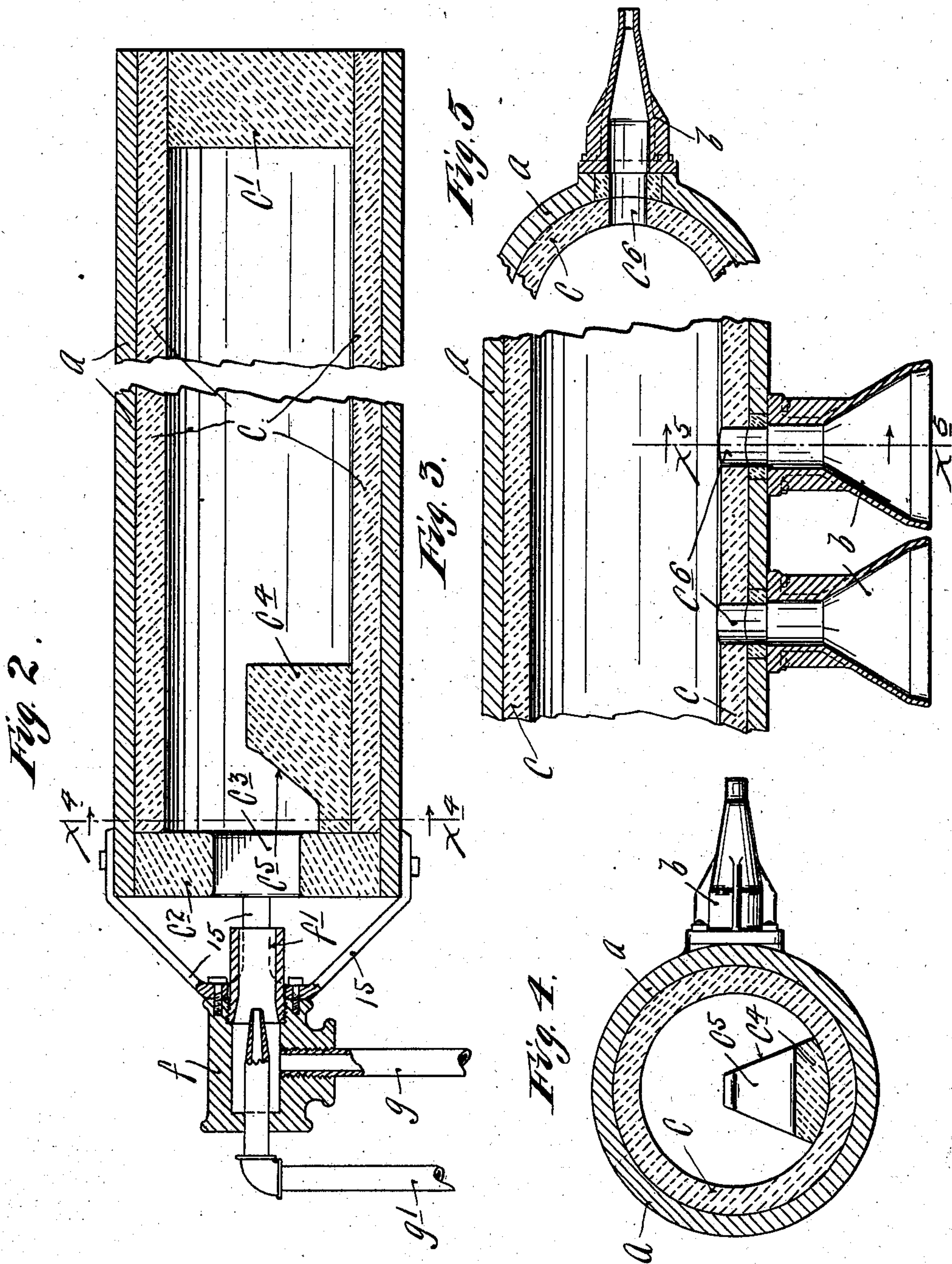
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# UNITED STATES PATENT OFFICE.

JOHN C. TELLER, OF MINNEAPOLIS, MINNESOTA.

## APPARATUS FOR GENERATING AND BURNING GAS.

SPECIFICATION forming part of Letters Patent No. 721,478, dated February 24, 1903.

Application filed May 6, 1902. Serial No. 106,111. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN C. TELLER, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Apparatus for Generating and Burning Gas; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention has particular reference to that type of ore-roasting furnace set forth and claimed in my prior patent, No. 649,999, of May 22, 1900, entitled "Ore-roasting furnace," and is especially directed to the provision of improved means for generating and burning gas formed by the commingled air and oil.

To the above ends the invention consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

The invention is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Figure 1 is a view, partly in side elevation and partly in vertical section, showing an ore-roasting furnace of the type disclosed in my said prior patent, but having applied thereto my improved generating and burning device. Fig. 2 is a longitudinal vertical section taken centrally through the so-called "primary" combustion chamber or tube and coöperating atomizer, some parts being broken away. Fig. 3 is a horizontal section taken centrally through an intermediate section of the said primary combustion chamber or tube. Fig. 4 is a transverse section taken on the line  $x^4 x^4$  of Fig. 2; and Fig. 5 is a detail in transverse section taken on the line  $x^5 x^5$  of Fig. 3, some parts being broken away.

Those devices which are herein shown and which are also disclosed in my prior patent above identified may be briefly described as follows:

To a platform or supporting-frame 1 is rigidly secured a pair of pedestals 2 and roller-bearing brackets 3, in the latter of which are journaled flanged drum-supporting rollers 4.

A rotary drum 5, which serves as a secondary combustion-chamber, is provided with peripheral hoops 5<sup>a</sup>, which run over the rollers 4, and thus support the former from the latter with freedom for rotary motion on an approximately horizontal axis. Rotary motion is imparted to the drum 5 from a power-driven shaft 6, mounted in suitable bearings on the platform 1 and provided with a pinion 7, which meshes with an annular gear 8, secured on the periphery of said drum. A breeching 9, having an outlet-tube 10, embraces the open delivery end of the drum 5, a close and flexible joint being made therewith by a packing-ring 11, loosely seated in a grooved collar 12 on the receiving end of said breeching. The receiving end of the drum 5 is partially closed by a head 13, having a central passage 14.

The character  $a$  indicates a long and quite large tube, which, as shown, extends axially through the drum 5, with its ends projecting therefrom and supported by the pedestals 2. The receiving end of the said tube is, as shown, also supported by a post  $a'$ , which rises from a beam  $a^2$ , secured to the platform 1 in any suitable way. The tube  $a$  is also shown as provided with longitudinal ribs  $a^3$ , which prevent sagging thereof at its intermediate points when the tube is highly heated. At one side and within the drum the tube  $a$  is provided with a plurality of twyers  $b$ , which are flattened in a horizontal plane, so that the several twyers project a flame in a thin sheet extending nearly approximately from end to end of the drum. The interior of the tube  $a$  is lined with fire-clay or similar material which is capable of being heated to incandescence. This lining is indicated at  $c$ . The inner end of the tube  $a$  is closed by a plug or block  $c'$ , preferably of the same material as the lining  $c$ . At its outer or receiving end said tube  $a$  is partially closed by a throat-piece  $c^2$ , having a central passage affording a throat-opening  $c^3$ . Just within the receiving end of the tube  $a$ , close to the throat-piece  $c^2$ , is a deflecting-block  $c^4$ , of fire-clay or similar material capable of being heated to incandescence. In cross-section this deflecting-block  $c^4$  has preferably the form of a truncated wedge, and adjacent to the throat-



opening  $c^3$  it is formed with an inclined deflecting-surface  $c^5$ , all for an important purpose, which will later appear.

The lining  $c$  of the tube  $a$  is provided with lateral perforations  $c^6$  in line with the axial passages in the twyers  $b$ .

A vapor of commingled air and oil is by a suitable atomizer delivered into the tube  $a$  under pressure through the throat-opening  $c^3$ . Of the parts of this atomizer,  $f$  is a hollow head, shown as supported from the tube  $a$  by a bracket 15 and having a nozzle-tube  $f'$ , and  $g$  and  $g'$ , respectively, are oil and air delivery pipes, which open into the said head  $f$ . The nozzle-tube  $f'$  stands in axial line with the perforation  $c^3$  and preferably terminates slightly outward thereof, so as to leave a free passage through which an auxiliary supply of air may be drawn to support the combustion within the tube  $a$  and at the twyers  $b$ . The air-tube  $g'$  terminates in axial line with the nozzle-tube  $f'$ , and the oil-pipe  $g$ , as shown, opens through the bottom of the head  $f$ . The air and oil tubes will in practice lead from suitable devices for delivering the air and oil, respectively, under pressure. The commingled air and oil in more or less vaporized form will be blown through the throat-opening  $c^3$  into the tube  $a$  and directly against the inclined surface  $c^5$  of the deflecting-block  $c^4$  and will thereby be more thoroughly vaporized and commingled. Furthermore, under the intense heat from the furnace or from the combustion within the roasting-drum or secondary combustion-chamber 5 the lining  $c$  and deflecting-block  $c^4$  will be very highly heated, usually to a state of incandescence. Hence the commingled vapor by its contact with the said deflecting-block  $c^4$ , and especially by its subsequent contact with the incandescent lining  $c$ , will be highly heated and thereby converted into a gas. In fact under this intense heat the gases thus generated will be ignited and a partial combustion thereof will take place within the said tube  $a$ . For this reason the said tube may very properly be designated as the "primary" combustion-chamber. The gas, while thus very highly heated and in a state of partial combustion, will be forced out through the twyers and into the secondary or roasting chamber—to wit, in the construction illustrated into the rotary drum 5, where the complete combustion thereof will take place. With the apparatus illustrated the flames from the twyers will be projected against the crushed ore-bearing rock while the same is, under the

rotary movement of the drum, being subjected to a rolling action, all as clearly set forth in my said prior patent.

The above-described process of generating and burning the gas and the apparatus by which it may be carried into effect I believe to be broadly new. By practical tests I have demonstrated its efficiency and superiority over all of those devices which ignite the gas only at the final point of combustion or as the commingled air and gas are discharged from the twyers or burners. The device described is, in fact, capable of use for generating a gas from commingled air and crude petroleum and then burning the same with great efficiency.

The statement in the specification and claims that the combustion-tube is open at its receiving end is used in a broad sense to mean that in one way or the other air-supplying and oil-supplying passages open through said end.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. The combination with a roasting-chamber, of a combustion-tube open at one end and closed at the other end, extending into said roasting-chamber and provided with laterally-projecting twyers, and means for delivering into the open end of said tube, commingled air and oil, under pressure, substantially as described.
2. The combination with a rotary roasting-chamber or drum, of a combustion-tube open at one end and closed at the other end, extending longitudinally into said roasting-chamber and provided with laterally-projecting twyers, and means for delivering into the open end of said tube, commingled air and oil, under pressure, substantially as described.
3. The combination with a secondary combustion-chamber, of the combustion-tube  $a$ , extending into the same and provided with laterally-projecting twyers, which tube is open at one end, closed at the other and is provided with the lining  $c$  and deflecting-block  $c^4$  of a refractory material capable of being heated to incandescence, and an atomizer for delivering into the open end of said tube  $a$ , commingled air and oil, under pressure, substantially as described.

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

JOHN C. TELLER.

Witnesses:

H. M. FREEMAN,  
J. H. BLANCHARD.