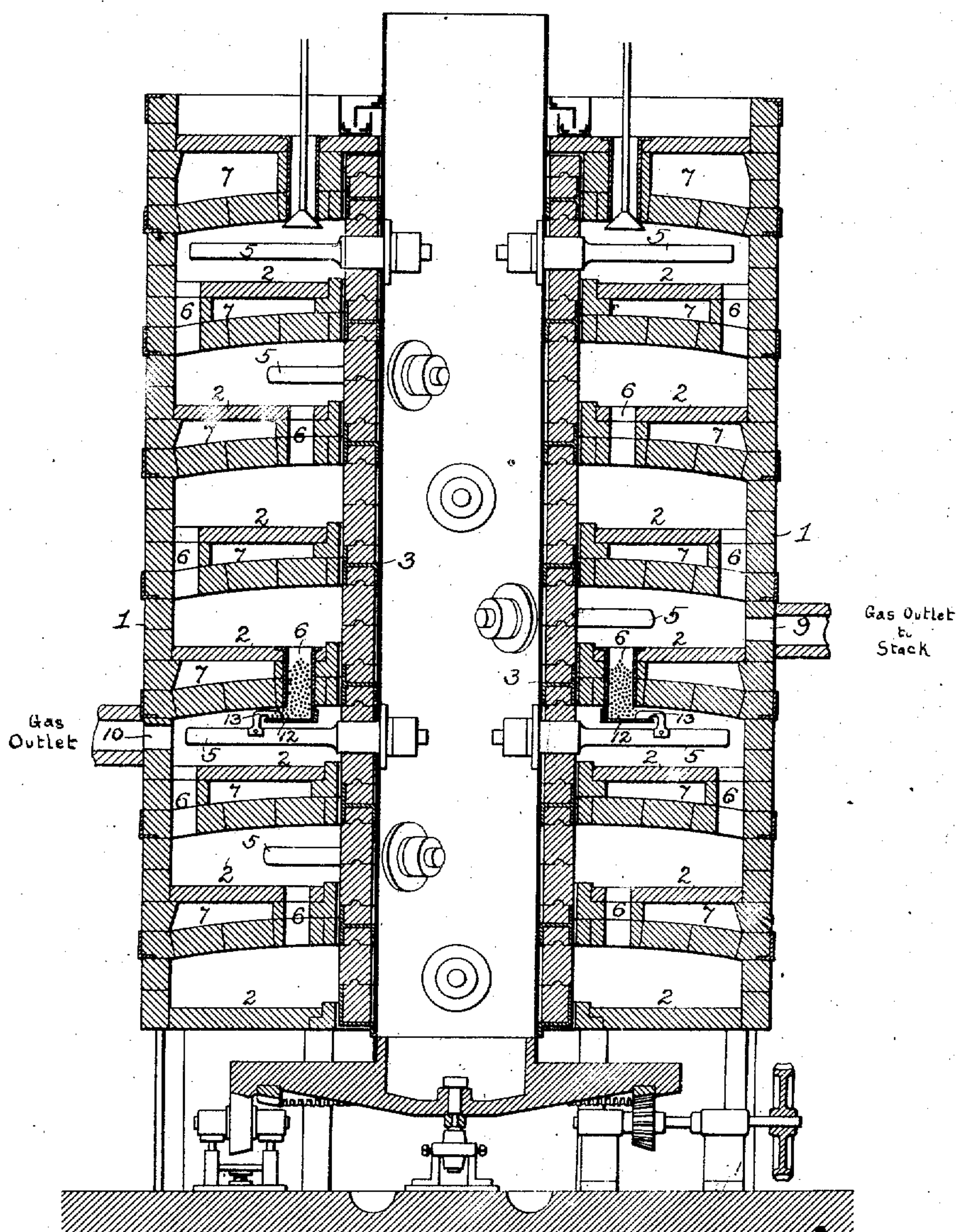


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ORE ROASTING FURNACE.  
APPLICATION FILED OCT. 18, 1909.

966,277.

Patented Aug. 2, 1910.



Witnesses  
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# UNITED STATES PATENT OFFICE.

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## ORE-ROASTING FURNACE.

966,277.

Specification of Letters Patent.

Patented Aug. 2, 1910.

Application filed October 18, 1909. Serial No. 523,180.

*To all whom it may concern:*

Be it known that I, UTLEY WEDGE, a citizen of the United States, residing in Ardmore, Pennsylvania, have invented certain  
5 Improvements in Ore-Roasting Furnaces, of which the following is a specification.

The object of my invention is to so construct a furnace for roasting ores, or for like purposes, as to provide for the more  
10 effective treatment of certain materials therein than is possible with furnaces of the usual construction. This object I attain in the manner hereinafter set forth, reference being had to the accompanying drawing,  
15 which represents, in vertical longitudinal section, a furnace constructed in accordance with my invention.

My invention is applicable to any furnace of that type which employs a plurality of superposed hearths, and in which the material to be treated is first deposited upon the uppermost hearth and then descends  
from hearth to hearth of the series.

In the drawing, I have shown a furnace  
25 similar in its general construction to that forming the subject of a number of my prior patents, 1 representing the outer wall of the furnace, 2 the superposed hearths, and 3 the central hollow shaft carrying the radial  
30 arms 5 which project into the working chambers of the furnace and are intended to carry stirring and feeding blades or rabbles (not shown in the drawing), these blades serving to convey the material over the  
35 hearths of the furnace first from the inner to the outer portion of one hearth and then from the outer to the inner portion of the next lower hearth, and so on, the material being discharged from one hearth to another  
40 through openings 6 located alternately at the outer and inner portions of the hearths.

Preferably, the roof of the furnace serves as a heating or drying floor for the green ore or other material under treatment, and  
45 the shaft 3 is provided with any suitable feeding device whereby the ore is deposited upon the uppermost hearth of the furnace through a trapped or luted passage, in order to prevent the escape of gas from the upper-  
50 most working chamber.

I have shown the furnace as one of the muffle type, 7 representing the chambers for the passage of the heating gases, but my invention is not limited to a furnace of this  
55 character, but is applicable as well to an open furnace in which the heating gases

have access to the working chambers, or to a composite open and muffle furnace, whether the latter feature be employed in connection with the preliminary chamber or  
60 chambers thereof, or with the final chamber or chambers.

In treating some classes of material it is advisable to subject the latter, during the final stages of its treatment, to the gases  
65 evolved from the material during the preliminary stages of the treatment, for instance, it is a common practice in treating copper sulfid ores to mix the same with salt for chloridizing the copper, consequently, as soon as heat is applied, hydro-  
70 chloric acid gas is set free, and if the furnace is of the ordinary up-draft type the gas escapes from the uppermost or preliminary treating chamber direct to the outlet flue or  
75 stack. If, however, the furnace, or two or more of the upper working chambers of the furnace, are provided with a down draft, the fumes or gases evolved from the material in the upper chamber or chambers are carried  
80 into contact with the material in a lower chamber or chambers, consequently, in a case such as that above noted, the hydrochloric acid gas would attack any copper  
85 oxid which might be present in such lower working chamber or chambers (by reason of decomposition of cupric chlorid, or otherwise) and the recovery of copper values in subsequent leaching with water, would  
90 thereby be made easier or more complete, as more of the copper value would be in a water-soluble condition.

My invention is applicable to a furnace having any desired number of superposed chambers, but in the drawing I have selected  
95 for illustration a furnace having seven of such chambers.

In the simplest form of my improved furnace the outlet flue or stack may communicate with the lowermost working chamber so  
100 that the draft would be downward through all of the working chambers of the furnace, but in the drawing I have shown a furnace with divided draft, one outlet flue or stack communicating through a passage 9 with  
105 an intermediate chamber of the furnace so as to provide a down draft through this chamber and through the chambers above the same, and another outlet passage 10 communicating with the next chamber below  
110 so as to provide an up draft through that chamber and through the chambers below



the same. This provides for the action of the evolved gases upon the material upon the four upper hearths and for the independent utilization, if desired, of the gases evolved from the material on the three lower hearths.

In order to prevent any flow of gas from one section of the furnace to the other the passage 6, connecting the fourth and fifth chambers, may be provided with any suitable form of seal or lute. In the drawing I have illustrated, immediately below said passage, a shelf 12, upon which the material flowing from one working chamber to the other is supported so as to back up into the passage 6 and close the same against the flow of gas in either direction, the material being removed from the shelf 12 at intervals by means of a scraper 13 attached to an arm 5 on the central rotating shaft 3 of the furnace, or more than one of said arms may be thus provided. If it is not desired to prevent the admixture of gases from the upper chambers with those from the lower chambers of the furnace, this seal need not be employed, the single outlet 9, serving to provide down draft through the upper chambers and up draft through the lower chambers or, when the seal is employed, the lower chambers may be without any gas outlet, if desired.

If up draft through the upper chambers and down draft through the lower chambers is required an outlet passage may communicate with the uppermost chamber and another outlet passage with the lowermost chamber with or without a sealed communication between the two sections of the furnace, or the outlet passages may be otherwise disposed, depending upon the desired direction of draft through the various chambers of the furnace.

I claim:

1. A furnace having a plurality of superposed working chambers, each with hearth for supporting material to be acted upon, and means for agitating said material, and an outlet passage communicating with a lower chamber and with suitable draft inducing means whereby down draft may be established through that portion of the furnace which is above the outlet.

2. A furnace having a series of superposed working chambers, and an outlet passage communicating with an intermediate chamber of the series and with suitable draft

inducing means, so as to cause down draft of gases in that portion of the furnace which is above the outlet without causing said gases to pass through that portion of the furnace which is below the outlet.

3. A furnace having a series of superposed working chambers and also having two outlet passages, each provided with suitable draft-inducing means, one of said outlet passages communicating with an intermediate chamber of the series so as to provide down draft through that portion of the furnace which is above the outlet, and the other outlet providing independent draft through the lower portion of the furnace.

4. A furnace having a series of superposed working chambers and also having two outlet passages each provided with suitable draft inducing means, said outlet passages being so disposed that down draft may be induced through the upper portion of the furnace and up draft through the lower portion of the same.

5. A furnace having a plurality of superposed working chambers, and a sealed passage for the material between two of the intermediate chambers of the furnace, whereby the draft in the upper chambers of the furnace may be cut off from that in a lower chamber or chambers.

6. A furnace having a plurality of superposed working chambers, a sealed passage for the material between two of the intermediate chambers of the furnace, and means for inducing down draft through the chambers above the seal.

7. A furnace having a plurality of superposed working chambers, a sealed passage for the material between two of the intermediate chambers, and independent outlet passages communicating with the upper and lower sections of the furnace.

8. A furnace having a plurality of superposed working chambers, a sealed passage for the material between two of the intermediate chambers, a down-draft outlet from the upper section of the furnace, and an up-draft outlet from the lower section.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

UTLEY WEDGE.

Witnesses:

CHAS. BENTLEY COLLINS,  
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