

No. 811,843.

PATENTED FEB. 6, 1906.

F. KLEPETKO.
ROASTING FURNACE.
APPLICATION FILED NOV. 6, 1905.

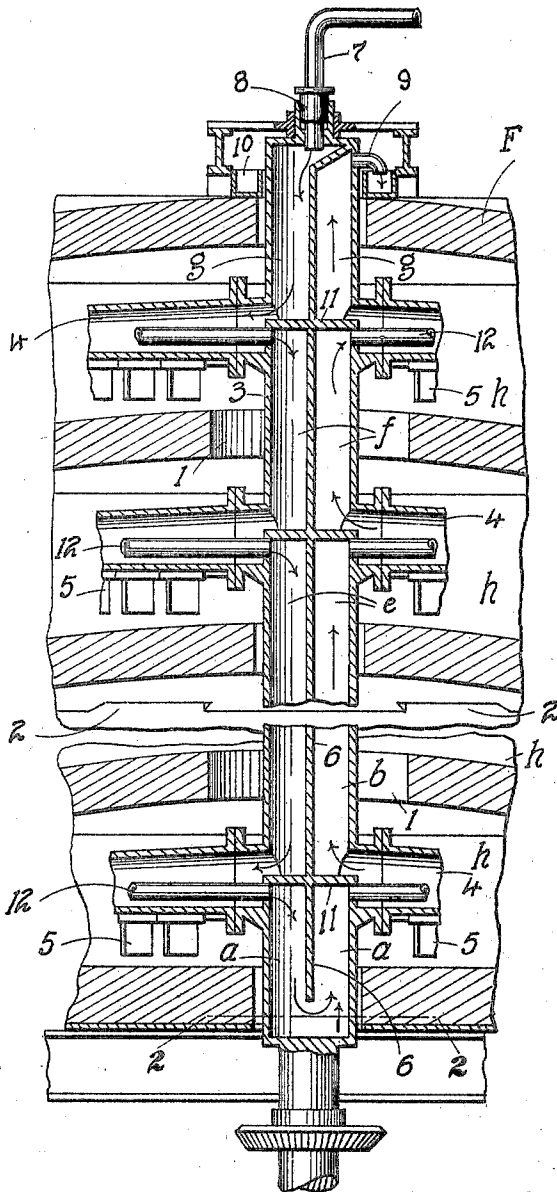


Fig. 1.

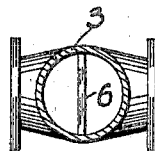


Fig. 2.

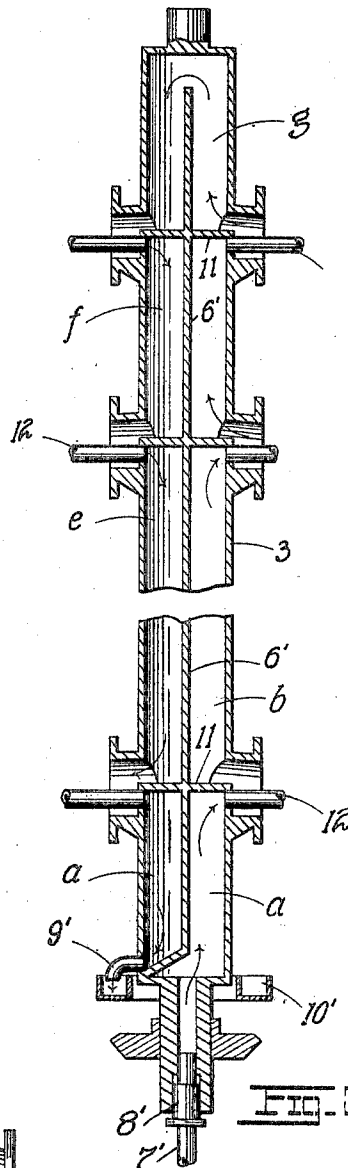


Fig. 3.

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ROASTING-FURNACE.

No. 811,643.

Specification of Letters Patent.

Patented Feb. 6, 1906.

Application filed November 6, 1905. Serial No. 236,043.

To all whom it may concern:

Be it known that I, FRANK KLEPETKO, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Roasting-Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in roasting-furnaces; and it consists in the novel construction and arrangement of parts more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a vertical central section of a conventional McDougall ore-roasting furnace, (partly broken,) showing a corresponding section of one of the forms of my improvement applied thereto. Fig. 2 is a cross-section on the line 2 2 of Fig. 1; and Fig. 3 is a vertical central section of the hollow rabble-shaft, showing a modification of the circulating system therefor.

The present invention is a qualification of the construction of the cooling apparatus shown and described in my pending application for Letters Patent for improvements in roasting-furnaces, Serial No. 223,539, filed September 6, 1904, the special object of the present improvement being to constrain the circulating medium to remain in contact with the walls of the rabble-shaft for a maximum length of time, the current traversing the length of the shaft first in one direction and then the other, whereby the abstraction of the heat units from the rabble-shaft and arms for purposes of cooling the same is accomplished with a minimum quantity and waste of the cooling medium, be the same water, air, gas, or the like. To this end I divide the rabble-shaft into preferably two longitudinal contiguous intercommunicating conduits, the current passing through the shaft in one conduit in one direction and through the other conduit in the opposite direction, whence it is discharged, all as will more fully appear from a detailed description of the invention, which is as follows:

Referring for the present to Figs. 1 and 2 of the drawings, F represents the furnace, and h the several hearths in which the material is treated, the said material dropping from the upper hearth successively through the several hearths until it is delivered into the delivery-hopper, (not shown,) the hearths being provided, respectively, with

the central and marginal openings 1 2 for the passage of the material. Passing through the hearths is the rotatable hollow rabble-shaft 3, from which radiate the series of hollow arms 4, extending into the several hearths and carrying rakes 5, by which the material is successively fed from one hearth to the hearth immediately beneath it, all as fully understood in the art.

Referring again to Figs. 1 and 2 of the drawings, 6 represents a longitudinal division-wall, diaphragm, or web dividing the passage-way of the shaft into contiguous conduits communicating with one another at the bottom of the shaft, the wall 6 terminating a short distance from said bottom. One of the conduits is supplied with a cooling medium (water) from a feed-pipe 7, passing through a stuffing-box 8 at the top of the shaft, the pipe leading to any source of supply. (Not shown.) The water circulates in one direction through the conduit into which it discharges, and thence in the opposite direction through the adjacent conduit, being eventually discharged through an outlet-nozzle 9 at the top of the shaft into a trough 10. The respective conduits of the hollow shaft are each divided into a series of compartments or chambers *a b c d e f g* (and so on, depending on the number of hearths, the present shaft and furnace being broken so as to omit compartments *c* and *d*) by means of the transversely-disposed division-walls 11, occupying a plane slightly above the bottoms of the adjacent rabble-arms 4, each chamber having leading therefrom the distributing conduits or pipes 12, which extend into the hollow arms and discharge therein. The presence of the several partitions 11 constrains the current of the inlet-conduit to pass first through the arms 4 outwardly, thence through the distributing-pipes 12 inwardly into the compartments from which said distributing-pipes lead, the current flowing successively from one compartment (*g f e*, and so on) to the next compartment below until it reaches the bottom compartment *a* of the particular conduit. The current then passes under the lower edge of the wall 6 into the bottom compartment of the adjacent conduit, flowing upwardly through said compartment *a* into the distributing-pipe 12 leading therefrom, thence inwardly through the arm 4, with which said pipe 12 communicates, into compartment *b*, and so on till the top compartment *g* is reached, when the cool-

ing medium is discharged through the nozzle 9 into the trough 10.

In Fig. 3 the inlet for the cooling medium is at the bottom, the division-wall 6' extending from the bottom of the shaft 3 to within a short distance of the top, the cooling medium in that event circulating upward from the bottom of one conduit and downward, as shown by the arrows, to the bottom of the adjacent conduit, eventually discharging through the outlet-nozzle 9' into a trough 10'. The feed-pipe 7' in that case enters into the bottom of the shaft, as shown, passing through a stuffing-box 8'. In either case both the inlet means 7 7' and outlet means 9 9' for the circulating medium are at one and the same end of the shaft, being at the top in the form shown in Fig. 1 and at the bottom in the form shown in Fig. 3. The circulation through the shaft and arms vertically and radially is in series. Obviously, the cooling apparatus need not be limited in its application to furnaces, but is available in other arts.

Having described my invention, what I claim is—

1. In a rabble apparatus, a hollow shaft having its passage-way divided into longitudinal intercommunicating conduits and means for circulating a cooling medium therethrough in opposite directions, substantially as set forth.

2. In a rabble apparatus, a hollow rotatable shaft having its passage-way divided into longitudinal intercommunicating conduits and means for circulating a cooling medium therethrough in opposite directions, substantially as set forth.

3. In a rabble apparatus, a hollow rotatable shaft having its passage-way divided into longitudinal conduits and means for establishing communication between the conduits at one end of the shaft, substantially as set forth.

4. In a rabble apparatus, a hollow rotatable shaft having its passage-way divided into longitudinal conduits, means for establishing communication between the conduits at one end of the shaft, and means for circulating a cooling medium through the respective conduits in opposite directions, substantially as set forth.

5. In a rabble apparatus, a hollow shaft having its passage-way divided into longitudinal conduits communicating with one another at one end of the shaft, means for circulating a cooling medium through the respective conduits in opposite directions, and inlet means and outlet means for the circulating medium at one end of the shaft, substantially as set forth.

6. In a rabble apparatus, a hollow rabble-shaft having its passage-way divided into longitudinal conduits communicating with one another at the top of the shaft, means for circulating a cooling medium through the re-

spective conduits in opposite directions, and inlet means and outlet means for the circulating medium at the bottom of the shaft, substantially as set forth.

7. In a rabble apparatus, a hollow shaft having its passage-way divided into longitudinal conduits communicating with one another at one end of the shaft, hollow arms leading from said conduits, means for circulating a cooling medium through the respective conduits and arms in opposite directions, and inlet means and outlet means for the circulating medium at one end of the shaft, substantially as set forth.

8. In a furnace having a plurality of hearths, a hollow rabble-shaft passing through the hearths and having its passage-way divided into contiguous intercommunicating conduits, a series of hollow arms leading from said conduits into the several hearths, a series of chambers distributed throughout each conduit and communicating with the hollow arms, and means for feeding a cooling medium into the conduits and circulating the same through the shaft and arms, substantially as set forth.

9. In a furnace having a plurality of hearths, a hollow rabble-shaft passing through the hearths and having its passage-way divided into contiguous conduits intercommunicating at one end of the shaft, a series of hollow arms leading from said conduits into the several hearths, a series of chambers distributed throughout each conduit and communicating with the hollow arms, and means for feeding a cooling medium into one of the conduits at the end of the shaft opposite to the intercommunicating passage between the conduits, and causing the same to circulate through the conduits and arms, and means for discharging the cooling medium from the shaft at a point adjacent to the inlet for the circulating medium, substantially as set forth.

10. In a furnace having a plurality of hearths, a hollow rabble-shaft passing through the hearths and having its passage-way divided into contiguous intercommunicating conduits, a series of hollow arms radiating from said conduits and extending into the several hearths, a series of chambers separated by transverse partitions distributed throughout each conduit, distributing-pipes leading from the respective chambers and opening into the adjacent arms, and a feed-pipe adapted to discharge a cooling medium into one of the conduits at a point removed from the point of intercommunication between the conduits, substantially as set forth.

11. In a rabble apparatus, a hollow rabble-shaft having its passage-way divided into longitudinal contiguous conduits having intercommunication at one end of the shaft, means for circulating a cooling medium

through the conduits and through the inter-communicating passage, and inlet means and outlet means for the circulating medium at one end of the shaft, substantially as set forth.

12. In a rabble apparatus, a hollow rabble-shaft having its passage-way divided into longitudinal contiguous conduits having intercommunication at one end of the shaft, means for circulating a cooling medium through the conduits and through the inter-

communicating passage, and inlet means and outlet means for the circulating medium at the end of the shaft opposite to the point of intercommunication between the conduits, substantially as set forth.

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

FRANK KLEPETKO.

Witnesses:

EMIL STAREK,
J. E. DEAKIN.