

No. 814,299.

PATENTED MAR. 6, 1906.

F. KLEPETKO.
ROASTING FURNACE.
APPLICATION FILED NOV. 8, 1905.

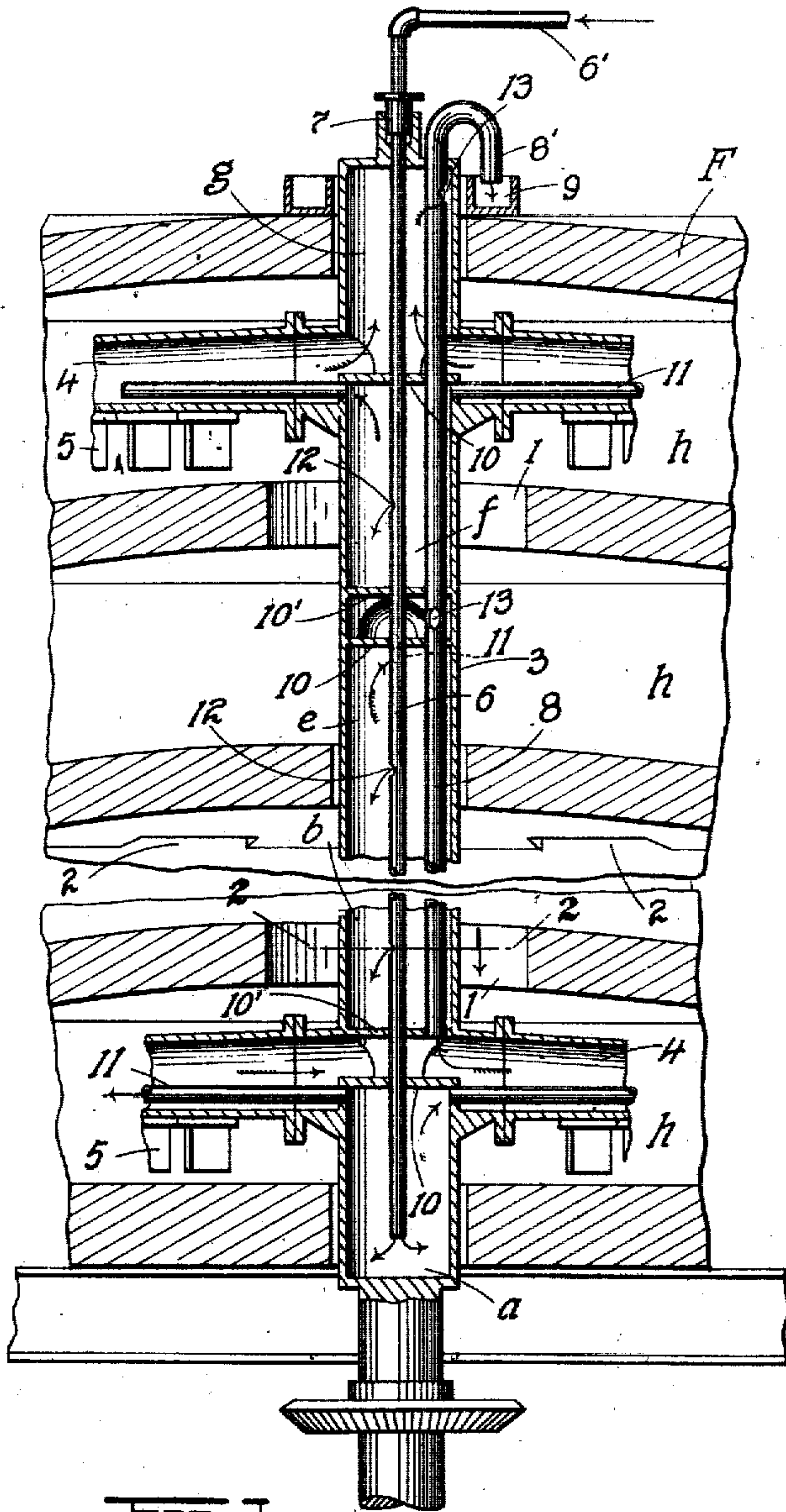


FIG. 1.

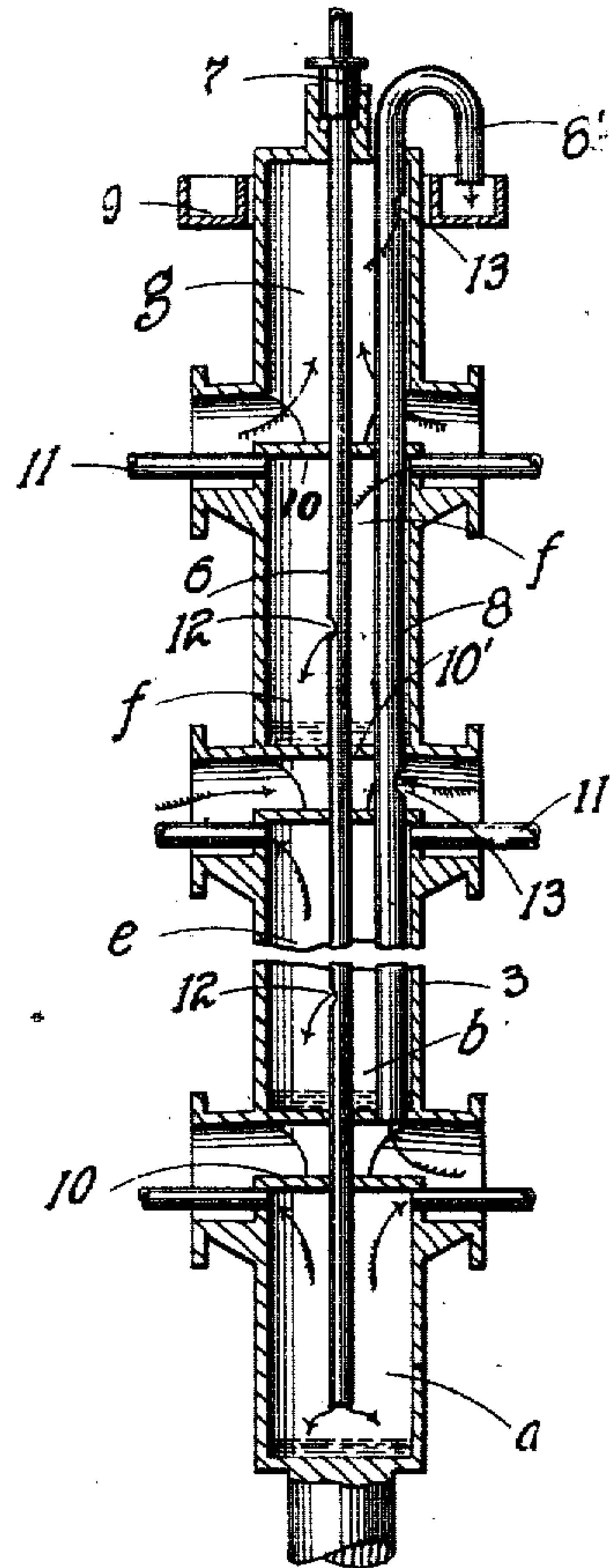
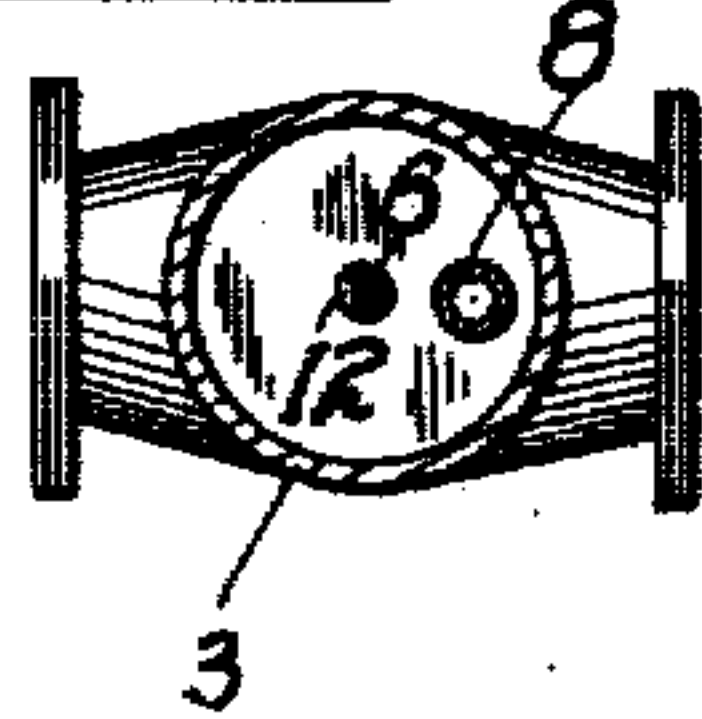


FIG. 2.

FIG. 3.



Witness
J. H. Hawn
M. D. Whitcomb

Inventor:
Frank Klepetko
By
Ernest H. Hawn
Attorney

UNITED STATES PATENT OFFICE.

FRANK KLEPETKO, OF NEW YORK, N. Y.

ROASTING-FURNACE.

No. 814,299.

Specification of Letters Patent.

Patented March 6, 1906

Application filed November 6, 1905. Serial No. 286,044.

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, with rabble-arms disposed ninety degrees apart for consecutive hearths, showing a corresponding section of my improvement applied thereto. Fig. 2 is a cross-section on line 2 2 of Fig. 1; and Fig. 3 is a vertical middle section of a rabble-shaft having all the arms superposed, showing my invention applied thereto.

The object of my invention is to construct a rabble apparatus for ore-roasting furnaces preferably of the conventional turret or McDougall type, which shall be divided into a series of sections or compartments corresponding to the number of hearths of the furnace, each section being cooled independently of any adjacent section by means of a circulating medium injected therein from a common source of supply, the said circulating medium being discharged from each section or compartment into a common return pipe or outlet leading from the furnace. The advantage of such a construction is that the circulating medium may be cut off for such of the hearth or hearths in which there is no longer any danger of injury to or disintegration or destruction of the rabble apparatus from the heat inherent in the charge contained in such hearth or hearths.

Referring to the drawings, and particularly to Figs. 1 and 2, 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

centrally 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 the drawings, 6 represents a feeder or feed-pipe, (preferably stationary,) which is located within the shaft, extending to a point near the bottom of the shaft and discharging therein, the feeder being supplied with water from a pipe 6', entering the stuffing-box 7 and leading to any source of supply. (Not shown.) Disposed to one side of the feeder 6 and mounted in the shaft and extending substantially the full length thereof is an outlet or exhaust pipe 8, said outlet terminating at the bottom in the space between the inner adjacent ends of the lower pair of rabble-arms. The pipe 8 terminates in a nozzle 8' above the shaft and discharges into a trough 9, though it is apparent that the discharge-waters may be led to any point where it may be availed of for heating and other purposes. The shaft is divided into a series of compartments or chambers *a b c d e f g*, the chambers being separated from one another by the transverse partitions 10, occupying a plane slightly above the bottom of the adjacent rabble-arms 4, each chamber having leading therefrom the distributing conduits or pipes 11, which extend into the hollow arms 4 and discharge therein. The intermediate chambers *b c d e f* (the furnace and shaft being broken so as to omit chambers *c d*) are each closed at the bottom by a transverse partition 10', which forms (preferably) a continuation of the upper walls of the pair of arms 4 immediately beneath, the lower compartment *a* being closed at the bottom by the bottom of the shaft 3 and the upper compartment *g* being closed at the bottom by the uppermost partition 10. By this construction each compartment or chamber *a b c d e f g* and the pair of arms with which it is in immediate communication (through the conduits 11) is cut off from its adjacent compartment and communicating arms, and, as presently to be seen, the cooling medium (water) injected or introduced into any compartment or chamber becomes available only for that compartment and its arms and no other. This will be apparent by follow-

ing the course of the circulation for the cooling medium, which is as follows: The feeder 6 is open at the bottom and discharges a quantity of water into the bottom compartment *a*. The same feeder discharges water into compartments *b c d e f* through peripheral openings 12. On the other hand, the outlet-pipe 8 opens at the bottom into the space connecting the lower pair of arms and is also provided with peripheral intake-openings 13 at points between the partitions 10 10' and also with an opening 13 in the upper compartment *g* for the escape of the discharge-waters. An inspection of the arrows in Fig. 1 discloses a circulation as follows: The water admitted into the compartments *a b c d*, and so on, respectively, through the bottom of the feeder 6 and through the peripheral openings 12 thereof becomes heated in its passage through the conduits 11 and hollow arms 4, the heat units abstracted from the walls of the arms (and shaft) as a result of such circulation insuring the preservation of the arms and shaft for an indefinite period. The water having subserved its purpose for each pair of arms is carried off from the lower pair of arms through the bottom of the pipe 8 out past the nozzle 8', and from the several intermediate series of arms the water is carried off through the intake-openings 13, (between the partitions 10 10',) the discharge from the upper chamber *g* escaping through the upper opening 13, formed in the pipe 8 within said chamber. Thus the arms for each hearth are supplied with a quantity of water from their corresponding chamber or compartment, those of one hearth being independent of the arms of any adjacent hearth. The rabble apparatus as a whole thereby becomes divided into a series of independent sections into which the cooling medium is injected, each section being provided with independent means of discharge or outlet.

In Fig. 1 the arms for the different hearths are set at right angles—that is, each pair is disposed at ninety degrees to its contiguous pair; but in Fig. 3 I show a form in which the arms for all the hearths are superposed. Being that the only difference between the two constructions lies in the angular disposition of the arms, it follows that a description of Figs. 1 and 2 is equally applicable to Fig. 3, and the same reference characters will accordingly apply.

An analysis of the circulation of the cooling medium makes it obvious that the current leaving the feeder 6 circulates through the series of arms 4 both vertically and radially in multiple, the inlet means 12 and outlet means 13 being disposed or distributed substantially throughout the length of the shaft.

Should it be found in the treatment of any ore that the heat inherent in the charge no

longer produces any deleterious effects on the rabble apparatus after reaching any particular hearth, the pipes 6 and 8 may be withdrawn from the shaft and the openings 12 13, respectively, conveying the circulating medium into and out of the arms of such hearth may be plugged up and the pipes reinserted. In this manner the circulating medium may be eliminated or excluded from any section of the rabble apparatus according to the character of the ore subjected to the roasting operation.

Having described my invention, what I claim is—

1. In a rabble apparatus, a hollow shaft divided into a series of compartments, hollow arms communicating therewith, and means for circulation through the shaft and arms vertically and radially in multiple, substantially as set forth.

2. In a rabble apparatus, a rotatable hollow shaft divided into a series of compartments, hollow arms communicating therewith, means for circulation through the shaft and arms vertically and radially in multiple, and inlet means and outlet means for the circulating medium, substantially as set forth.

3. In a rabble apparatus, a hollow shaft divided into a series of compartments, hollow arms communicating therewith, means for circulation through the shaft and arms vertically and radially in multiple, and an inlet into and an outlet from each compartment for the circulating medium, substantially as set forth.

4. In a rabble apparatus, a hollow shaft divided into a series of compartments, hollow arms communicating therewith, means disposed within the shaft for introducing a circulating medium into the several compartments, and outlet means for the circulating medium from each compartment, substantially as set forth.

5. In a rabble apparatus, a hollow shaft, and hollow arms therefor, a series of compartments closed at bottom and top distributed throughout the shaft and communicating with the hollow arms, means for feeding a circulating medium simultaneously into the respective compartments, and independent outlets or exhausts leading from the arms communicating with the respective compartments, substantially as set forth.

6. In a rabble apparatus, a hollow shaft and hollow arms therefor, a series of chambers or compartments closed at top and bottom by transverse partitions, distributed throughout the shaft, said compartments freely communicating with the hollow arms, a feeder passing through the several partitions of the several compartments and provided with means for discharging a cooling medium into each compartment, and an exhaust-pipe disposed adjacent to the feeder, and provided with intake-openings in the

spaces between contiguous compartments for conducting away the circulating medium out of the shaft, substantially as set forth.

7. In a furnace having a plurality of hearths, a hollow rabble-shaft passing through the hearths, a series of hollow arms radiating from said shaft and extending into the several hearths, a series of chambers closed at top and bottom distributed throughout the shaft and communicating with the adjacent arms of the series, a water-feed pipe passing through the several chambers of the shaft and discharging therein through openings leading into the respective chambers, an ex-

haust-pipe disposed adjacent to the feed- 15
pipe and provided with openings between the consecutive chambers, and with an opening communicating with the upper terminal chamber of the series, and having an outlet or discharge nozzle beyond the shaft, the 20
parts operating substantially as and for the purpose set forth.

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

FRANK KLEPETKO.

Witnesses:

EMIL STAREK,
J. E. DEAKIN.