N° 27,393 A.D. 1898

Date of Application, 28th Dec., 1898—Accepted, 11th Feb., 1899

COMPLETE SPECIFICATION.

Improvements in Roasting Furnaces.

I, JOHN BROWN FRANCIS HERRESHOFF, of 19, Pierrepont Street, Brooklyn, in the County of Kings and State of New York, United States of America, Chemist, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

My invention relates to roasting furnaces and has for its special object to improve the means for connecting the arms to the central vertical shaft of such furnaces. In furnaces heretofore devised it has been proposed to employ a hub rigidly fastened to the vertical shaft and to provide the said hub with means for readily being engaged or disengaged by the removable arms. Such a structure, however, is imperfect, for the reason that the hubs in the course of time deteriorate under the fierce heat employed and will no longer remain firmly fixed to the shaft nor properly receive and support the removable arms.

My invention is designed to avoid this defect by providing means whereby the stirrer arms may be removably engaged directly with the hollow shaft through which air passes, in order that it may be artificially maintained at a lower temperature than the general temperature of the furnace, whereby the junction of the shaft and arms will not be exposed to the terrible heat to which they have heretofore been subjected.

My invention will be understood by referring to the accompanying drawings in which—

Figure 1 is a transverse vertical section of a roasting furnace embodying my invention;

Figure 2 is an enlarged sectional view of one arrangement whereby the removable arms are mounted directly to the shaft, the section being taken on line 2—2 of Figure 3;

Figure 3 is a vertical section taken on line 3—3 of Figure 2;

Figure 4 is a section on line 4—4 of Figure 3, showing the sharpening of the lower edge of the side webs of the arms. This drawing shows one embodiment of my invention.

In the drawing, A represents the furnace which is provided with the usual roasting floors B and a shaft C. This shaft C is the driving shaft which carries the stirrer arms and is hollow in order to allow circulation of air. This shaft C is driven in any suitable manner from a shaft D and is provided with apertures c for the influx of a cooling medium such as air at the lower part and is open or perforated at the top for the escape thereof. The hollow shaft is shown as provided with inwardly extending plates or partitions c^1 c^2 c^3 c^4, so as to form inwardly extending passages or pockets. The upper partition c^3 is shown as provided at its centre with a recess c^5 for the reception of lugs on the stirrer arms, as will be explained. The lower partition c^4 serves also to guide the stirrer arms as they enter said

pockets. The form of stirrer arm E shown is preferably provided with teeth e in the usual manner and with a toe or lug e^1 adapted to enter the recess c^5 in the passage or pocket in the shaft. It will be observed that the stirrer arm E is of a rectangular box shape and that the lower web or side e^2 thereof rests upon the lower edge of the passage through the shaft at the periphery c^6 thereof and is cut away at e^3 so that the said lower web does not extend entirely to the extreme inner end of the arm. The side webs e^4, as it will be seen, extend beyond the lower web e^2 and are sharp, as will be seen by an inspection of Figure 4, in order that they may readily enter the passage or pocket even when the same is partly choked up with dust and chemicals lying in the bowed portion of the partition c^4. It will be observed that the partitions forming the pockets within the shaft do not prevent the flow of air or other cooling fluid through the said shaft, but the air can freely circulate around the said pockets thereby cooling the same and the ends of the arms contained within the passage or pocket. When the stirrers extend diametrically from a continuous passage as shown, their inner ends may substantially abut.

The arms E become imperfect during the operation of the furnace either by deterioration or destruction of the teeth, or for other causes and it is quite important to be able to withdraw a defective arm and insert a perfect one without stopping the furnace a longer time than a moment or so, as such furnaces require considerable time to cool and stopping the same for repairs is extremely costly. By my invention, however, when an arm becomes defective for any reason, it is merely necessary to lift up its outer end, thus rocking the arm on the edge c^6, thereby removing the lug e^1 from the recess c^5 so that the arm may be removed while momentarily stopping the furnace and without cooling it down and a perfect arm inserted by a reverse operation to that described for withdrawing the arm. As I have stated before it has heretofore been attempted to produce a practical roasting furnace by providing the same with removable stirrer arms, but in such cases it has been the custom to provide the vertical shaft with hubs for the reception of the arms which hubs were more or less flimsily secured to the shaft, so that when subjected to the high heat employed they very shortly became disconnected from the shaft. This defect I obviate by securing the arm in pockets of suitable form in the hollow shaft itself and cooling the junction of shaft and arms. It will be noted that I have provided a means for feeding ore or other chemicals to the furnace comprising a hopper 1, a receiving pan 2, from which a chute 3 depends. A slide rod 4 sliding in suitable bearings 5 is provided with a clearer 6 adapted to clear or remove ore from the pan 2. The slide rod 4 receives its motion from a frame 7 provided with lugs 10 acted upon by a bowl 8 carried upon a collar 9 on the shaft. It will be obvious that as the shaft rotates it will reciprocate the slide rod 4 back and forth and thereby clear the pan of its contents at each reciprocation, so that a continuous regulable feed is provided for the furnace.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In a roasting furnace, the combination of a hollow shaft having inwardly extending pockets, combined with stirrer arms entering said pockets with means substantially as described for locking the stirrer arms in said pockets and with means to permit circulation of a cooling medium through said shaft.

2. In a roasting furnace, the combination of an upright hollow shaft provided with interior passages or pockets opening to the outside of the shaft, the top walls of which are recessed, with stirrer arms adapted to enter the passages or pockets and provided with lugs entering the said recesses and with means for passing a cooling fluid through the shaft and around the passages or pockets therein to cool the junction of the stirrer arms with the shaft.

3. In a roasting furnace the combination of a hollow shaft having passages extending therethrough laterally; stirrer arms entering the said passages from

opposite sides and adapted to abut against each other within the passages and means substantially as described for locking the said stirrer arms in said passages and with means to permit circulation of a cooling medium through said shaft.

Dated this 28th day of December 1898.

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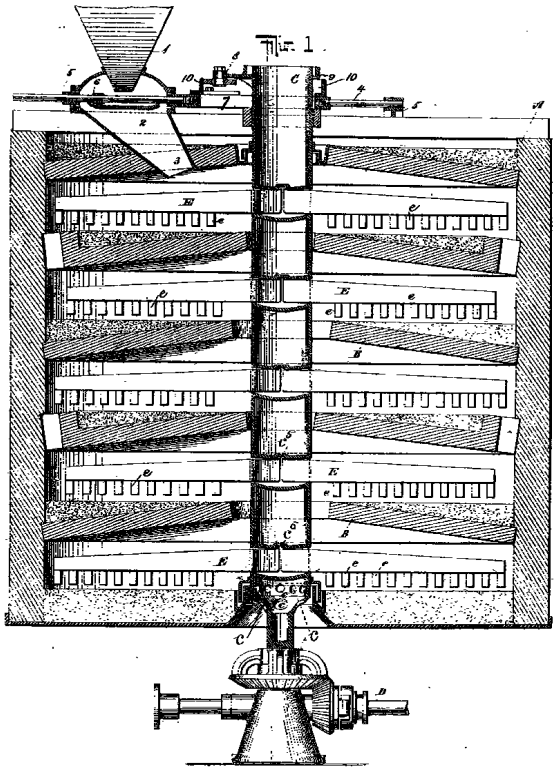
HERRESHOFF'S Complete Specification.

SHEET 1.

Fig. 1.



(2 SHEETS)
SHEET 2

Fig. 2.

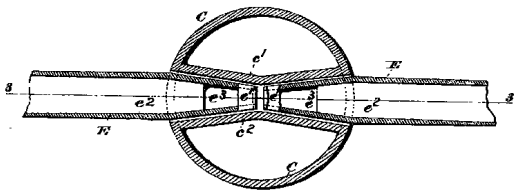


Fig. 3.

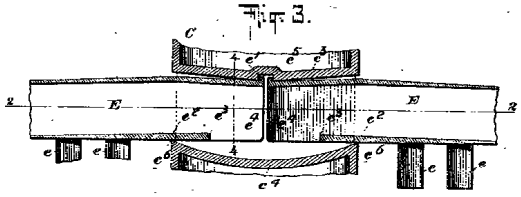


Fig. 4.

[This Drawing is a reproduction of the Original on a reduced scale]

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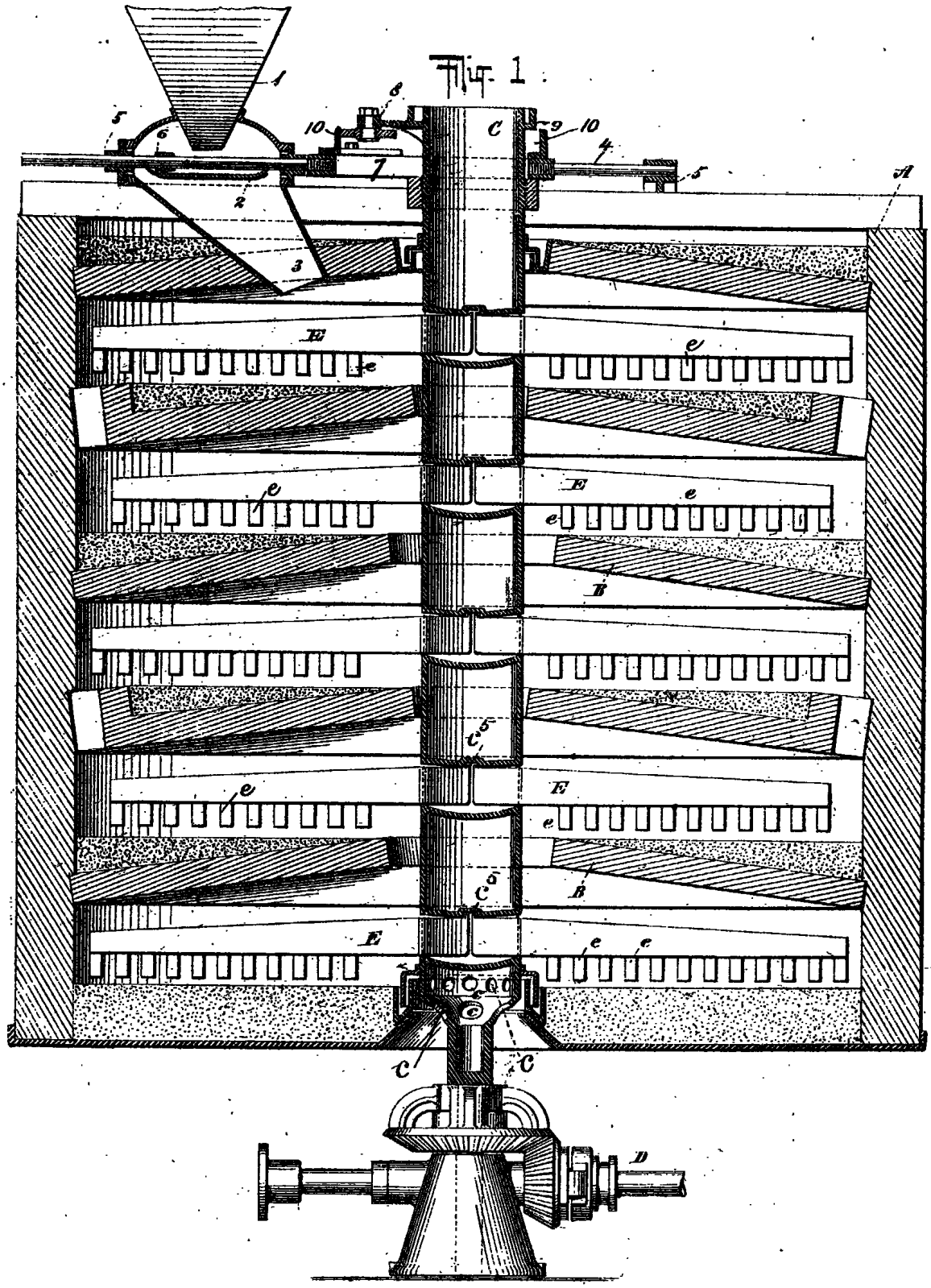


Fig. 2.

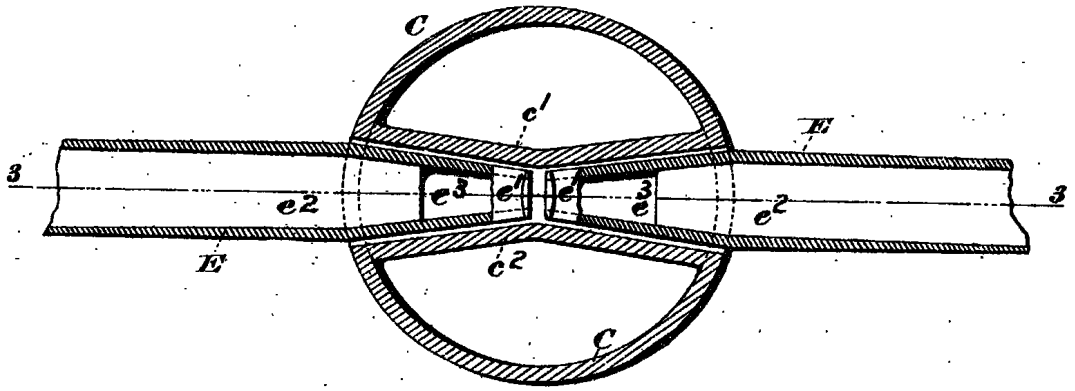


Fig. 3.

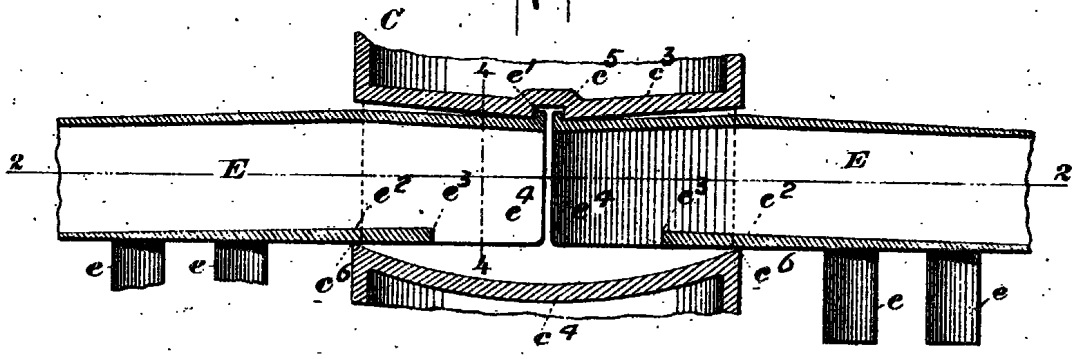
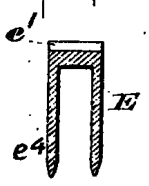


Fig. 4.



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