No. 637,864. Patented Nov. 28, 1899.

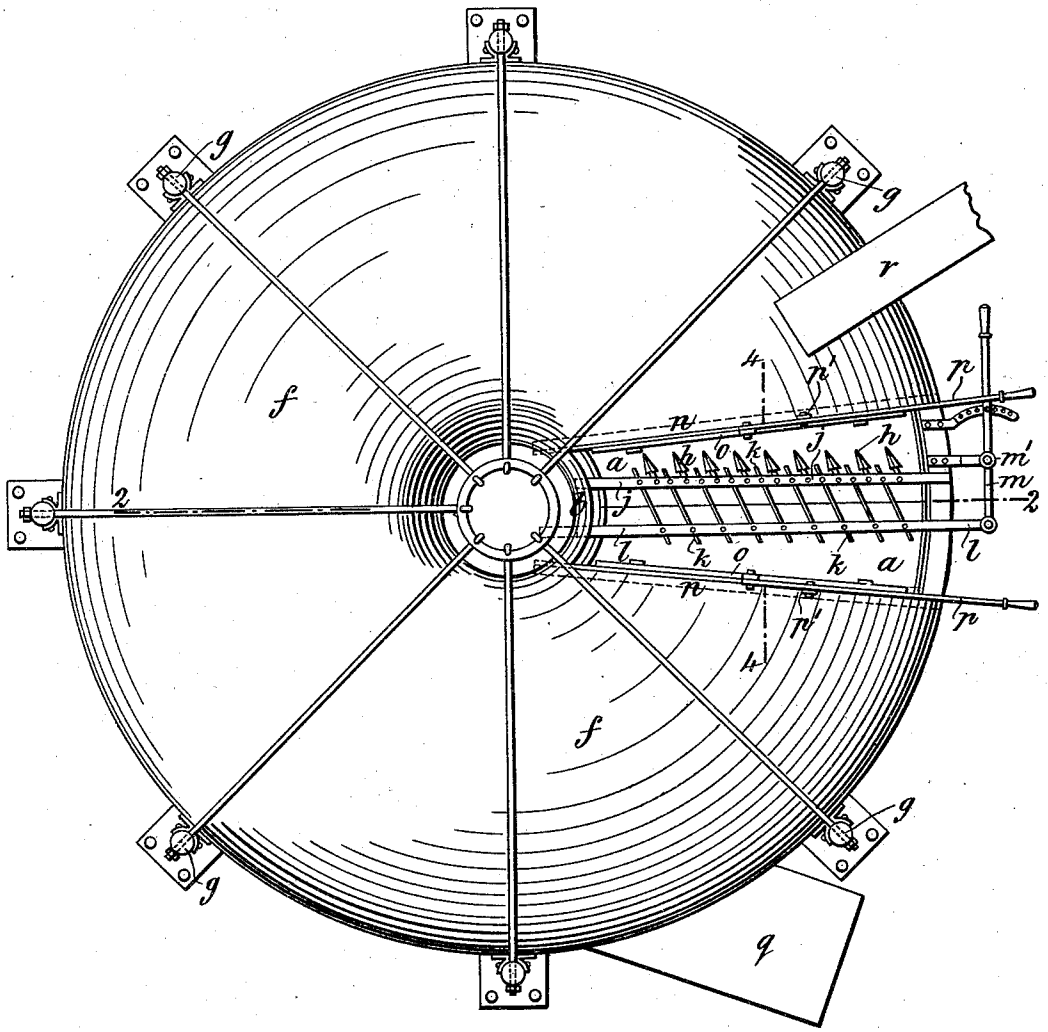
J. GODFREY & H. J. HAYES.

CALCINING FURNACE.

(Application filed Jan. 3, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.



Witnesses.
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Walter R. Tubbs.

Inventors.
Joseph Godfrey
Henry John Hayes
By their Attorneys,
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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(No Model.) 2 Sheets—Sheet 2.

Fig. 4.

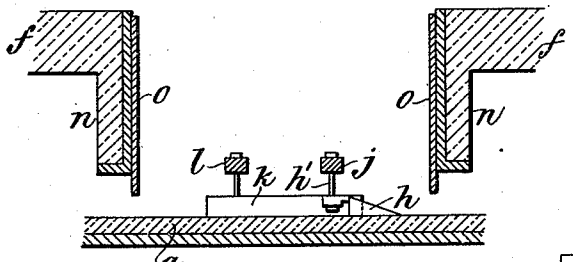


Fig. 2.

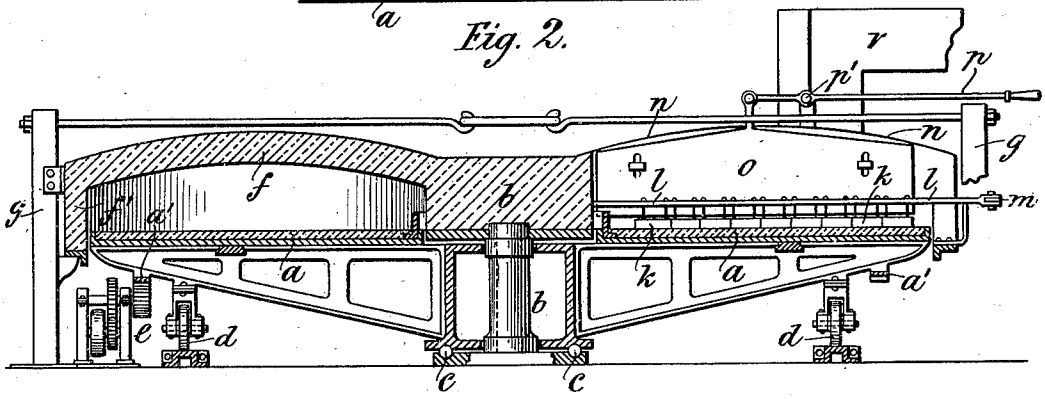
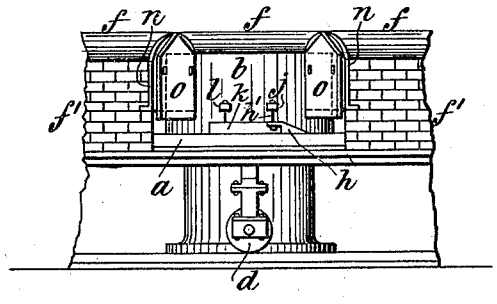


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOSEPH GODFREY AND HENRY JOHN HAYES, OF SWANSEA, ENGLAND, ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE GODFREY CALCINER, LIMITED, OF LONDON, ENGLAND.

CALCINING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 637,864, dated November 28, 1899.

Application filed January 3, 1899. Serial No. 700,960. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH GODFREY, assayer, residing at 55 Walter road, and HENRY JOHN HAYES, commercial agent, residing at 203 Eaton Crescent, Swansea, in the county of Glamorgan, England, subjects of the Queen of Great Britain, have invented a certain new and useful Calcining-Furnace, of which the following is a specification.

This invention relates to furnaces of the type in which there is an annular rotating bed. In such furnaces plows are usually fixed above the rotating bed in order to rabble the material under treatment and direct it outward to the discharge-opening. Such plows have heretofore been fixed so that the material must of necessity be discharged after a certain number of revolutions of the bed and they have been covered by the furnace-roof, so that they are exposed to great heat, which rapidly destroys them, although partitions have sometimes been used to screen them from the direct action of the flame. Furnaces of this class are shown in British patent to Spence, No. 2,245, of February 12, 1887. According to this invention the plows are adjustable, so that they can be set tangentially to the path of the material in order that the material may be treated during any desired number of revolutions without any of it being discharged. The plows are in the open air, uncovered by the furnace-roof, and radial partitions, adjustable in height, so as to come close down onto the material being calcined, are provided at each side of the opening to keep in the flame and to prevent the entrance of an undue amount of air into the furnace and so cooling it. The open section freely admits oxygen into the ore when it is being turned over by the plows, thus causing rapid calcination and preventing fusing and volatilization of metals to any appreciable extent, while the heat of the furnace is in no way interfered with.

Our furnace is especially adapted for calcining lead ores, sulfid ores containing lead, zinc ores containing lead, and all other ores and materials.

Figure 1 is a plan, and Fig. 2 a vertical section on the line 2 2, Fig. 1, of a furnace constructed according to this invention. Fig. 3 is a part right-hand side elevation of Fig. 1. In this view the levers operating the parts are omitted. Fig. 4 is a local section, to a larger scale, on the line 4 4, Fig. 1.

a is the annular bed of the furnace, (preferably covered with fire-clay tiles or other refractory material,) free to revolve about a central column b and supported by a ring of balls c and rollers d. On the under side of the bed a there is a ring of teeth a', driven by any suitable gearing e.

The roof f and side walls f' of the furnace are fixed, being supported by the central column b and by columns g. It will be observed that air can pass freely beneath the furnace. h are plows fixed on stems h', carried by a fixed radial bar j. k are other plows, in the form of flat vertical plates pivoted at one end to the bar j and at the other to a movable bar l, operated by a lever m, pivoted at m'. The roof f is in the form of a segment of a circle, being entirely cut away above the plows, so that these are in the open air. n are radial walls extending from the central column b to the side walls f' and up to the roof f. The spaces between the bottoms of the walls n and the rotating bed a can be more or less closed, according to the depth of material on the bed, by adjustable plates o, which lie against the outer faces of the walls n and can be moved up and down by the levers p, pivoted at p'.

q is the fireplace, and r the flue by which the products of combustion are led away.

The material to be calcined may be fed onto the bed a at the opening in the roof between the walls n or through a hole formed in the roof between the left-hand wall n and the fireplace q. When the plows k are set as shown in Fig. 1, the material is gradually carried to the circumference of the bed a as the latter revolves and is discharged over its edge between the walls n; but if the plows k are set tangentially to the path of the bed the material is not discharged.

We do not herein claim the process or method of calcining consisting in alternately heating the material to be calcined in a closed furnace and exposing it to the open air out of contact with the products of combustion, as

this method or process is claimed in our application for patent, Serial No. 716,083, filed May 9, 1899.

What we claim is—

1. The combination of a rotating bed, a fixed roof in the form of a segment of a circle, leaving an opening in the roof, partitions along the radial sides of the opening in the roof, plows between the partitions below the opening and means for rotating the bed beneath the plows, the organization being such that the material is alternately heated and exposed to air out of contact with the products of combustion, and the plows are protected against undue heat.

2. The combination of a rotating bed, a fixed roof in the form of a segment of a circle, leaving an opening in the roof, partitions along the radial sides of the opening in the roof, plows arranged between the partitions below the opening in the roof, and means extending to the outside of the furnace for adjusting the partitions vertically to vary the distances between the bottoms thereof and the bed of the furnace.

3. The combination of a rotating bed, a fixed roof in the form of a segment of a circle, leaving an opening in the roof, partitions along the radial sides of the opening, devices extending to the outside of the furnace for adjusting the distances of the bottoms of the partitions from the bed, plows between the partitions and devices extending to the outside of the furnace for adjusting the angle of the plows to the direction of motion of the bed.

4. The combination of a rotating bed, a fixed roof in the form of a segment of a circle, leaving an opening in the roof, partitions along the radial sides of the opening, a set of plows fixed above the furnace-bed, another set of plows coöperating with the first-mentioned plows, and means for adjusting the angle of said last-mentioned plows to the direction of motion of the bed.

5. The combination of a rotating bed, a fixed roof in the form of a segment of a circle, leaving an opening in the roof, partitions along the radial sides of the opening, devices extending to the outside of the furnace for adjusting the distances of the bottoms of the partitions from the bed, two sets of plows between the partitions below the opening, one fixed and the other pivoted, and means extending to the outside of the furnace for simultaneously adjusting the angle of the pivoted plows to the direction of motion of the bed.

JOSEPH GODFREY.
HENRY JOHN HAYES.

Witnesses:
WILLIAM COX,
JOHN WILLIAM PACKE.