

(No Model.)

W. P. BLAKE.
FURNACE FOR ROASTING ORES.

No. 513,755.

Patented Jan. 30, 1894.

Fig. 1.

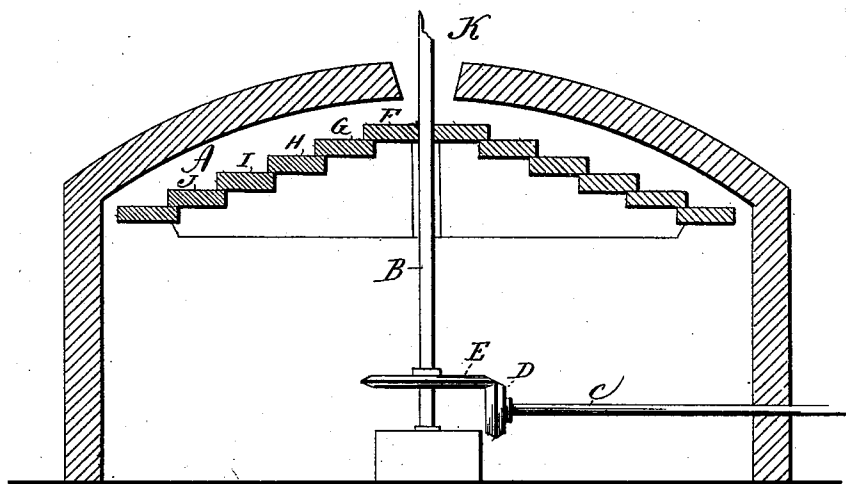
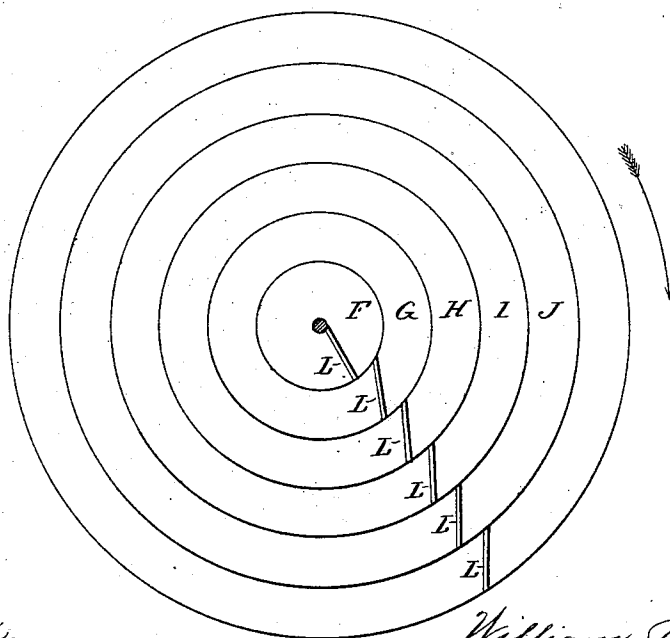


Fig. 2.



Witnesses.

J. H. Shumway
Lillian D. Kelsey.

William P. Blake.
Inventor.

By attys.
Earle Seymour

UNITED STATES PATENT OFFICE.

WILLIAM P. BLAKE, OF NEW HAVEN, CONNECTICUT.

FURNACE FOR ROASTING ORES.

SPECIFICATION forming part of Letters Patent No. 513,755, dated January 30, 1894.

Application filed March 23, 1891. Serial No. 386,029. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM P. BLAKE, of New Haven, in the county of New Haven and State of Connecticut, have invented a new
5 Improvement in Furnaces for Roasting Ores and Like Purposes, (Case B); and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full,
10 clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a vertical section through a roasting-chamber showing the hearth half in section and half in side view; Fig. 2, a top or plan view of the hearth.

This invention relates to an improvement in the class of furnaces for roasting, desulphurizing, and chloridizing ores and for like
20 purposes in which a revolving hearth is employed in the roasting-chamber, to receive the ore to be treated, and from which revolving hearth the ore is delivered after treatment. Under the more general construction of this
25 class of furnaces, the hearth is a plane flat surface; in some cases, however, it has been of a slightly conical form, so as to slope from the center outward to the periphery. The ore is received upon this hearth and spread,
30 and the hearth revolving, subjects the ore to a continuous and regular heat for the roasting treatment.

The object of my invention is to construct the hearth so that a forced change of position
35 of the ore or material to be roasted, will be frequently produced during the operation, and it consists in constructing the hearth as a series of concentric steps, rising from the periphery toward the center so that the ore
40 or material to be roasted, deposited upon the central step, will at one or more points in the revolution be turned or forced from the said central step, and caused to fall upon the next lower step, where it will revolve until again
45 the material will be forced from that second step, and so as to fall upon the third, and so on. A step arrangement, whereby the material is forced to fall from one step to another disturbs the material, and causes a positive
50 change of position of the particles, essentially

different from that which would be produced by simply turning the material out of its path, as upon a plane flat hearth, where the material would be pushed upon the surface without the agitation, disturbance or separation
55 of the particles produced by the fall, that is, whereas on a substantially flat surface the material would simply slide on the hearth without any substantial change of its relative position to the hearth, in the hearth constructed with the several steps, whereby the material falls several times in its passage
60 from the center to the periphery, a positive change of position of the particles of the material is required, turning the charge over as it were at each step, thus presenting a much
65 greater exposure of the ore to the direct heat and oxidizing condition than can be had upon a flat surface.

The drawings illustrate a vertical transverse section of a furnace, cutting centrally through my improved hearth.

As here represented, the chamber A, is of the usual construction; circular in form, and the rotating-hearth is of corresponding circular shape; the hearth is supported upon a vertical shaft B, or upon a frame with wheels, to which rotation is imparted by any suitable means, here represented as from a horizontal shaft C, to which power is applied, communicating the power to the vertical shaft B, by bevel gears D E, but for this any suitable means may be employed.

The rotating hearth is composed of a series of concentric steps F, G, H, I, J, &c., more or less in number. These steps commence, the highest F, at the center, and each successive step dropping below the plane of the preceding step to the periphery, which is the lowest. The rise of the step may be varied according to circumstances, the greater the rise, the more will be the disturbance of the material as it falls from one step to the next. The working surface of the steps is preferably flat, as shown, but this shape may be
95 varied according to circumstances.

The roof of the furnace is constructed with an opening K, at the center, over the first step F. The material to be roasted is passed through this opening K, upon the step F. The
100

hearth revolving, the material thus falling upon this step F, is carried around and subjected to the action of the furnace.

The direction of the revolution of the hearth is indicated by the arrows in Fig. 2. To force the material from one step to the next, stationary deflectors L, are arranged, as seen in Fig. 2; these deflectors are supported from the stationary walls or roof of the chamber, and the material to be roasted is introduced in advance of the deflector or deflectors of the first step F, then with the revolution of the table, the material will strike the deflector and be forced therefrom, and will fall upon the next step G, in advance of the deflectors on that step, and so continuing, from step to step. The material as it falls from one step upon the next, will necessarily be loosened and tumble about, and to so great an extent as to change the position of the material with relation to the hearth, so that on the second step or hearth it will be presented in an entirely different position with relation to the hearth from that which it occupied on the preceding hearth, and thus throughout the entire operation there is a material change of position or disturbance of the material at each revolution, giving the most perfect exposure of all parts of the material or charge to be roasted or otherwise treated.

When the material being roasted or treated reaches the lower step, it is carried around by that step in like manner as in the preceding steps, until the deflector is reached, whereby the material will be turned by the deflector into a suitable chute, not shown, being a common and well known device and thus delivered from the furnace, it being understood that the speed of revolution of the hearth is such as to give the proper exposure of the charge under treatment.

The great advantage of the step or terrace construction of the hearth, is that the material or charge in falling from one step to the next, is better exposed to the heat and air while movement and delivery are facilitated. As a result of these successive falls of the material and the change of position, the work of roasting is so greatly facilitated that a greater quantity of material may be treated

in the same time than can be treated when the ore is simply spread upon an unbroken surface.

I do not in this application illustrate means for heating the roasting-chamber, as that is immaterial to this invention; any of the known methods of heating furnaces may be employed in connection with the roasting chamber and my improved revolving hearth.

From the foregoing it will be understood that I do not claim broadly a revolving hearth for furnaces for roasting ores or other purposes.

I am aware that a conical hearth having a series of downwardly inclined concentric deflecting surfaces over which the ore continually cascades, is old. I do not therefore broadly claim a hearth having a series of concentric surfaces successively receiving the ore.

I claim—

1. A hearth for an ore-roasting furnace, having a series of concentric steps or terraces, each adapted in shape and position to retain the ore thrown upon it until the same is forcibly dislodged, substantially as set forth, and whereby the ore in its passage downward over the successive steps is completely under control and may be subjected for any desired length of time to the action of the furnace.

2. A rotating hearth for an ore-roasting furnace, having a series of concentric steps or terraces, each adapted in shape and position to retain the ore thrown upon it until the same is forcibly dislodged; in combination with a series of deflectors for dislodging the ore from the steps so that it will pass downward from one to the other, and means for rotating the hearth, substantially as described, and whereby the ore in its passage downward over the successive steps is completely under control, and may be subjected for any desired length of time to the action of the furnace.

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

WM. P. BLAKE.

Witnesses:

FRED C. EARLE,
LILLIAN D. KELSEY.