

(No Model.)

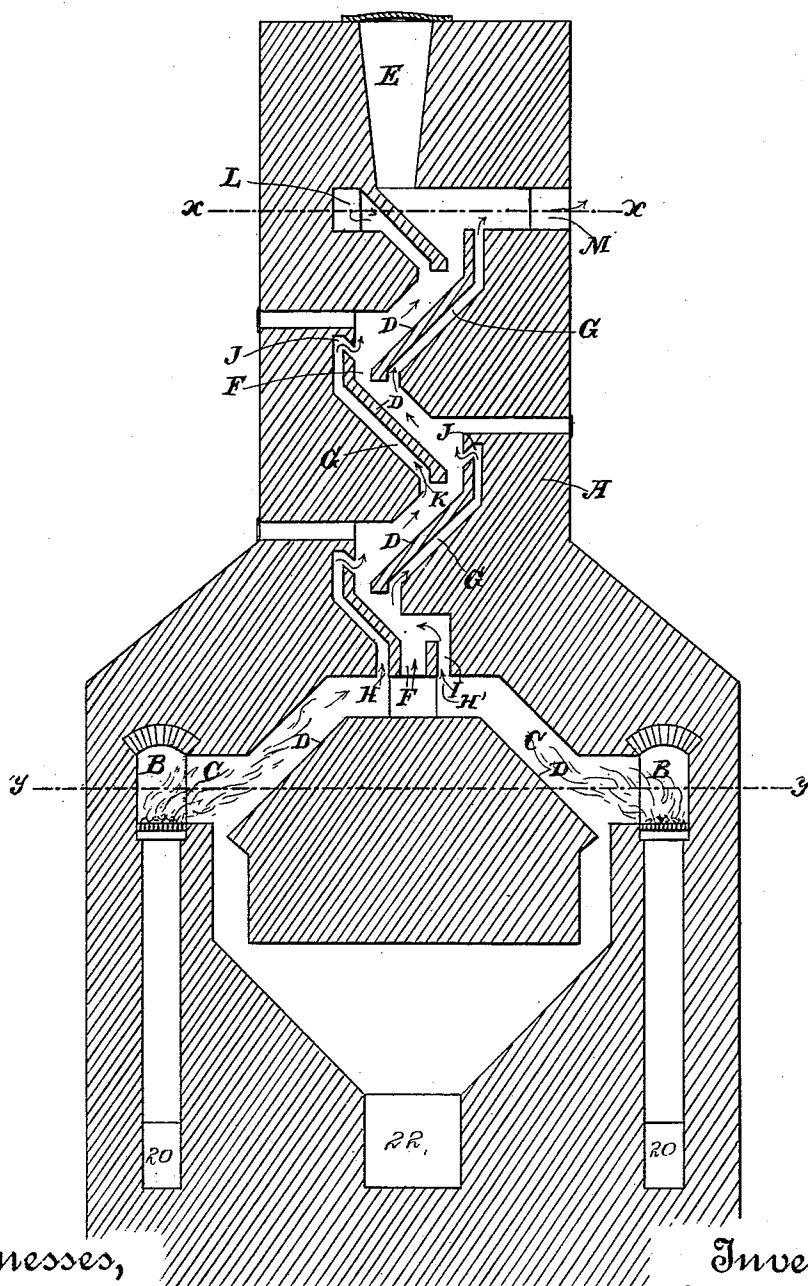
2 Sheets—Sheet 1.

C. E. STOCKFORD.
ORE ROASTING FURNACE.

No. 569,361.

Patented Oct. 13, 1896.

Fig. 1.



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(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

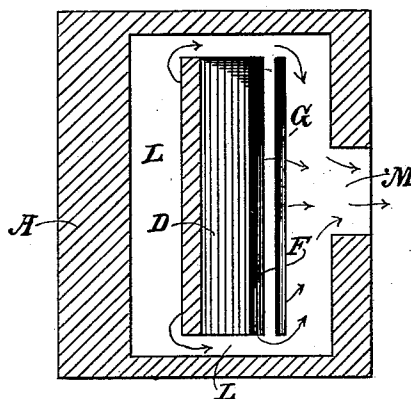
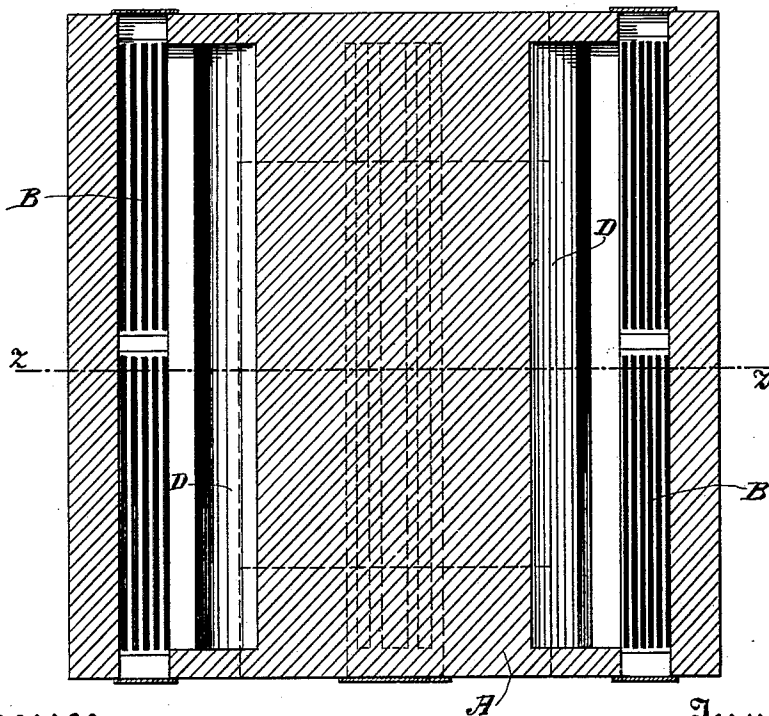


Fig. 3.



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UNITED STATES PATENT OFFICE.

CHARLES EDWARD STOCKFORD, OF SULPHUR CREEK, CALIFORNIA.

ORE-ROASTING FURNACE.

SPECIFICATION forming part of Letters Patent No. 569,361, dated October 13, 1896.

Application filed April 20, 1896. Serial No. 588,250. (No model.)

To all whom it may concern:

Be it known that I, CHARLES EDWARD STOCKFORD, a citizen of the United States, residing at Sulphur Creek, county of Colusa, State of California, have invented an Improvement in Ore-Roasting Furnaces; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a furnace for roasting ores, and is particularly designed for roasting quicksilver and other similar ores.

It consists in certain details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a vertical section through my furnace on line *zz* of Fig. 3. Fig. 2 is a horizontal section on line *xx* of Fig. 1. Fig. 3 is a similar section on line *yy* of Fig. 1.

The inclination of the floors and the construction of the passages between them are such that the ore will lie to a considerable depth upon each floor and will be choked in the passages from one floor to the other when the furnace is charged.

A fireplace is arranged so that its heat passes into the lower part of the furnace, being subdivided so that a portion passes over the surface of the ore upon each inclined floor and the other portion of the heat passes beneath the floor to roast both sides.

At the upper end of the floor that portion of the heat which passed above the preceding floor will be delivered into a chamber to pass beneath the next succeeding one, while that which passed beneath the previous floor will be so delivered as to pass above the succeeding one, the heat thus alternately passing above and below the floors until it reaches the exit-pipe.

A is a structure which may be made of brick or other suitable material and of any desired or necessary height to expose the ore to the heat for a sufficient length of time. Upon opposite sides of this stack near the bottom are built the fireplaces B, which may be of any suitable size and construction, and have ash-pits with doors 20, through which the ashes are removed by raking, and arches or openings C leading into the lower part of the furnace proper.

This furnace is constructed with inclined

floors D, made of tiles or any desired material, over which the ore can pass and through which the heat can act upon the ore. These floors are here illustrated as standing at an angle of about forty-five degrees, or at such an angle that the ore will lie upon the incline to a depth of a few inches when the lower end of the ore is prevented from moving. These inclines stand alternately in opposite directions, as shown, and the uppermost one is adapted to receive ore through an ore-feeding device E at the top.

The ore to be roasted or burned is broken into suitable sizes, preferably anything that will pass through a screen having a two-inch mesh, and when the furnace is completed it may be first filled with dry waste. This material as well as the ore will pass by gravitation over all the inclines until it reaches the open space below the lowermost heating-surface or floor, where it will completely choke the opening above. The ore will then fill up over this floor on the first incline, reaching a depth of from three to six or seven inches, and when this has been covered it will choke the opening or space F between the top of this floor and the bottom of the next oppositely-inclined floor, this space being about six inches in diameter. This space being filled or choked the ore will again accumulate over the surface of the next incline until it is in like manner covered to a certain depth, and the ore will choke the next passage F above, allowing the next floor to be in like manner covered, and so on until the ore has reached the top. The receiver or hopper E being filled with ore, this passage will be closed and may be, furthermore, covered with a close cover, if desired or found necessary. This may be in the form of a cast-iron top with lid-opening large enough to admit charging of furnace.

Beneath each of the floors D is a fire space or passage G from the fireplace, said passages being preferably of substantially the same diameter throughout. The heat passes, as before described, and ascends through a four-inch opening H upon the left into a fire-flue G beneath the lowermost of the inclined floors. On the right side the fire passes into a narrow opening H' left in the arch and through flue I into the space above the ore on this

inclined floor, the top and bottom of the ore being thus heated from above and below. At the upper end the fire-flue G, below the inclined floor, opens through a channel J into the space above the second inclined floor, and at a point above where the ore chokes the passage between the two floors, so that the heat which has just passed beneath the first floor will pass above the ore on the next incline. The heat which passes up over the ore on the first incline passes through a passage K into the inclined flue G beneath the second floor, and the heat is thus alternately carried above and beneath the floors upon which the ore lies until it reaches the upper part of the furnace or stack. At this point it passes into a chamber L and thence into the exit-pipe M, through which the fumes and vapors arising from the roasting ore pass. The chamber L, which receives the heated ore and fumes, extends all the way around the upper part, so that the hot air and fumes both from above and from below the ore are all delivered into this chamber and pass thence to the exit-pipe. The ore is delivered to the upper part of the furnace from cars or by other suitable means, and after the furnace is charged may remain as long as necessary to properly reduce it.

The operation can be observed through peep-holes or sliding doors or other devices properly arranged with relation to the floors and the ore thereon, and any clogging at any point can be loosened by means of rods introduced through these or similar openings.

When the ore has been sufficiently reduced, the discharge-car will be run under the draw upon one side of the furnace and the ore drawn out through a door-controlled pit sufficiently to fill the car.

The removal of the ore from below will cause the whole body of ore from bottom to top of the furnace to move along to fill the space thus provided for it, and the ore will continue to move down the inclines until it occupies a position upon the next floor below in each case, the new charge of ore being at the same time introduced at the top to cover the upper floor. In this manner the roasting

continues as long as may be desired, the furnace being a perpetual one as long as the fire is kept up.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a roasting-furnace, the combination, of a shell or casing, a series of superposed oppositely-inclined floors having vertically-connecting throats between the bottom of each floor and the upper end of the succeeding one, fireplaces in the shell or casing, one on each side of the ore-passage, and having arches or openings leading inward, a passage or flue back of each floor and following the inclination thereof and of its vertical throat, and having substantially the same diameter throughout, having a channel opening into the ore-passage at the top of one floor and just above the lower end of the floor next above, whereby the heat acts directly on the ore passing alternately under one floor and then over the ore on the floor above, and means for charging the furnace.

2. An improved ore-roasting furnace consisting of a shell or casing having a central ore-passage, arches or passages leading outwardly from the bottom thereof, fireplaces on each side of the passage, one communicating with each arch or passage, a series of oppositely-inclined floors within the ore-passage, having vertically-connecting throats, a flue or passage back of each floor and leading directly into the ore-passage at the upper portion of one floor and just above the lower portion of the floor next above, whereby the heat alternately passes under one floor and then passes over the body of ore on the floor above, a chamber circumscribing the uppermost floor and receiving the hot air and fumes both from above and from below the ore, and an exit-pipe for said air and fumes.

In witness whereof I have hereunto set my hand.

CHARLES EDWARD STOCKFORD.

Witnesses:

H. H. WILSON,
WILLIAM BLANN.