(No Model.)

G. M. LEVETTE.

ATTACHMENT FOR SMELTING FURNACES.

No. 296,586. Patented Apr. 8, 1884.

Fig. 1.

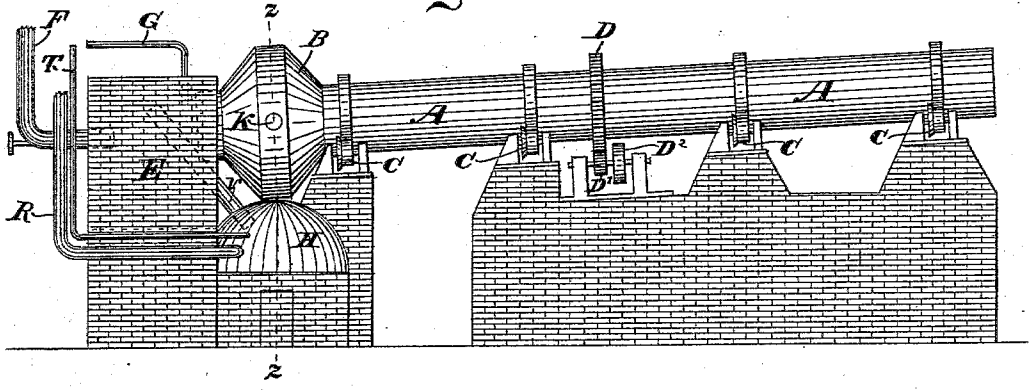


Fig. 2.

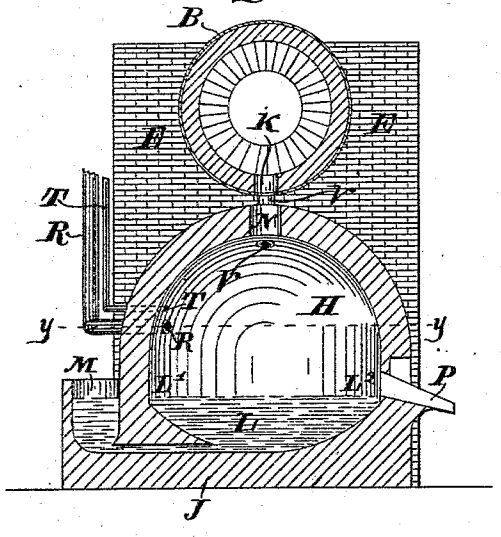
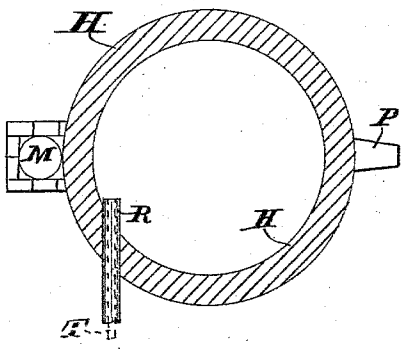


Fig. 3.



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ATTACHMENT FOR SMELTING-FURNACES.

SPECIFICATION forming part of Letters Patent No. 296,586, dated April 8, 1884.

Application filed November 17, 1882. (No model.)

To all whom it may concern:

Be it known that I, GILBERT M. LEVETTE, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful improved desilverizing lead-bath and slag-pot attachment to smelting-furnaces for smelting gold, silver, copper, and lead ores, of which the following is a specification.

My invention relates to that class of smelting-furnaces especially which are placed nearly horizontal (inclining one to two inches per linear foot toward the slag-bosh) and made to revolve for the purpose of intimately mixing the ores and fluxes and bringing the mixed ores and fluxes into constant and ever-changing contact with the heat. The inclination of the revolving furnace also serves the purpose of constantly and uniformly moving the charge from the feed or higher end down to the slag-bosh. A notable example of this class of furnaces is the one on which Letters Patent No. 236,562 of the United States were granted to George Duryee on January 11, 1881. Practice with horizontal revolving smelting-furnaces, when operated on ores of gold, silver, copper, or lead, has shown that from sixty to eighty per cent. of the values are expelled from the slagged ore and carried out of the furnace on the current of gases forced through by the blast, and that the remaining twenty to forty per cent. of values are carried down with the slag.

The object of my invention is to recover in an economical manner and available form all or nearly all that portion of said values (gold, silver, copper, or lead) carried down in the slag. This I accomplish by placing a bath of molten lead in convenient relation to and at a proper distance from the tap-hole in the bosh of the furnace, and combining therewith a proper fuel-supply, as will be presently described. The slag, when drawn from the furnace-bosh, will fall or run on the molten lead, plunge to some distance beneath the surface and rise and float on the lead. A great proportion of the values contained in the slag will by the falling and plunging movement be brought in contact with the lead and combine with it, and the slag resting on the molten lead being kept in a hot flowing condition, the metals remaining suspended will gravitate downward through the fluid mass and combine with the underlying metal. To keep the slag in the molten fluid condition in which it runs from the furnace-bosh, I construct over the lead bath a dome of fire-brick or other refractory material, which completely covers the lead bath and superincumbent slag. At a convenient point above the slag-level, in the wall of the dome, I insert two pipes, each of the proper size for its special purpose—one to conduct a stream of petroleum or coal-gas, and the other to conduct an air-blast to the interior of the dome. The molten slag will furnish the heat to ignite the petroleum or gas, and the blast of air will support the combustion, producing the heat to keep the slag in that fluid condition necessary to allow the deposition of all suspended metals. The slag may be tapped off and removed at convenient intervals in the usual manner, and any accumulation of base bullion in the lead bath may be dipped from the lead-well into molds, ready for the refinery.

Referring to the accompanying drawings, which are made a part hereof, and on which similar letters of reference indicate similar parts, Figure 1 is a side elevation of a furnace embodying my invention; Fig. 2, a transverse vertical sectional view, looking to the left from the dotted line *z z;* and Fig. 3, a horizontal sectional view, looking downwardly from the dotted line *y y.*

Similar letters refer to similar parts throughout the several views.

A A, Fig. 1, is a revolving cylinder supported on anti-friction rollers C C C C.

D is a cog-wheel which encircles the cylinder, and is secured thereto. D′ is a smaller cog-wheel that gears into D, and on the shaft with D′ is a belt-pulley, D^2, to which is communicated the power to revolve the whole cylinder. B, the slag-bosh, is an enlarged portion of the cylinder so constructed as to retain in its V-dish-shaped cavity a quantity of slag until such time as it may be convenient to draw it off through the tap-hole K.

E is a furnace constructed of brick and built up around the slag-bosh end of the revolving cylinder A A. A fire of wood or coal is kept on the grate-bars within the furnace E, for the purpose of igniting the petroleum or gas, from which is obtained the heat necessary to smelt ores in the cylinder.

G is a pipe for conducting petroleum or gas

to the lower end of the cylinder A A, from which point the air-blast from the pipe F carries the burning oil or gas into the revolving cylinder.

H is a dome of fire-brick covering the lead-bath and confining the slag.

T is a pipe conducting petroleum or coal-gas into the dome H above the slag-level, the combustion of which is supported by a blast of air from the pipe R. The products of combustion, and other gases in the dome H, are conducted through the pipe V into the furnace E, and from there carried through the revolving cylinder A A by the blast from the pipe F.

J, Fig. 2, is a foundation of masonry which supports the lead bath L.

H is a hemispherical dome, built of fire-brick, on the foundation J. The dotted line L' to L^2 shows the upper surface of the lead in the lead-bath L.

M is a lead-well, connected by an opening through the masonry with the bath L, from which any excess of lead or base bullion may be dipped as it accumulates from the successive charges of slag.

N is an annular opening in the apex of the dome H, for admitting slag from the furnace-bosh to flow onto the lead bath.

When it becomes necessary to draw slag from the bosh B, the tamped clay is punched from the tap-hole K, and the furnace is stopped just when the tap-hole is directly over the opening N, when the fluid slag will run into the dome H and float on the lead-bath L. After the slag has rested a sufficient time on the lead, it may be drawn off through the slag-spout P in the breast of the dome.

R is an air-blast pipe connecting the dome H with a blower. T is a pipe for conducting petroleum or coal-gas from some suitable reservoir into the dome H. The combustion of the oil or gas will keep the slag in a proper degree of fluidity to allow the reduced metals to gravitate to the underlying molten lead. The air-blast pipe R and the fuel-pipe T are made to pass obliquely through the wall of the dome H, as shown in Fig. 3, so that the blast and flame will strike the inner surface of the wall at a glancing angle, inclining the flame to a circular movement over the surface of the slag.

I am aware that a bath of lead is in common use in all smelting-furnaces where ores of lead or metallic lead are used in the charge to recover silver and gold; and I am aware that the slag resting on the molten lead in the furnace-bosh is kept by the furnace-fuel in that condition of limpid fluidity necessary to permit any particles of metal to gravitate through it to the underlying molten lead.

I am not aware of any plan or device for keeping furnace-slag at a flowing temperature after it has been drawn from the furnace in which the ores were slagged into a supplementary furnace or receptacle.

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

1. The combination, with a smelting-furnace, of an independent covered receptacle containing a lead bath and adapted to receive the melted slag from the furnace, and distinct means of supplying fuel and a blast of air to said receptacle, whereby when said air-blast and fuel-supply are in operation the slag in said receptacle is kept in a melted condition, thereby permitting the valuable metals therein to be precipitated into said lead bath, substantially as set forth.

2. The combination of the substantially horizontal revolving furnace A, having enlarged portion or bosh B, the covered receptacle H, having orifice N, and containing a lead bath, the blast-pipe R, and fuel-supply pipe T, substantially as set forth.

3. The combination of the furnace A, the covered receptacle H, containing a lead bath, the fuel-supply T, the air-supply R, the escape V for the products of combustion, the escape P for the slag, and the well M for removing the molten metal as the same accumulates, substantially as set forth.

GILBERT M. LEVETTE.

Witnesses:
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W. H. THOMAS.