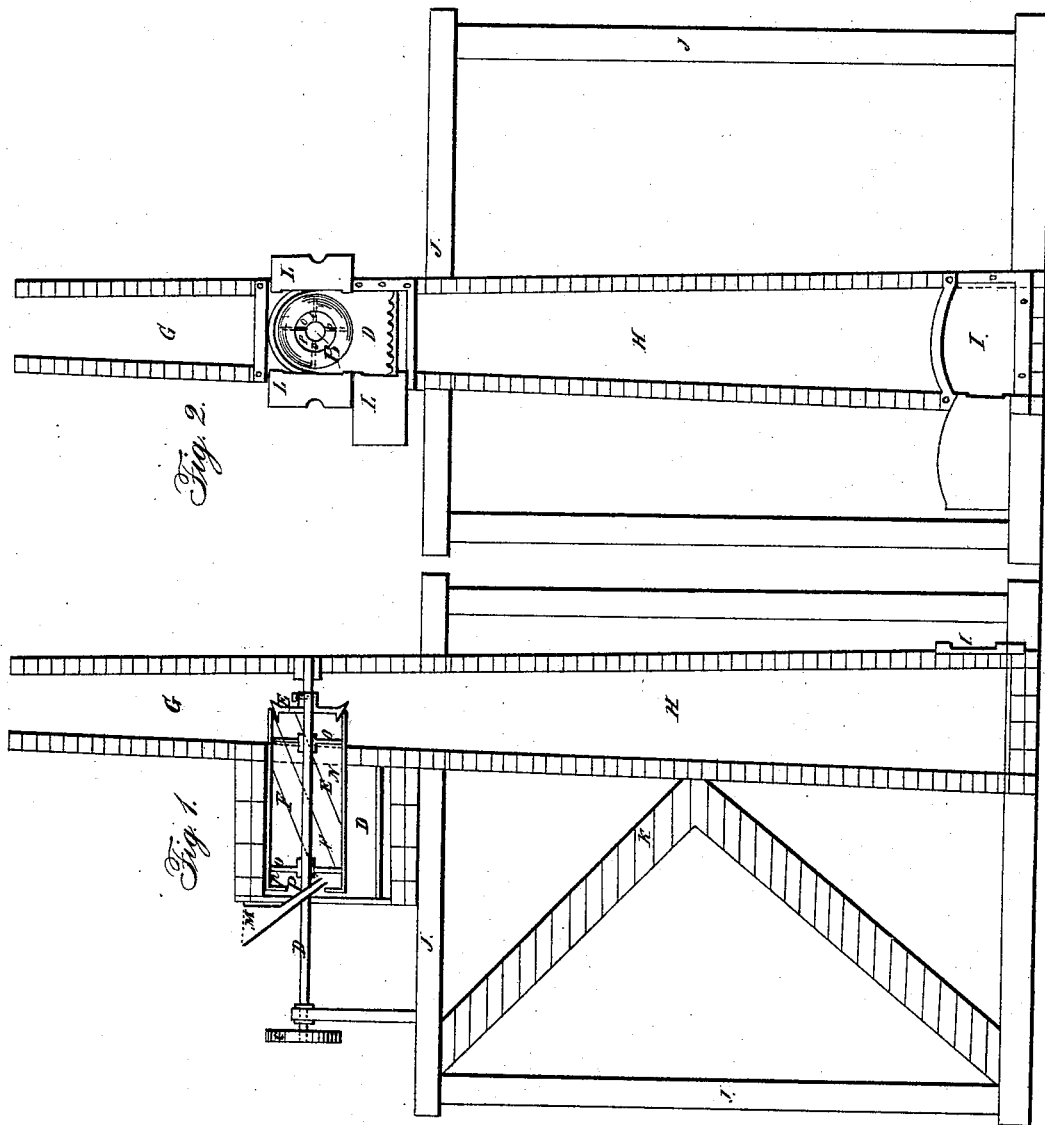


J. S. BRIGGS.
Shaft Furnace.

No. 53,266.

Patented Mar. 20, 1866.



Witnesses:

W. E. May
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Inventor:

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UNITED STATES PATENT OFFICE.

J. SMITH BRIGGS, OF CHICAGO, ILLINOIS.

IMPROVED APPARATUS FOR DESULPHURIZING ORES.

Specification forming part of Letters Patent No. 53,266, dated March 20, 1866.

To all whom it may concern:

Be it known that I, J. SMITH BRIGGS, of Chicago, in the county of Cook and State of Illinois, have invented and discovered a new and useful Improved Process for Desulphurizing and Oxidizing Metalliferous Ores; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and the letters and figures marked thereon, which form part of this specification.

The nature of my invention relates to a novel mode of treating ores bearing the precious metals for the purpose of separating therefrom and removing all sulphur, sulphurets, and the baser metals, as lead, copper, and the like, which may be mingled therewith; and it consists in heating the said ores, after the same have been subjected to some crushing or disintegrating process to reduce them, and then precipitating them when in a heated condition from the heating apparatus, and allowing them to fall through the air, in a suitable inclosure, for a distance of from fifteen to one hundred feet or more, according to the more or less complete pulverization or disintegration of the ores, the effect of which treatment is to burn off the sulphur completely and oxidize the baser metals, which are then carried off in fumes, leaving the gold and silver to fall to the bottom with the silica or quartz, which may then be separated in any of the known ways.

To enable those skilled in the art to understand how to practice and make use of the invention herein claimed, I will proceed to describe the same with particularity, making reference in so doing to the aforesaid drawings, in which—

Figure 1 represents a longitudinal vertical section of my apparatus, and Fig. 2 a front elevation of the same.

Similar letters of reference in the two figures denote like parts of my invention.

H represents a tall chimney-like structure, which may be built of brick or of any other suitable material, and should be from sixty to one hundred feet high, more or less, according to the aforesaid conditions. J J represent a platform and its supports, upon which is arranged a furnace and the appliances thereto, hereinafter described, said platform being from sixty to one hundred or more feet from the bottom of the chimney H, and at a suitable

distance from its top. K represents a flight of steps or stairs ascending from the ground to the said platform.

Directly over the fire-space of the furnace D, as shown, there is arranged a cylinder, A N, into which the disintegrated or pulverized ores are fed through the hopper and spout marked M, the said ores being raised and discharged into the same by any suitable elevator or conveyer, or otherwise. The said cylinder is supported and kept in position by the shaft B, passing through the same longitudinally, as shown, being rigidly attached thereto by means of the arms O. The shaft revolves in suitable bearings, as shown, motion being communicated thereto by the drum C, or in any other suitable manner, thus giving a revolving or rotary motion to the said cylinder, for the purposes hereinafter described.

In that end of the cylinder at which the ores are introduced there is a central opening (marked P) for that purpose, while the other end is provided with an adjustable head sliding upon the shaft B, being secured in any desired position by means of a set-screw, or in any other convenient manner. The perimeter of the said movable head E is beveled, as shown in Fig. 1. Upon the interior surface of the cylinder there are attached or provided a series of spirally-arranged flanges, (marked F,) projecting inward a suitable distance for the purpose of conveying the ores gradually through the cylinder and discharging them into the flue H at the opposite end of the cylinder.

The use of the head E is to prevent an air-draft through the cylinder, which would otherwise be induced by the intense heat of the furnace, and also to regulate the discharge of the ores into the hollow shaft H.

L represents suitable doors for closing the end of the cylinder at which the ores are introduced, and also the fire-chamber of the furnace. I represents a door at the bottom of the hollow tower H, through which air may be admitted when desired, and as desired. The bottom of the tower is suitably constructed and arranged for receiving and saving the precious metals which may fall upon the same, as hereinafter set forth.

Instead of erecting a tower or chimney, as herein described, the furnace may be placed upon the surface of the earth, and a mining or other shaft sunk into the ground to a suitable

distance may be used in place of the aforesaid tower, if preferred.

Having described my invention and the mode of its application, I will now describe its operation.

A fire is kindled in the furnace and the cylinder set into motion, when, the adjustable head E being properly arranged, the ores suitably prepared are fed into the cylinder through the opening P, where they are heated to a red heat, or thereabout, during their passage through the cylinder, and are then discharged in small quantities into the tower H, through which they fall. The particles of ore being small, and falling separately and not in mass, are thoroughly exposed to the oxygen in the air, and their rapid fall being equivalent to a blast of air through the falling ores the sulphur is burned off or out of the ores, while the baser metals are oxidized and carried off in fumes or gases, leaving the gold or silver to fall to the bottom pure or mixed only with the silica or quartz in the ores from which the precious metals may be readily separated in any of the known ways.

It is obvious that the finer the particles of the ore may be the less will be the distance nec-

essary for them to fall in order to attain a perfect result, the distance varying in general, as stated, from sixty to one hundred feet.

It is necessary that when the ores are once heated they should fall the whole distance necessary to complete their desulphurization and separation from the baser metals, such as readily oxidize before being cooled, as if the distance is only enough to partially effect the desired result, a subsequent treatment will not produce the complete result aimed at.

Having described the nature and operation of my invention, I will now specify what I claim and desire to secure by Letters Patent:

1. Heating metalliferous ores and dropping them in a heated state through the air for a suitable distance, substantially as and for the purposes herein shown and described.

2. The employment of a revolving cylinder, N, provided with internal spiral flanges, F, in combination with an adjustable head, E, arranged and operating substantially as specified, and for the purposes set forth.

J. SMITH BRIGGS.

Witnesses:

W. E. MARRS,
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