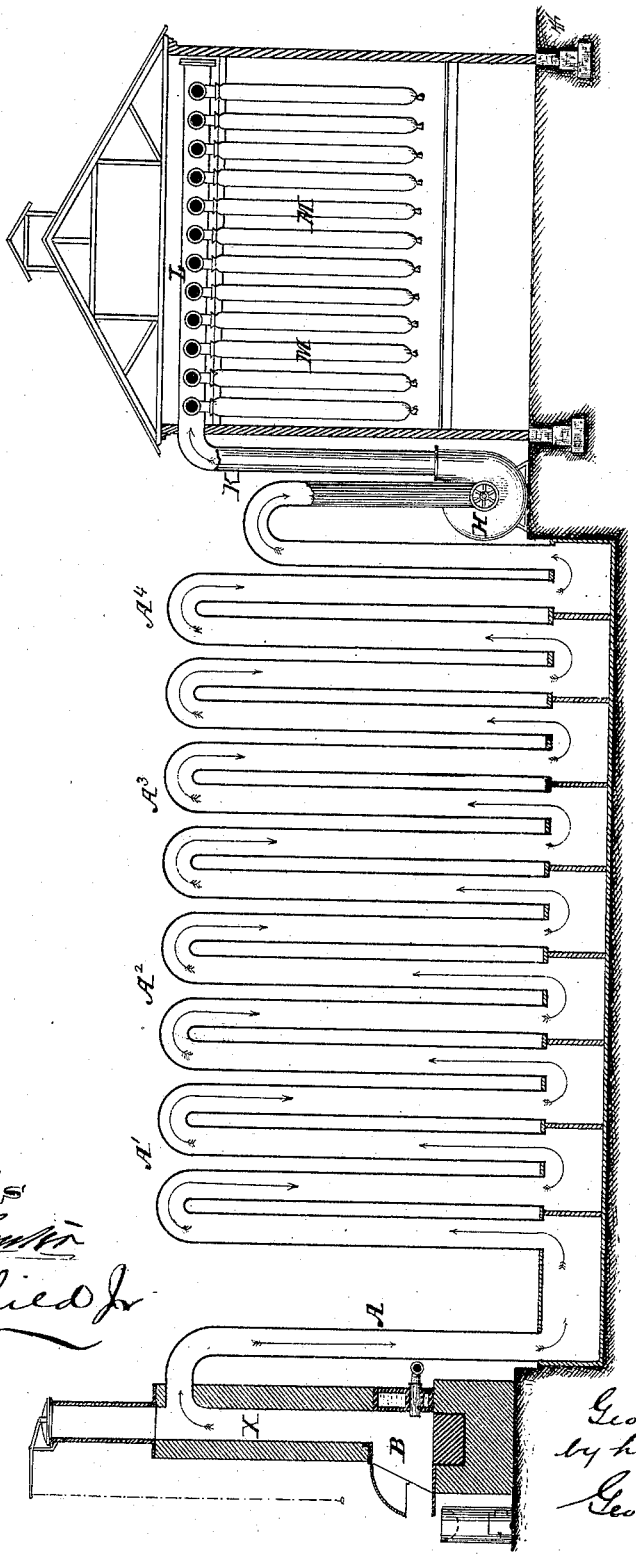
G. T. LEWIS.

Collecting Waste-Lead Fume.

No. 212,855. Patented Mar. 4, 1879.



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UNITED STATES PATENT OFFICE.

GEORGE T. LEWIS, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN COLLECTING WASTE LEAD FUMES.

Specification forming part of Letters Patent No. **212,855**, dated March 4, 1879; application filed October 22, 1878.

To all whom it may concern:

Be it known that I, GEORGE T. LEWIS, of the city and county of Philadelphia, in the State of Pennsylvania, have invented a new and useful improvement for collecting waste fumes which incidentally and necessarily escape in the furnaces used for smelting lead ores, of which the following is a specification:

In the process of smelting lead ores large amounts of volatile fumes necessarily escape and are lost. These escaping fumes are also found to be injurious to the surrounding land.

Various attempts have been heretofore made, by passing these escaping fumes through horizontal or ascending flues of great length, to cause the fumes to be deposited; but these were attended with great expense, and were only partially successful.

I have discovered that by passing the escaping fumes from a lead-ore-smelting furnace through a series of cooling-tubes, and then into a series of bagging, the escaping fumes can be thoroughly and effectually strained out and collected, while the attachment of the cooling-tubes and collecting-bags does not interfere with the smelting operations.

This cooling and collecting apparatus may be used in combination with either of the ordinary lead-ore smelting or reducing furnaces, such as the Scotch-eye furnace, the reverberatory smelting-furnace, or the cupola smelting-furnace, or with the lead-refining furnaces.

In the accompanying drawing I show the apparatus as combined with the stack of a Scotch-eye reducing-furnace, although it may be combined in like manner with the stack of either of the equivalent furnaces mentioned above.

The drawing represents an ordinary Scotch-eye lead-smelting furnace.

B is the furnace proper, in which the lead ore, in admixture with carbon, is reduced. X is the furnace stack or chimney, through which the fumes ascend. This ascending flue is common to each of the smelting-furnaces or refining-furnaces above mentioned.

A descending flue, A, leads from this stack to the commencement of a series of vertical cooling-tubes, A A^1 A^2 A^3 A^4, so arranged that the fumes are forced to ascend and descend successively as they pass along through the tubes. These tubes are made of sheet metal, as thin metal rapidly throws off the heat of the contents and cools the fumes. These tubes should be about two feet in diameter, and the series should furnish about three hundred and fifty feet of aggregate length. These vertical tubes can be cleaned out by openings with movable covers made in the lower part of the flue, if necessary; but the deposit will be very small. The last tube of the series of tubes communicates with the eye of a fan, H. The fumes are drawn by this fan H through the series of cooling-tubes and discharged into a tube, K, which connects with a horizontal tube, L. From this tube L are suspended a series of strainers or bags, M M M, composed of textile fabric, through the meshes of which the gases escape, leaving the solid material or fume proper within the bag or strainer. Equivalent straining material for textile fabric may be used. These fumes, so collected, are composed of sulphate, sulphite, carbonate, and oxide of lead when ordinary galena ore is smelted, or, when carbonate lead ores are smelted, the fumes collected will be found to consist mainly of oxide and carbonate of lead. If the ores smelted are the argentiferous ores of lead, then the fumes so collected will contain, in addition to the above-mentioned salts of lead, also the corresponding salts of silver.

The fumes when collected in the bags are removed therefrom by shaking, and may be either used as a gray pigment direct, or, after purification, as a whiter pigment; or these fumes may be returned to the furnace and reworked for the metals which they contain.

I am aware that it has been heretofore attempted to collect the waste fumes of lead-smelting furnaces in long flues; but this was expensive and unsatisfactory.

I am also aware that a patent was heretofore granted for blowing pulverized argentiferous ores of lead into a furnace, and then passing the fumes through a showering-chamber to throw down the silver, and afterward the lead fumes were collected in bags; but the water employed to wash the fumes absorbed the sulphuric acid and the vapor destroyed the bags.

I am also aware that textile fabrics have been employed with compound reducing and oxidizing zinc-furnaces, and also with compound reducing and oxidizing lead-furnaces; but no one has combined a series of cooling-tubes and collecting textile fabric with the lead smelting and refining furnace so as to prevent the waste incident to the processes of smelting or refining.

My present improvement consists in the direct combination, with the stack of a lead-ore-smelting furnace or lead-refining furnace, of a series of metallic cooling-tubes and a series of bags of textile fabric or their equivalent.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In combination with the stack of a lead-ore-smelting furnace or lead-refining furnace, a cooling flue or tubing and textile bags or straining-receptacles for collecting the escaping lead fumes.

2. The combination, with the stack of the ordinary lead-ore-smelting furnace or lead-refining furnaces, of a series of cooling-tubes, a blower, and a series of bags composed of textile or straining fabrics, substantially as described.

GEORGE T. LEWIS.

Witnesses:
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