(No Model.) 2 Sheets—Sheet 1.

G. T. LEWIS.

MANUFACTURE OF WHITE PIGMENTS.

No. 346,114. Patented July 27, 1886.

Fig. 1.

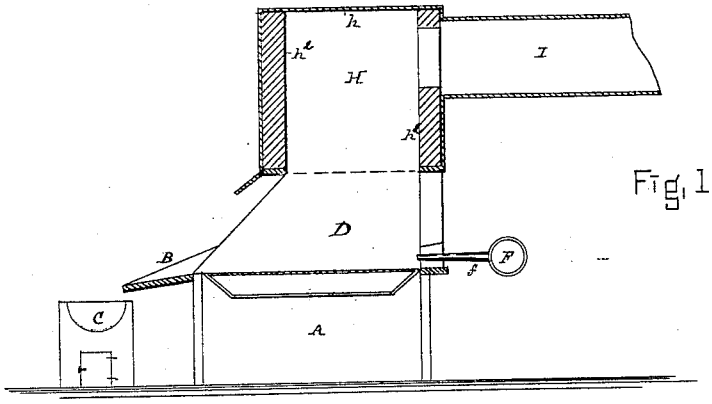


Fig. 2.

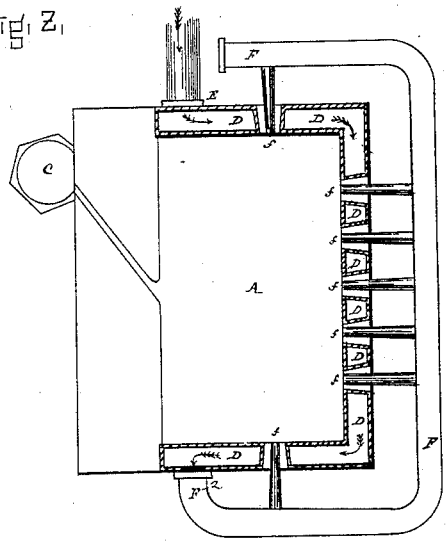
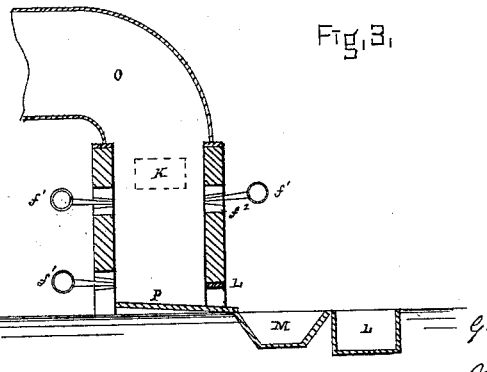


Fig. 3.



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(No Model.) 2 Sheets—Sheet 2.

G. T. LEWIS.

MANUFACTURE OF WHITE PIGMENTS.

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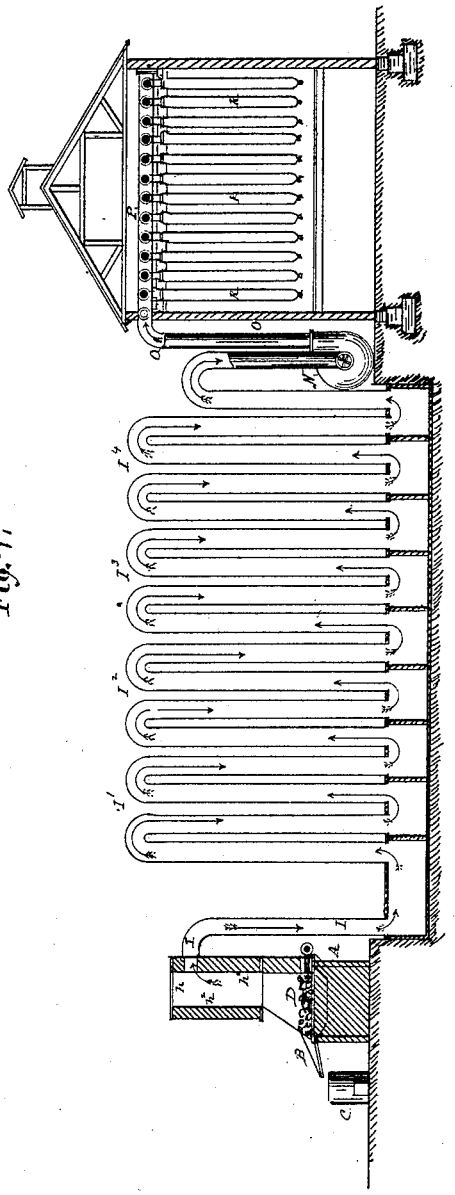

Fig. 4.

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UNITED STATES PATENT OFFICE.

GEORGE T. LEWIS, OF PHILADELPHIA, PENNSYLVANIA.

MANUFACTURE OF WHITE PIGMENTS.

SPECIFICATION forming part of Letters Patent No. 346,114, dated July 27, 1886.

Application filed August 3, 1885. Serial No. 173,440. (No model.)

To all whom it may concern:

Be it known that I, GEORGE T. LEWIS, of Philadelphia, Philadelphia county, State of Pennsylvania, have invented certain new and useful improvements in the process of making white pigment of complex lead and zinc ores which contain these metals as sulphurets, of which the following is a full, clear, and exact description.

The within-described process is an improvement on the process described in Letters Patent No. 83,357, granted to Nathan Bartlett, and dated October 27, 1868, and it is not my intention to herein claim the process therein described.

In the drawings, Figure 1 is a vertical section of a Rossie American-Scotch hearth for melting lead, but provided with seven tuyeres. Fig. 2 is a plan view of the same, showing the arrangement of the tuyeres and the air-circulation. Fig. 3 is a vertical section of the pigment-furnace, which is a slag hearth similar to the Wetherill. Fig. 4 is a longitudinal section of the cooling-pipes and bags referred to in this specification, and for which I hold Letters Patent No. 212,855, dated March 4, 1879.

A is the hearth-box.

B is the work-stone, of cast-iron, provided with a diagonal groove leading to the cast-iron pot C.

D is an air-chest. The blast passes into this chest through a pipe, E, whence it passes into the pipe F, whence by a curved pipe it is discharged into the tuyeres *f f*, five of them being at the back of the hearth and one at each end.

H is a sheet-iron head, the iron being indicated by *h*. It is lined with fire-bricks h^2.

I is a flue leading to safety catching apparatus.

K, in Fig. 3, is the feed-opening for slag; M, lead-pot; L, slag-pot.

L' L^2 L^3 L^4 are a series of vertical cooling-tubes connected to the flue I leading from the Rossie American-Scotch hearth. (Shown on a larger scale in Fig. 1.) These tubes are so arranged that the fumes are forced to ascend and descend successively as they pass along through the tubes.

N is a fan, which draws the fumes through the tubes and forces them into the tube K, which connects with the horizontal tube L. From this tube L are suspended a series of bags or strainers, R R, composed of textile fabric, through the meshes of which the gases escape, leaving the solid material or fumes proper within the bag.

Hitherto such metallic ore has been worked into a white pigment by roasting it in a reverberatory furnace and treating the roasting mass in a Wetherill zinc-furnace by the Nathan Bartlett process. This is, however, an expensive process. The roasting is expensive, and where the ore is desulphurized in this manner will contain so much free oxide of lead that it often becomes discolored. The waste fumes from such reverberatory furnace are also mixed with a large quantity of free sulphuric acid, which prevents the condensation of the solid matter of the fumes in textile fabric of either cotton or wool.

By my improved process I produce a compound containing less free oxide of lead and more sulphate of lead, the whiteness is uniform, and the pigment forms a better basis for paints, not cracking and blistering, and is not so poisonous.

My improved process consists in roasting the mixed lead and zinc ore in a Rossie American-Scotch hearth or any similar lead-smelting furnace of the Scotch hearth order, preferably, however, with a hot-blast, previously mixing the ore, in a finely-crushed state, with carbonaceous material, such as soft coal. This process differs from the ordinary roasting, in that the blast (preferably hot) being blown into the mass of coal and ore oxidizes the ore much quicker than in the ordinary roasting-furnace, with much less labor and fuel. The coal is employed in only just sufficient quantity to keep the temperature at the proper degree. On the other hand, by my improved process a large amount of the metals volatilize and form fumes of sulphates and oxides of lead and zinc, while the residual roasted mass not volatilizing contains somewhat more sulphate of lead and less oxide of lead than is contained in the mass resulting from ordinary roasting, and if much lead is present some will smelt down as metal and may be run off as such. I draw off the fumes from the roasting-furnace by a fan through a series of cooling-pipes, and force them into bags or sacks of

textile fabric, serving to separate by filtration the solid particles from the roasting-gases in which they are suspended. This collecting apparatus is shown in Letters Patent No. 212,855, granted to me March 4, 1879, and I do not here claim it. The roasted ores and waste fumes are now treated in the ordinary manner in a Wetherill furnace, or in a low cupola furnace with a double row of tuyeres, one row near the bottom and the other row near the top. One form of this furnace is shown in Fig. 3 of drawings. This furnace is shown in Letters Patent No. 13,806, granted to Samuel Wetherill November 13, 1855, and the process above referred to is shown and described in the Lewis and Bartlett Patent No. 206,680, of August 6, 1878. The white pigment is collected in the usual manner, as described in the Nathan Bartlett Patent No. 83,257, and dated October 27, 1868.

Having now fully described my invention, what I claim, and desire to secure by Letters Patent, is—

The process of making an improved white pigment from mixed crude lead and zinc ore, consisting in roasting the ore by blowing hot air into the mass of ore and carbonaceous matter, and then subliming the mixture of residual and roasted ore of this operation and the condensed fumes by heating them in a Wetherill furnace or in a low cupola furnace with lower and upper blast, substantially as shown and described.

In witness whereof I have hereunto set my hand.

GEORGE T. LEWIS.

Witnesses:
JOHN L. VANDIVER,
H. R. SHULTZ.