

S. T. JONES.
Making White Zinc.

No. 13,332.

Patented July 24, 1855.

Fig. 1.

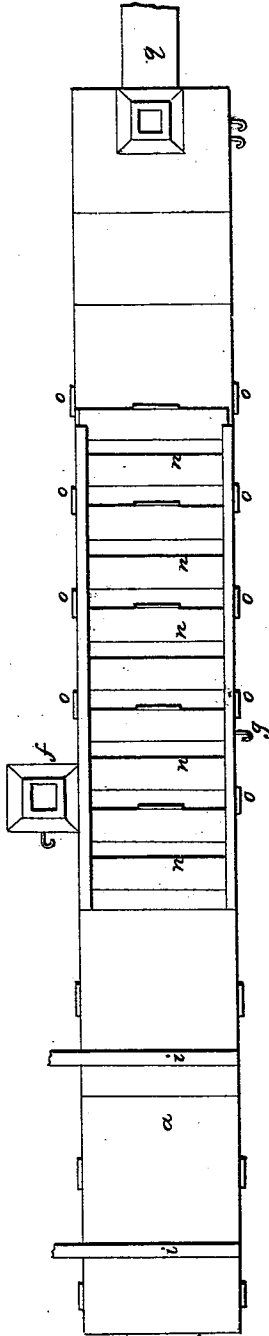
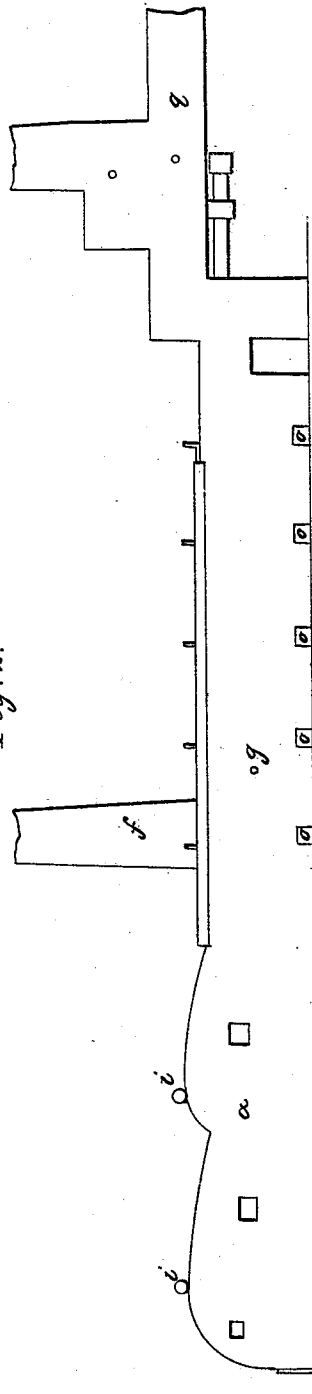


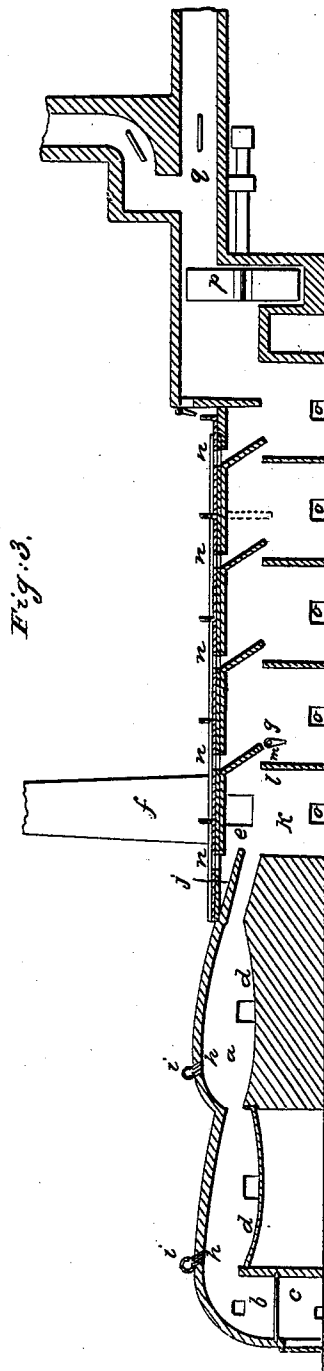
Fig. 2.



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UNITED STATES PATENT OFFICE.

SAMUEL T. JONES, OF NEW YORK, N. Y.

IMPROVEMENT IN FURNACES FOR TREATING ZINC ORES.

Specification forming part of Letters Patent No. 13,332, dated July 24, 1855.

To all whom it may concern:

Be it known that SAMUEL T. JONES, of the city, county, and State of New York, have invented certain new and useful Improvements in the furnace and apparatus for the reduction of the ores of zinc and other substances connected therewith, and for collecting the white oxide of zinc, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a plan, Fig. 2 a side elevation, and Fig. 3 a longitudinal vertical section.

The same letters indicate like parts in all the figures.

The said improved furnace and apparatus is for reducing the ores and other admixtures of zinc, and for insuring the admixture of atmospheric air with the vapors of zinc evolved therefrom to produce the white oxide of zinc, to cool and collect the same in a pure state, and, when the ore contains iron, as in treating the ore called "franklinite," to work the iron after the zinc has been worked off; and my said invention consists in combining with the separating and collecting apparatus and the puddling-furnace, and interposed between them, a chimney, the passage to which is governed by a damper or register to be opened on starting the apparatus before the vapors of zinc are evolved, and when the iron contained in the ore is to be worked for the production of iron after the zinc has been worked off.

In the accompanying drawings, A represents a reverberating furnace such as is usual for puddling iron, and consisting of two chambers, one behind the other, and with a fire-chamber, *b*, in front, with an ash-pit, *c*, below, in which a blast is to be introduced in the usual way. The ore to be worked, properly reduced in size and mixed with carbonaceous matter, such as anthracite coal, is placed on the two hearths *d d*, and a suitable fire made in the grate in the fire-chamber *b* and the blast applied at or beyond the rear end of the second hearth, and through the side wall there is an aperture, *e*, governed by a damper leading to a chamber, *f*. When the furnace is started, the aperture *e* is to be opened, and a damper, *g*, beyond, closed, so that the products of combustion shall escape into the chimney. So soon as the ore begins to give out the vapors of zinc, the ap-

erture is to be closed and the damper *g* opened, so that the vapors of zinc shall pass into and through the series of separating-chambers. Through the roof of the furnace and over each hearth, and a little back of each bridge, are arranged a series of tuyeres, *h h*, communicating with a pipe, *I*, connected with a suitable blowing apparatus. The pipes through which the blast of air is supplied can be heated by the waste heat of the furnace or in any other suitable manner, or may be introduced without being heated. The tuyeres are inclined backward and direct a series of jets of atmospheric air on the charges of ores and carbonaceous matter on the hearths to aid in effecting the combustion of the carbonaceous matter and the reduction of the ore, but more particularly to supply oxygen to the vapors of zinc as evolved from the ore to insure their oxidation, and thereby insure the production of the white oxide. At the rear end of the second hearth the roof *j* inclines downward to discharge the gaseous products of the furnace into a separating-chamber, *k*. The rear wall, *l*, of the said chamber has an aperture, *m*, near the top leading to the next chamber of the series, which is constructed like the first, and so to the end of the series. There is an aperture, *n*, in the top of each chamber governed by a damper or register, so that when this aperture in the top of each chamber is opened the force of the current of gases, &c., from the furnace induced by the exhaust at the rear end of the apparatus produces a current of air through each aperture *n*, which mingles with the vapors of zinc in escaping to the next chamber or to the exhaust, and thus insures the oxidation and cooling of the vapors of zinc. The force of the blast through the furnace forces the products of the furnace into the series of separating-chambers in a downward direction, which causes the solid impurities to lodge in the said chambers, from whence they can be drawn out through holes or doors *O* at the side, while the vapors are induced to rise and pass out through the aperture at the back into the next chamber, and so on throughout the series, and from the last of the series into the exhausting apparatus. The last of the series of separating-chambers communicates by a pipe with the central part of a fan-blower, *p*, by the rotation of which the vapors are drawn

into and forced out into a pipe, *q*, leading to one or more bags or receiving-chambers where the white oxide is collected. After the ores have given out all the vapor of zinc, if the ore contains iron the damper leading to the separating-chamber is to be closed and that leading to the chimney opened, and the remaining iron can then be treated in the usual manner of making iron in reverberatory furnaces, and so with regard to other metals which may be contained in the ore.

It will be obvious from the foregoing that the construction of the reverberating furnaces can be changed at pleasure, although the construction specified and represented is deemed best; and, if desired, any other suitable furnace may be substituted in connection with the separating, cooling, and collecting apparatus. The number of separating-chambers can be varied at pleasure from one upward, and so with the exhausting-fan. Any other mode of exhaustion may be substituted, although I prefer to use the rotating fan.

The chimney may be so located (as shown)

as to answer the required purpose for two or more furnaces; and so with reference to the construction of the separating-chambers, instead of deflecting the currents downward to deposit the impurities and permit the vapors to rise and pass out through the apertures at the back, any modification may be made in the construction which will effect the same purpose by analogous means.

What I claim as my invention, and desire to secure by Letters Patent, is—

The double use of the chimney, substantially as specified, by combining the said chimney, governed by a damper or register, with the furnace and collecting apparatus, and interposed between the two, substantially as specified, whereby the iron contained in the ore can be worked after the zinc has been worked and collected, as set forth.

S. T. JONES.

Witnesses:

C. W. M. KELLER,
WM. H. BISHOP.