J. CORSON & F. WINTER.

PROCESS AND APPARATUS FOR REFINING METALS

No. 181,046. Patented Aug. 15, 1876.

Fig. 1.

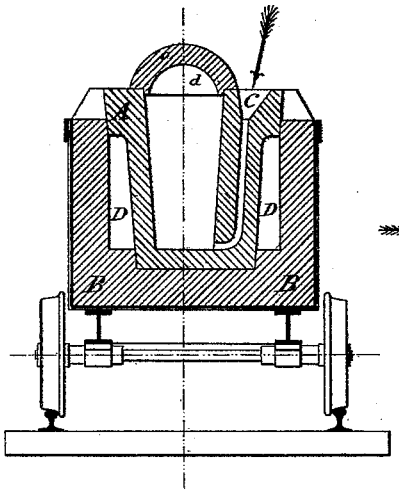


Fig. 2.

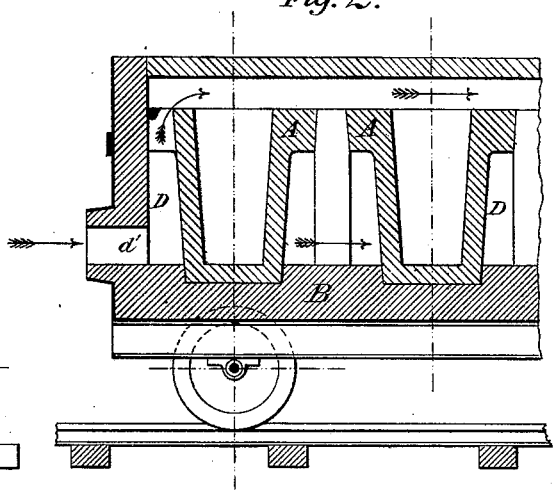


Fig. 3.

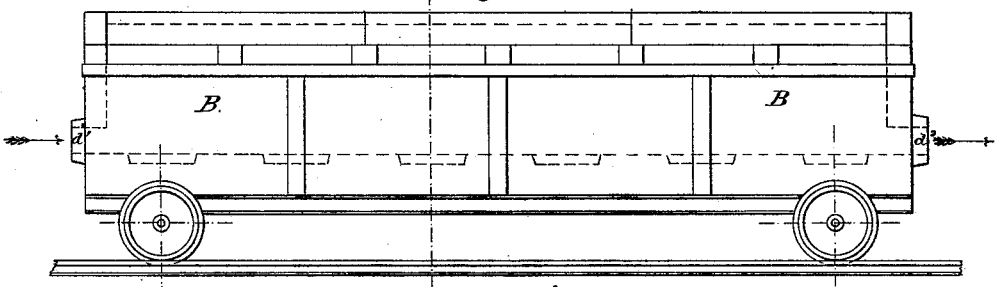
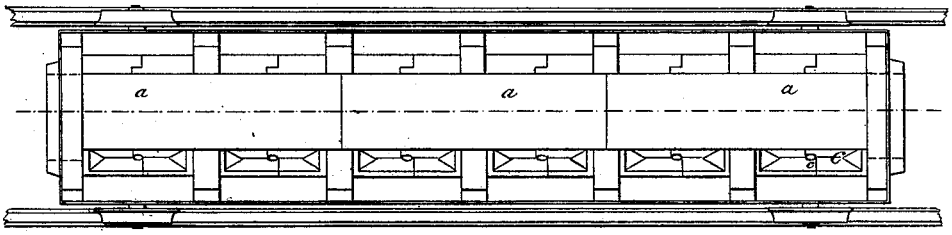


Fig. 4.



Witnesses,

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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN PROCESSES AND APPARATUS FOR REFINING METALS.

Specification forming part of Letters Patent No. **181,046**, dated August 15, 1876; application filed May 19, 1875.

To all whom it may concern:

Be it known that we, JOHN CORSON and FREDERICK WINTER, both of the city of Washington, District of Columbia, have invented certain Improvements in Refining Metals, and in the apparatus used for this purpose, which improvements are fully set forth in the following specification, reference being had to the accompanying drawings.

The object of our invention is to prepare iron and other metals in a pure state for subsequent manufacture.

In the accompanying drawing, Figure 1 is a transverse section of a crucible, A, inclosed in a jacket, B, resting on a wheeled truck. Fig. 2 is a longitudinal section of the jacket and truck, showing also two of a group of crucibles. Fig. 3 is a side view of the jacket, made to contain a group of six crucibles. Fig. 4 is top view, showing a sectional arched covering, *a a a*, for the crucibles, with the beveled casting-hopper C, having mouth-holes *c*.

Appropriate letters of reference designate other several parts.

The jacket B forms an outer case or box for the reception of one or a series of crucibles, A, which, when there are more than one, are arranged longitudinally in a row. These crucibles are shaped somewhat narrower at their lower end than at the top, so as to leave an intervening space or air-chamber, D, between them. This air-chamber D terminates at each end of the jacket, as shown in Fig. 2, d^1, and Fig. 3, d^1 d^2. This air-chamber thus forms one continuous connection inside, the full length of the jacket, round the sides of each crucible, and also under the arched cover, *a*, as shown in Fig. 1, *d*.

The jacket containing the group of crucibles being mounted on a wheeled truck, which rests on a tramway, the whole can be readily transported in any direction. When preparing for casting the ingots in the crucibles the whole apparatus, as shown in Fig. 3, is led up to a furnace in which hot air is generated to the blast-flame from a gas-pipe, or to their equivalent, and, being temporarily connected thereto at d^1, a blast or current of hot air is forced in the direction of the arrows on Figs. 2 and 3, entering through the opening d^1, and circulating through the chamber D and under the arched cover *a*, eventually passes out at d^2. Thus the spaces between the several crucibles and those intervening between them and the inner sides of the jackets, as well as the space *d* under the arched cover *a*, form one connected caliduct, through which heated air circulates in the direction of the arrows shown in Figs. 2 and 3. Having by this means thoroughly heated the several crucibles to a required degree of temperature, and removed all the outer atmospheric influence, the caliduct is disconnected and the truck is removed on the tramway as near to the reservoir of the smelting-furnace as required. The molten metal is then poured through the opening mouth *c*, each crucible being successively moved into proper position near the furnace-reservoir. The outer atmosphere having been expelled, and the molten metal coming into immediate contact only with surfaces of uniform temperature, none of those violent shocks follow, which largely contribute to flaws and produce oxidation.

Metal cast in crucibles, as herein set forth, also will contain no air-cells.

Our process effects another beneficial result. The heated crucibles and surrounding heated air of uniform temperature offering no counteracting influence or "chill" to the inflowing mass of metal, it immediately commences to settle rapidly, to filtrate, and precipitate in obedience to the laws of gravitation, as well as to chemical and other influences peculiar to metals in their fluid state. All the impurities are forced upward, and the lower contents of the crucible become densely compact.

We do not claim the casting of specific articles, such as pipes, railway-chairs, &c., as our invention only relates to the preparing and refining of metal in the mass preparatory to its being used in the arts for casting, rolling, &c.

We claim—

1. The caliduct, composed of the crucible surrounding chamber D, the arched space *d* beneath the cover, and the inlet and outlet passages d^1 and d^2, communicating therewith.

2. The process described of refining metals by casting them in ingots in covered crucibles previously heated to the required uniform

temperature, and not further heated after the metal is supplied to the crucible, except from the top, the metal being prevented from contact with outward or variable atmosphere, substantially as described.

3. The described method of refining a mass of metal at the lower part of the ingot or mass, and forcing the volatile and other impurities upward, by casting in a heated crucible deprived of variable atmosphere, and surrounded at sides and at top by caliducts, in connection with introducing the molten metal at the bottom of the mold.

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Witnesses:
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