2 Sheets—Sheet 1.

C. WOOD.

MANUFACTURE OF BRICKS, &c., FROM FURNACE SLAG.

No. 185,712. Patented Dec. 26, 1876.

Fig: 1.

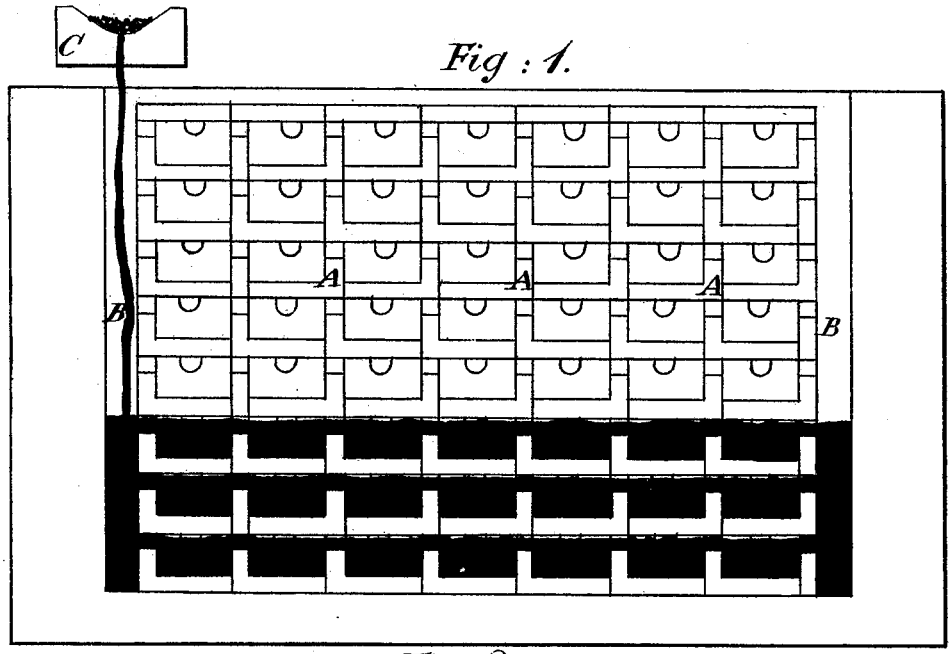
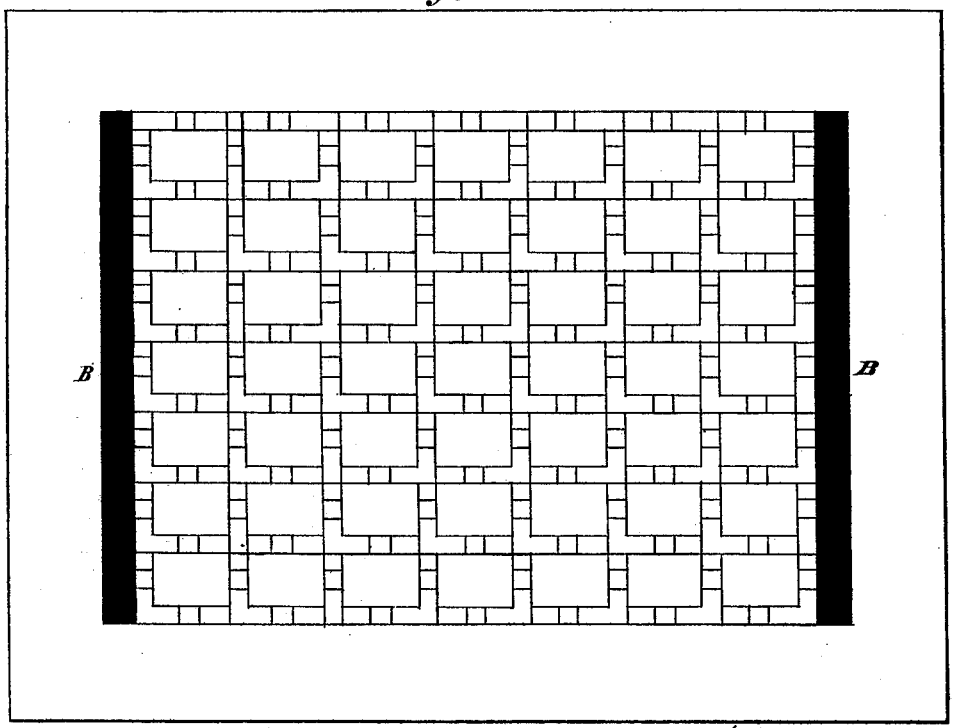


Fig: 2.



WITNESSES E. B. Davidson, F. Stolle

CHARLES WOOD INVENTOR
BY HIS ATTORNEYS
Baldwin, Hopkins & Peyton

THE GRAPHIC CO. N.Y.

2 Sheets—Sheet 2.

C. WOOD.

MANUFACTURE OF BRICKS, &c., FROM FURNACE SLAG.

No. 185,712. Patented Dec. 26, 1876.

Fig: 3.

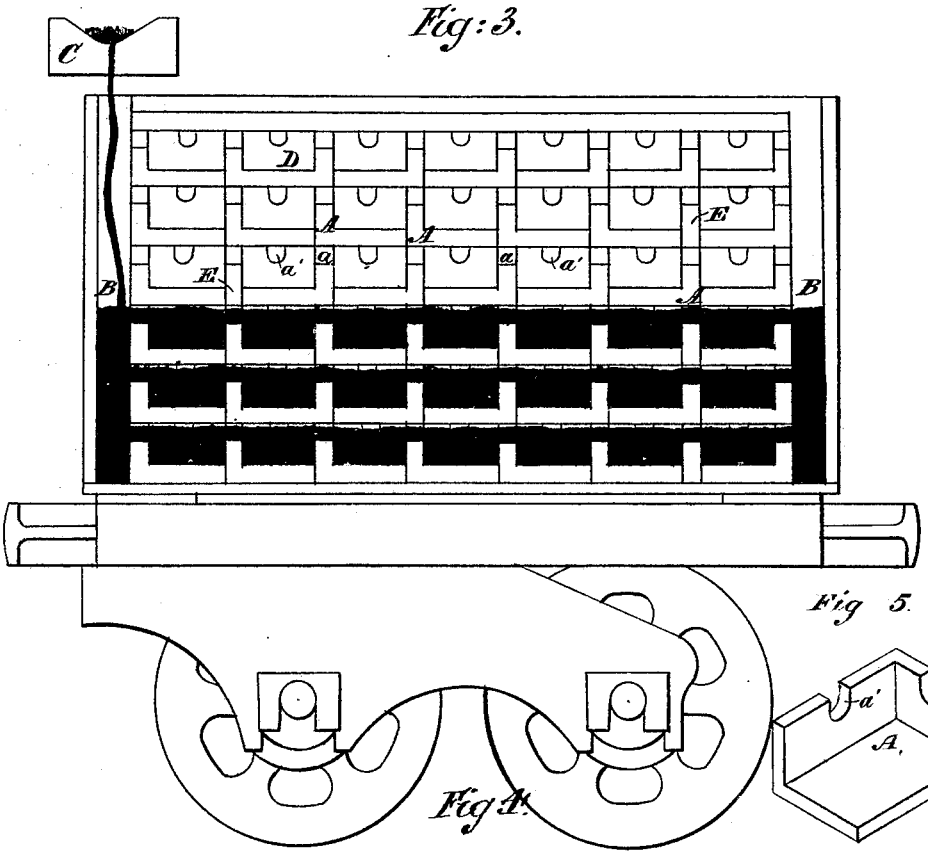


Fig 5.

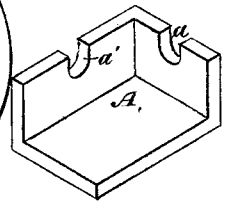
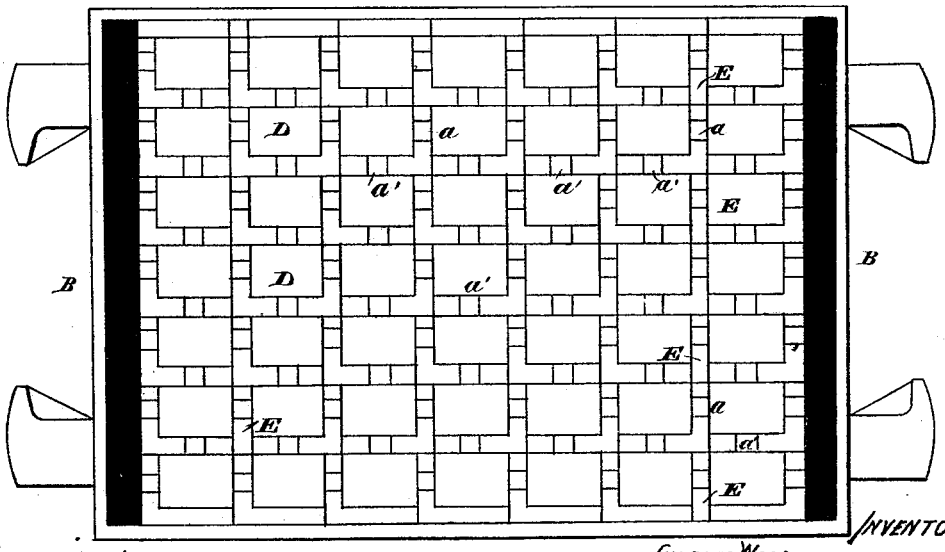


Fig 4.



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UNITED STATES PATENT OFFICE.

CHARLES WOOD, OF TEES IRON-WORKS, MIDDLESBOROUGH-ON-TEES, ENGLAND.

IMPROVEMENT IN THE MANUFACTURE OF BRICKS, &c., FROM FURNACE-SLAG.

Specification forming part of Letters Patent No. **185,712**, dated December 26, 1876; application filed October 5, 1876.

To all whom it may concern:

Be it known that I, CHARLES WOOD, of the Tees Iron-Works, Middlesborough-on-Tees, England, have invented new and useful Improvements in the Manufacture of Bricks and other Articles from Furnace-Slag, which improvements are fully set forth in the following specification, reference being had to the accompanying drawings.

My invention relates to the treatment of blast-furnace slag or cinder for the manufacture of various articles, such as bricks, blocks for paving, and ornamental goods.

I place a circular or square sided box (without a bottom) upon the top of a small truck with a flat top. Inside these boxes I arrange a large quantity of sand cores or molds, which have been previously made and dried in an ordinary core-oven. These cores or molds are hollow, containing the shape of the brick, block, or other casting to be made. These sand cores or molds are stacked in rows, one on the top of the other, inside the square or circular box. The slag is then run into the box, in the usual way, direct from the furnace, flowing into each mold by channels or gits left for that purpose. The slag runs into each tier of molds as the box fills up with the fluid slag. In this way it is possible in a large box to run as many as from five hundred to eight hundred bricks or blocks at one time. As soon as the slag becomes set the slag-box is drawn away, and allowed to cool in the open air, in the usual way, no further annealing being necessary than the initial heat of the slag. After the ball has become cool it is tipped off the bogie and the bricks taken out. It is found by this method that there is quite enough heat to thoroughly anneal the bricks or blocks without putting them into annealing-ovens. Fresh sand cores or molds are used each time.

If convenient space can be had at or near the furnaces, I prefer to make a square or round well, into which I place the sand cores, as many as eight to one thousand in a block, according to the size of the bricks. This well can be made of bricks, or even formed of sand cores built up on the outside of the internal space, being partly filled up also with sand cores or molds, and the slag run into the well in the same way as into the boxes before mentioned.

By this last plan I allow the whole pitful of bricks to get nearly cool and become annealed before taking out the mass to pick out the bricks.

Figure 1 on the drawing annexed shows a section of a pit, showing the sand cores (in section) stacked one layer on the top of the other. Fig. 2 shows a plan of the same, showing how the sand cores are arranged in rows. Fig. 3 shows a sectional elevation of an ordinary slag bogie, with a loose or fixed top, as commonly used in the Cleveland district, and having sand cores arranged within it. Fig. 4 shows a plan of the same, showing the sand cores arranged in this bogie or wagon in the same way as in the pit. Fig. 5 shows a view, in perspective, of one of the molds.

The sand cores or shells A A A are made separately or in pairs, having a shell of about one and a half inch in thickness of sand to divide one paving-brick or article from another, and having a git or runner from one mold-cavity to another, so that the hot liquid slag nearly or entirely fills one cavity before it flows into the next. These cores or shells are usually made singly, and rammed up in a core-box by boys, and are then placed in a core-oven until dry. They are then removed and stacked in the pit or wagon, as shown, with the gits or runners *a a'* in their ends and sides, forming communicating channels between the cavities in adjacent molds, and thus connecting by these gits all the molds in a layer of the stack. When made singly the cores or shells have only three sides, as shown clearly in Fig. 5. They are placed in position in the pits or wagons, as shown, so that the articles to be cast are completely covered on all sides. In each layer or row of molds the open side and end of a mold are closed by the side and end of the contiguous molds. The open tops of the molds are closed by the bottoms of the layer next above. To complete each row one core can be made with four sides, as at D, Figs. 3 and 4, or a loose end, E, put in separately. A space is left at one end or at both ends of the pit or wagon.

This space acts as the main runner, as shown at B B, Figs. 1, 2, 3, 4, C C being the spout for the liquid slag from the furnace. The slag runs from this spout C C into the bottom of the space or main runner B B, first feeding the bottom layer of cores. The slag runs from one shell or core to another until all the cavities of the layer are filled. The slag then rises in the space or main runner B B, and feeds the next layer of cores or shells, and so on until the whole pit is full, when they are left alone for three or four days to cool. Articles thus cast are sufficiently self-annealed.

I am aware that slag has been cast in both iron and sand molds before, and that bricks, and paving-blocks, and ornamental goods have often been made; but

What I claim as my invention is—

1. The hereinbefore-described method of manufacturing annealed brick, &c., in bulk, from furnace-slag, which consists in running the slag direct from the furnace to a mass or large number of sand molds stacked in a pit, box, or frame, layer upon layer, with the molds in the respective layers communicating with each other by gits or runners, and the end molds of each layer of the series communicating with a common feeder or runner formed by a space between the wall or side of the pit, box, or frame and the stack of molds, allowing the mass to stand to cool and become self-annealed solely by the initial heat of the slag, and finally breaking up the mass of molds, and separating the bricks, whereby large quantities of bricks are expeditiously molded and cheaply produced from a single run of slag, and annealed without the necessity of employing an annealing-oven, as set forth.

2. A stack of sand molds or shells, consisting of a series of rows or layers of molds built up in a pit, box, or frame, as hereinbefore described, the molds being three-sided, having end and side gits or channels, and arranged as shown, so that the open end and side of one mold are closed by the end and side of the contiguous molds, and the open tops of the molds of one layer covered by the bottoms of the layer above, whereby a series of layers of communicating molds is formed, and each layer communicates with a common runner formed by the space between the stack and the wall of the pit, box, or frame surrounding the stack, as set forth.

3. The three-sided mold having the gits or runners *a a'* in its end and side, as and for the purpose set forth.

CHARLES WOOD.

Witnesses:
JNO. T. BELK,
JAS. A. JOHNSTON.

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