No. 64,709. PATENTED MAY 14, 1867.

J. A. ROOT & J. N. BARTRAM.

SMELTING FURNACE.

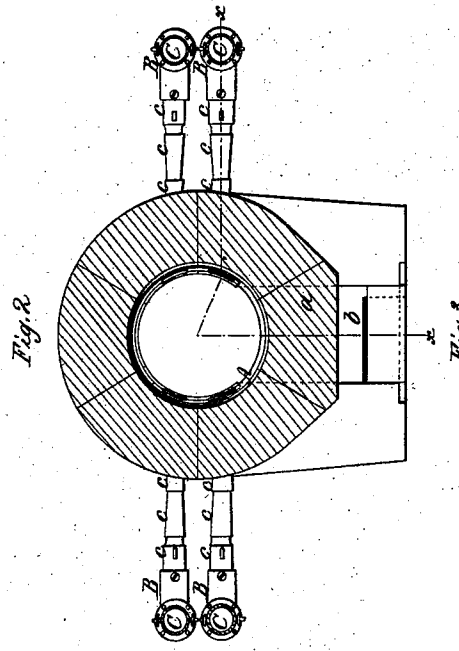

Fig. 2

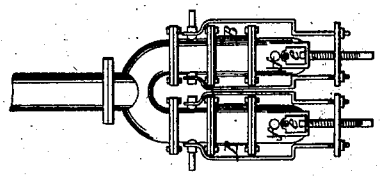

Fig. 3

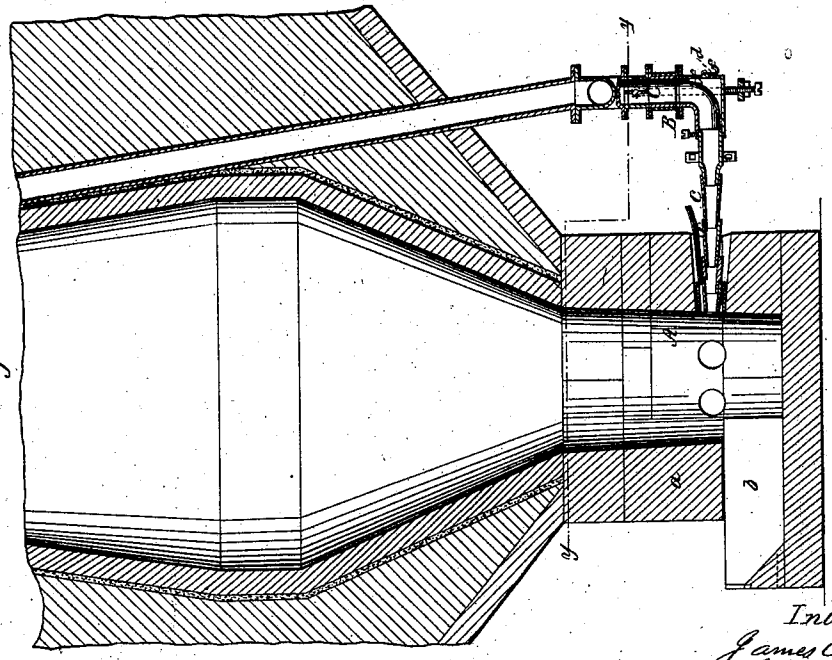

Fig. 1

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JAMES A. ROOT, OF EAST CANAAN, AND J. N. BARTRAM, OF SHARON, CONNECTICUT.

Letters Patent No. 64,709, *dated May* 14, 1867.

IMPROVEMENT IN SMELTING FURNACES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that we, JAMES A. ROOT, of East Canaan, Litchfield county, Connecticut, and J. N. BARTRAM, of Sharon, Litchfield county, Connecticut, have invented a new and improved Smelting Furnace; and that the following description taken, in connection with the accompanying drawings, hereinafter referred to, forms a full and exact specification of the same, wherein we have set forth the nature and principles of our said improvements, by which our invention may be distinguished from all others of a similar class, together with such parts as we claim and desire to have secured to us by Letters Patent.

This invention consists in constructing the hearth of stone cut and laid in such a manner as to have a circular interior in its horizontal section, and admit of the furnace operating perfectly when first erected. The usual way is to build the hearths of fire-stone, and of square form, which invariably operate imperfectly until the attrition caused by the descending ore wears them into cylindrical form. The angular corners form a great obstruction to the descending ore, and occasion considerable trouble until they become rounded by wear. The invention further consists in a novel and improved manner of constructing the blast tubes, to wit, with telescopic slides or extension pipes, as hereinafter fully shown and described, whereby said pipes may with the greatest facility be graduated in length as circumstances require. In the accompanying sheet of drawings—

Figure 1, Sheet No. 1, is a vertical section of our invention taken in the line *x x*, fig. 2.

Figure 2, Sheet No. 2, a horizontal section of the same taken in the line *y y*, fig. 1.

Figure 3, a detached outer side view of the blast pipes.

Similar letters of reference indicate like parts.

A represents the hearth of the furnace, which is constructed of cut stone, the inner sides of which are curved, forming segments of circles, so that when the stones are laid up the hearth will have an interior of inverted conical form, as shown in fig. 1, a stone, *a*, extending entirely over the passage *b*, through which the metal is drawn. The stone of which the hearth is built or composed should be of that kind which will resist the action of heat. We have used a species found in our locality, (Litchfield county, Connecticut,) which has proved to be exceedingly durable. B B represent the pipes, which conduct the blast to the interior of the hearth. Any suitable number of these pipes may be used. They are arranged in pairs, each pair communicating with a main one, as shown in red, (see figs. 1 and 3.) Each pipe B is of L form, the upper parts being composed of sections secured together by bolts or otherwise, and the lower parts are composed of a series of sections, *c*, so arranged that they may slide one within the other, (see fig. 1,) and be capable of being extended or shortened as occasion may require. The ends of these lower parts of the blast tubes are fitted in tuyeres, shown in red in fig. 1, and it will be seen that by this telescopic arrangement of the sections *c*, the blast tubes may be adjusted to compensate for the diminution of the thickness of the hearth, occasioned by the action of heat, and also to accommodate the exact position of the main blast tubes or pipes. Each pipe B is provided with a valve, C, for regulating the strength of the blast, and at the outer end of the lower part of each tube B there is an opening, *d*, covered by a slide or pivoted lid, *e*. Just above this there is inserted a glass, *f*, through which the operatives may look to see whether the pipes are becoming choked or clogged, in which case rods are inserted through the openings *d* for the purpose of cleaning them. The lower part of the pipes B B may be of sheet metal and the upper parts of cast metal. We do not, however, confine ourselves to any particular material.

Having thus described our invention, we claim as new, and desire to secure by Letters Patent—

1. The constructing of the hearth of a smelting furnace of cut stone having their inner surfaces rounded so as to form an interior of inverted conical shape, with a solid or single stone, *a*, extending across the passage *b*, substantially in the manner as and for the purpose set forth.

2. Having the lower parts of the blast pipes B formed of sections *c*, arranged to slide one within the other, substantially as and for the purpose specified.

3. The glasses *f* in the pipes B, in combination with the openings *d*, substantially as and for the purpose set forth.

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Witnesses:

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