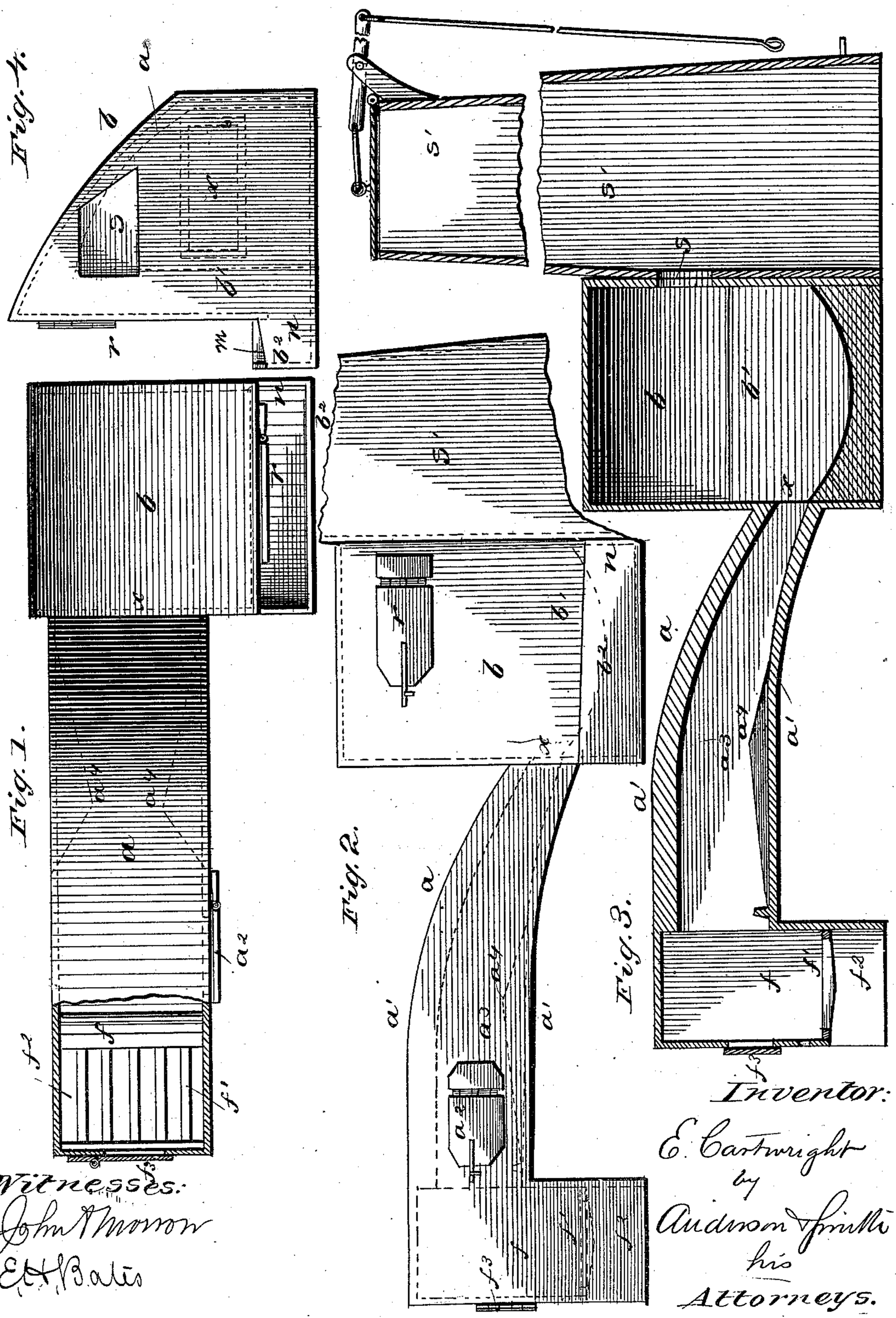
(No Model.)

E. CARTWRIGHT.

SMELTING FURNACE.

No. 286,777. Patented Oct. 16, 1883.



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UNITED STATES PATENT OFFICE.

EDWARD CARTWRIGHT, OF WILBER, NEBRASKA, ASSIGNOR OF TWO-THIRDS TO WILLIAM H. MANN AND JOHN S. EDWARDS, OF SAME PLACE.

SMELTING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 286,777, dated October 16, 1883.

Application filed June 30, 1883. (No model.)

To all whom it may concern:

Be it known that I, EDWARD CARTWRIGHT, a citizen of the United States, residing at Wilber, in the county of Saline and State of Nebraska, have invented certain new and useful Improvements in Smelting-Furnaces; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Figure 1 of the drawings is a plan view. Fig. 2 is a side view. Fig. 3 is a vertical sectional view, and Fig. 4 is an end view.

This invention has relation to smelting-furnaces for gold and silver; and it consists in the construction and novel arrangement of parts, as will be hereinafter fully described, and particularly pointed out in the claims appended.

The expense attending erection of blast-furnaces for smelting gold and silver ores is so great that it is not practical to build them at all mines, owing, in some instances, to the refractory and low-grade ores mined, and the low grade that will not pay sufficiently, in other instances, to transport them to furnaces already erected at a distance. Besides, large quantities of the ores in the mining regions are refractory and cannot be treated at all in the blast-furnaces. In order to surmount these and other difficulties, I have constructed a furnace for smelting the low-grade, refractory, and other ores without a blast and from material nearly all of which may be found at any mine, whereby but little cost of transportation of material is incurred, and whereby I am enabled to erect a smelting-furnace at any mine.

To enable others skilled in the art to which my invention appertains, I will now describe it, referring to the accompanying drawings, and the letters of reference marked thereon.

a designates an elongated arched furnace, which connects at its narrower end with a second furnace, *b*, which has vertical front and end walls and a convex or arched top and back, as shown in the drawings. *f* designates the fire-box for the furnace *a*; *f'*, the grate for the same; f^2, the ash-pit, and f^3 the door to the fire-box. The top and bottom of the furnace *a* curve downward from a point at about *a'* to the point of junction of the furnaces *a* and *b*, and the furnace *a* narrows gradually in its approach to the furnace *b*, as shown in the drawings.

a^2 is the door which closes the opening leading to the ore-bed a^3, which lies between the point *a'* and the fire-box *f*. The ore or quartz is to be placed on this ore-bed a^3 to be melted. I preferably place ribs a^4 a^4, of the outline shown in dotted lines in Figs. 1 and 2, on the bottom of the furnace *a*, at its sides, to retard the flow of the melted ore or quartz and prevent it from entering the furnace *b* too rapidly. The reflector-furnace *b* is provided with a fire-box, *b'*, through the door *r* of which the charcoal or other fuel is fed. *s* is the exit from this furnace to the smoke-stack *s'*, which is provided with a hinged cover having an arm and a rod, by which the cover may be manipulated to regulate the draft. The base of the furnace *b* extends in front of the front wall of said furnace *b*, and this projection is open at the top, as shown. The front wall, b^2, of this extension is termed the "dam." The lowest point of the bottom of the extension is at the front left-hand corner, and the lowest point of the top of the dam is at the front right-hand corner of the extension at *n*, preferably, although this arrangement may be reversed. I usually coat the interior walls of both of the furnaces with a plaster of plumbago. The floor of the furnace *b* is concave. The heat passes from the fire-box *f* into the furnace *a*, and from this furnace *a*, by reflection and draft at *x*, into the reflector-furnace *b*, where, by reason of the concave and convex shape of the interior of the furnace *b*, the heat is reflected to all parts of the same. The smoke and gases pass at the flue *s* into the smoke-stack. After the metal passes into the reflector-furnace *b*, it there liquefies and separates. The metal, sinking to the floor, runs to the lower corner of the extension. The cinder or slag, being lighter, floats on the top and passes off at the point *n* at the top of the dam.

By this construction I am enabled to smelt

quartz, low-grade and refractory ores of all kinds, and the expense attending the erection of such a furnace is such that it may be put up and made to pay at all mines, no blast being necessary, the draft and reflection doing the work perfectly.

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

1. In a furnace for smelting gold and silver ores, the reflector-furnace *b*, having the bottom and top concave interiorly, in combination with a front open-top extension at its base, provided with the depression *m* in its bottom, and the low portion *n* in the top of its dam b^2, substantially as specified.

2. The combination, with the reflector-furnace *b*, having the bottom and top concave interiorly, and the front base-extension with depression *m*, and the low portion *n* in the top of the dam b^2, of the arched elongated furnace *a*, narrowing gradually from the fire-box *f* to the point of connection with the reflector-furnace *b*, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD CARTWRIGHT.

Witnesses:
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