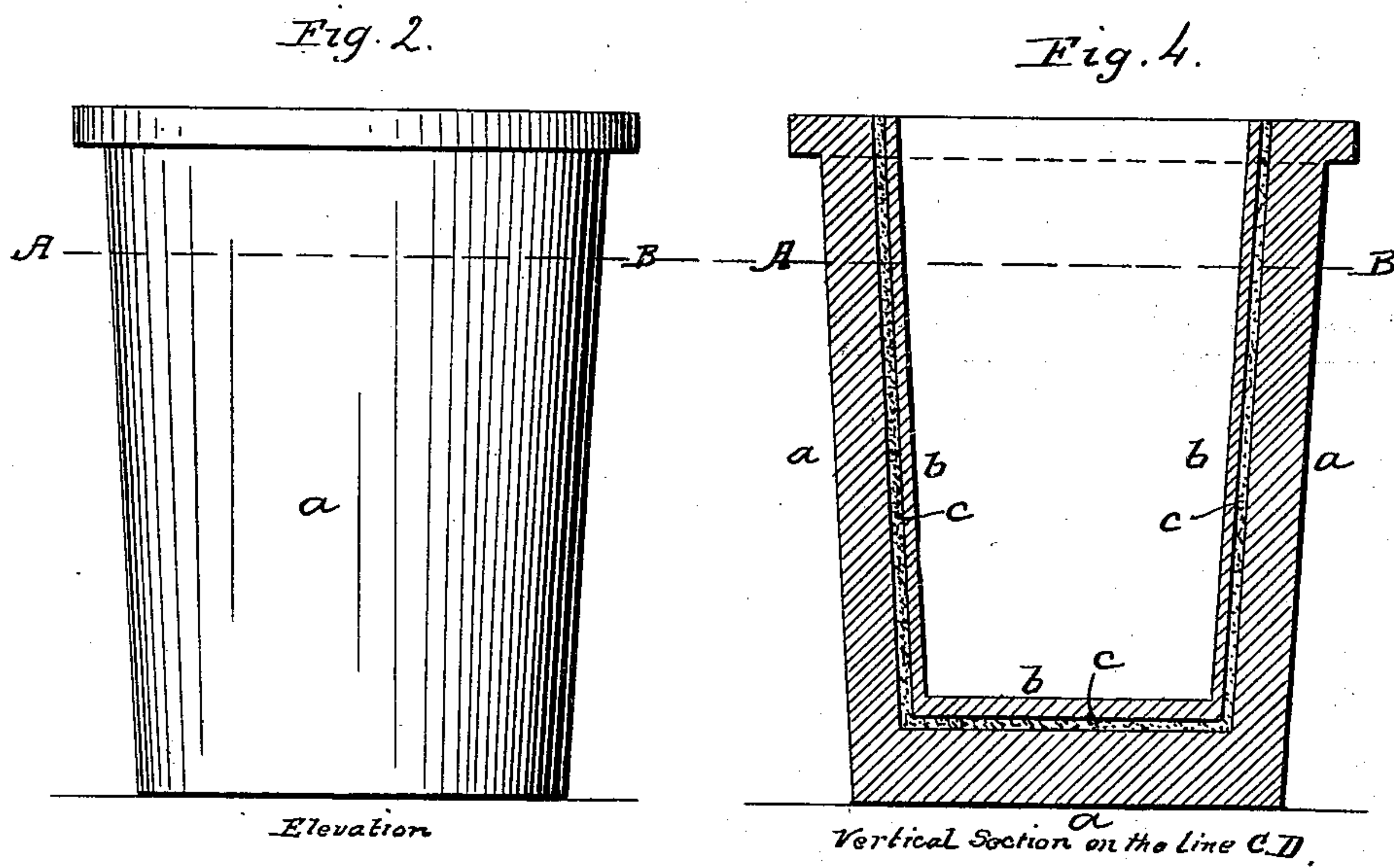
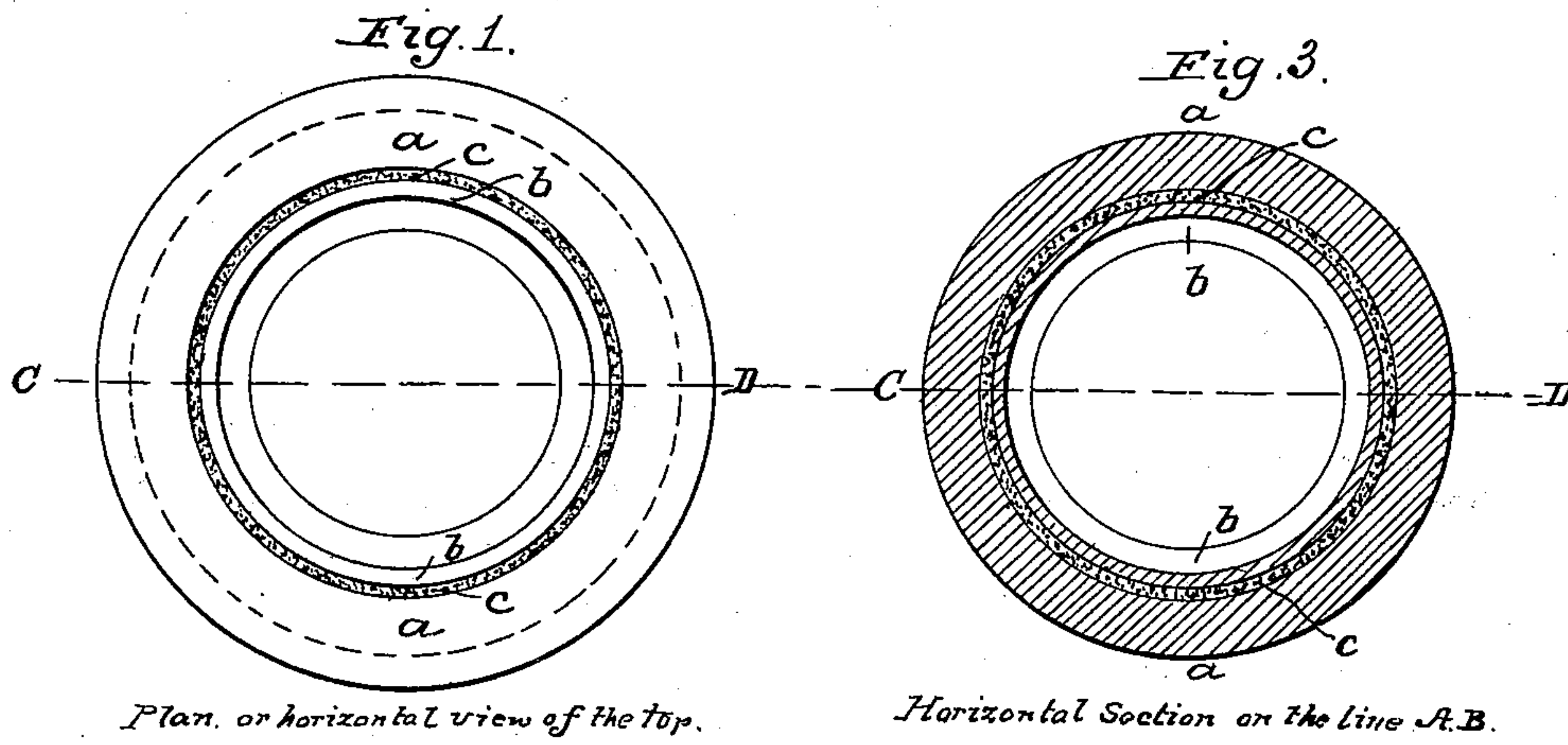


B. S. STOKES.  
Crucible for Metallic Baths.

No. 49,009.

Patented July 25, 1865.



Witnesses:  
John A. M. B. L. L.  
B. S. Stokes

Inventor:  
Benjamin S. Stokes



# UNITED STATES PATENT OFFICE.

BENJAMIN S. STOKES, OF MANCHESTER, NEW HAMPSHIRE.

## IMPROVED CRUCIBLE FOR METALLIC BATHS.

Specification forming part of Letters Patent No. 49,009, dated July 25, 1865.

*To all whom it may concern:*

Be it known that I, BENJAMIN S. STOKES, of Manchester, in the county of Hillsborough and State of New Hampshire, have invented a new and Improved Mode of Constructing Crucibles for Metallic Baths; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, where similar parts are represented by like letters.

Figure 1 is a plan or horizontal view of top; Fig. 2, an elevation; Fig. 3, a horizontal section on the line A B of Figs. 2 and 4; Fig. 4, a vertical section on the line C D of Figs. 1 and 3.

*a a* represent the outer crucible or cylinder; *b b*, the inner crucible or cylinder; *cc*, the space between *a* and *b*.

The nature of my invention consists in constructing a crucible of two parts, so as to prevent the wasting of the metal used in the same, and to render it durable and economical.

Single cast-iron crucibles filled with lead, for the purpose of heating files or other pieces of steel uniformly and evenly, have been long used, but experience shows that such crucibles, after a few weeks', sometimes a few days' use, become so porous and spongy by the action of the heat and air upon their outer surfaces that the lead filters through them and renders them worthless, although the crucible is not sensibly diminished in size or injured in any other respect than in its capacity to retain the lead. A cast-iron crucible, one and a quarter inch thick, capable of holding two hundred pounds of lead, will leak and waste from six to twelve pounds of lead per day after being used about ten days.

To construct a crucible that will prevent this waste of its metallic bath by preserving the original structure of the lining or inner crucible in shielding it from atmospheric air is the object of my invention, which I will describe, to enable others skilled in the art to make and use the same.

In the first place I cast of iron a crucible. (Represented by *a a*, Figs. 1, 2, 3, 4.) I then make of best wrought-iron a crucible, *b b*, Figs. 1, 3, 4, smaller in diameter than the inside of *a a*, and of less depth than inside of *a*, a section of which is shown in Fig. 4 by *b b*, this inner crucible being thinner than the outer one, but of sufficient thickness and strength for the purposes

required of it. Next I take common fine sand, sift out the smaller particles, wash the sand and dry it, then sprinkle this on the bottom of inside of *a*, Fig. 4, as indicated by the yellow color in space *c*, between the bottoms of *a* and *b*. I then introduce *b* into *a*, resting *b* on the sand on the bottom of *a* until the entire space between *a* and *b* is filled with this sand, which is tamped down as it is filled in, and the sand forms, as it were, a third or middle crucible between *a* and *b*, as shown by *c* in the drawings. *b* is then filled with lead, and the two crucibles thus prepared are heated in the usual mode.

I use this crucible in the manufacture of files, which are placed in the lead bath after it is heated to the desired temperature; but all kinds of cutlery and other steel instruments are tempered by heating in lead baths, and my invention applies to all lead or other metal baths, and to all other kinds of crucibles, for whatever purposes they may be used.

I make *b* of wrought-iron on account of its structure and compactness, and its tendency to resist leakage from expansion by heat when it is protected from the air.

To protect *b* from atmospheric air on its outer surface I introduce the sand, as described, which experience shows entirely prevents the outer surface of *b* from oxidation or scaling and wearing away, and thus preserves to *b* its original size, structure, and compactness, and while so preserved *b*'s power to retain its metallic bath is not diminished by heat, as several months' use of such a crucible shows no sensible loss of the metal constituting its bath.

There is no reason why *b* will not last as long as *a* is thick enough to hold the sand around its outer surface; and when *a* shall have been burned so thin as to allow the escape of the sand, which could not be in many months, then a new cast-iron crucible can be substituted for *a* and *b* be re-inserted and packed therein, as before described, *b* meanwhile retaining its integrity. Another advantage of the sand is that when crucibles *a* and *b* are made of cast and wrought iron the sand will adapt itself to the different degrees of expansion such irons are subject to, and thus relieve any strain that would otherwise result to either *a* or *b*.

I do not wish to confine myself to making *a* of cast-iron, nor to filling the space between *a* and *b* with sand, for I contemplate that other

materials may be used in their stead to prevent the oxidation and wearing off of the outer surface of the inner crucible, substantially as described, and that such are included in my invention. The inside surface of *b* is always protected from the air by its metallic bath—a fact common to all crucibles.

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

The construction, substantially as herein described, of a crucible of two parts, *a* and *b*, with space *c* between *a* and *b* filled with sand or its equivalent, for the uses and purposes herein set forth.

BENJAMIN S. STOKES.

Witnesses:

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