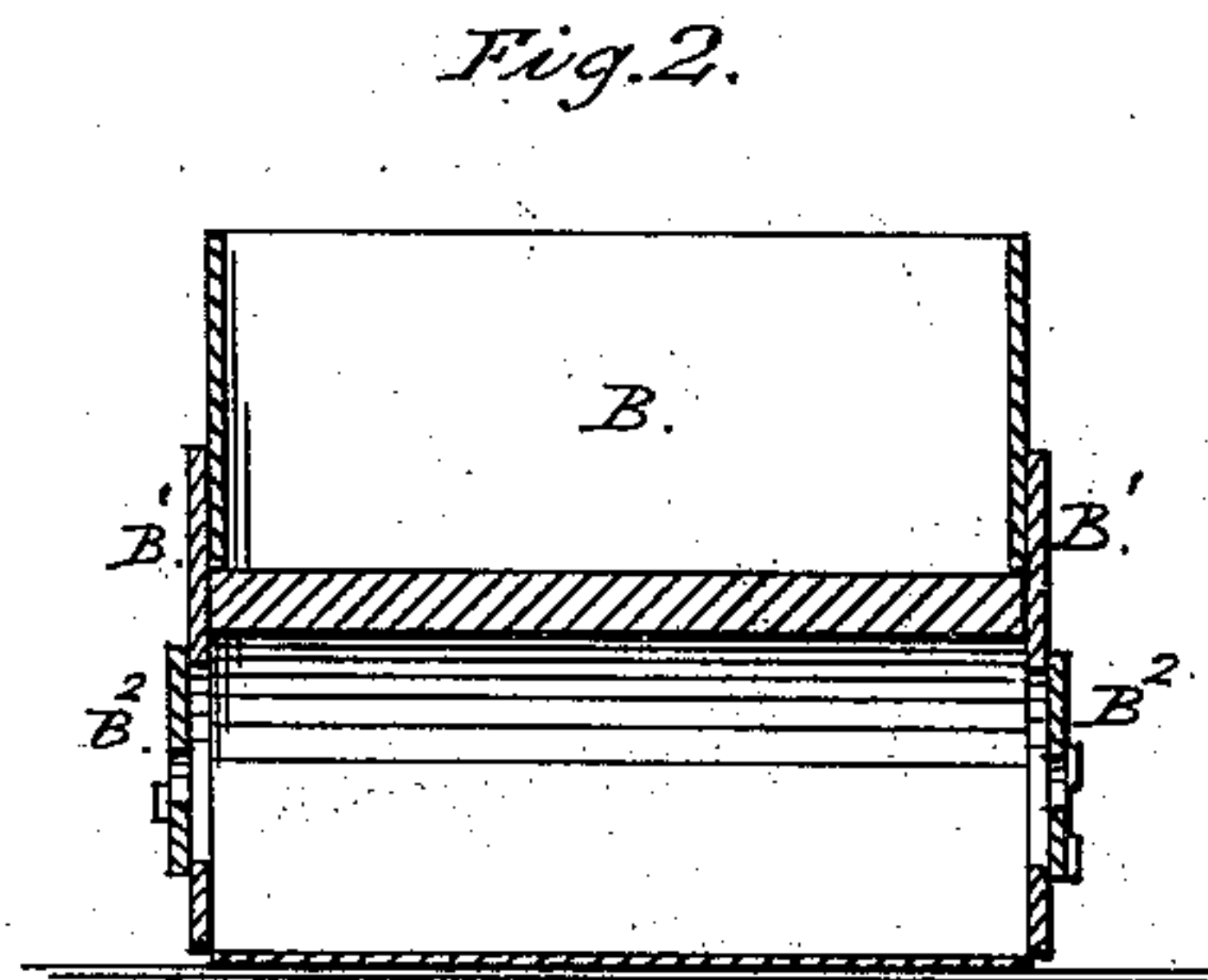
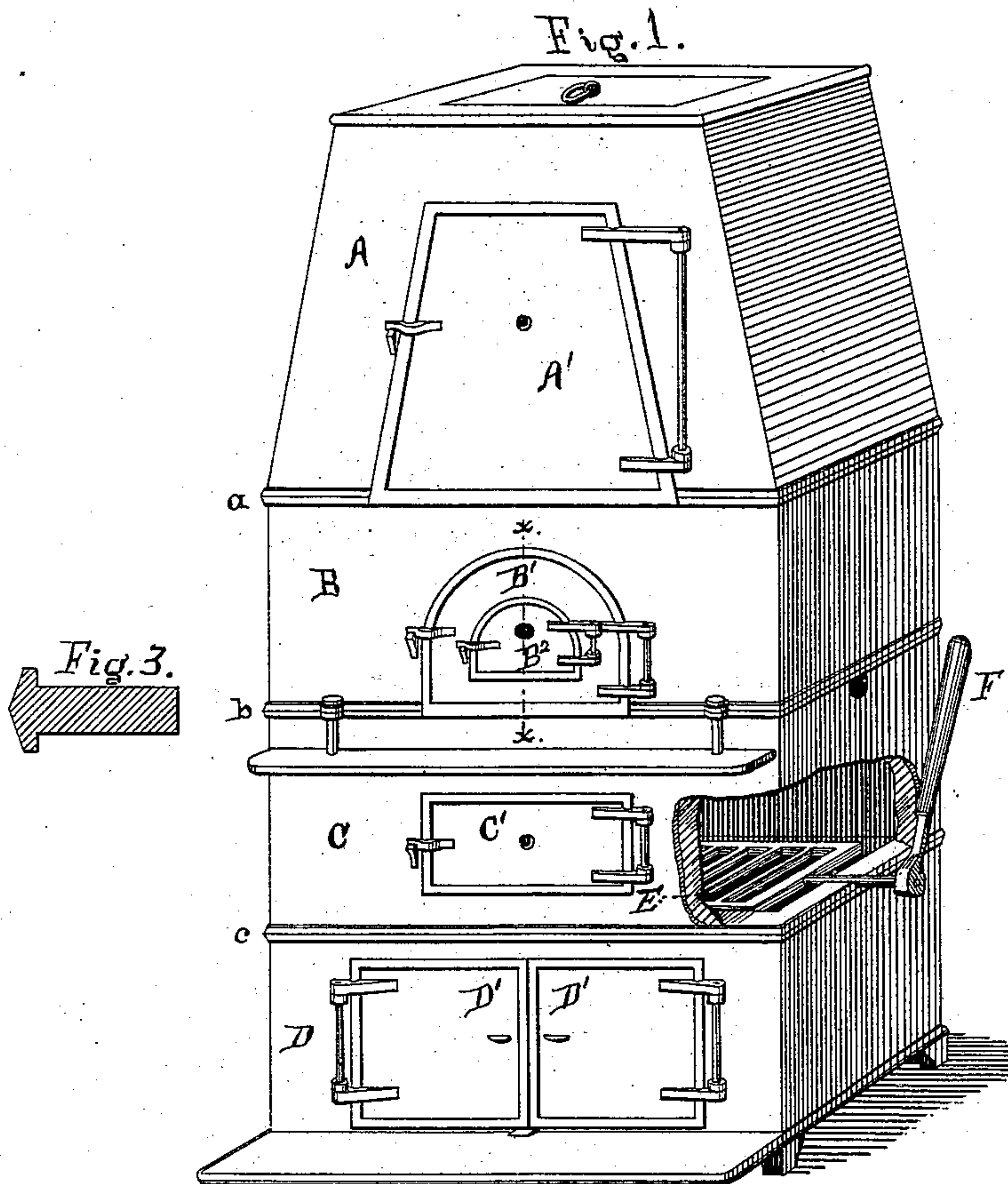


(No Model.)

W. E. JUDSON.
Assay Furnace.

No. 236,037.

Patented Dec. 28, 1880.



Witnesses,
James A. Payne.
John C. Schröder

William E. Judson. *Inventor.*

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UNITED STATES PATENT OFFICE.

WILLIAM E. JUDSON, OF CLEVELAND, OHIO.

ASSAY-FURNACE.

SPECIFICATION forming part of Letters Patent No. 236,037, dated December 28, 1880.

Application filed March 29, 1880. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. JUDSON, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Improvement in Assay-Furnaces; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention relates to certain improvements in the construction and arrangement of the various parts of assay-furnaces, so as to render them capable of more and better results than any of the old styles, and also make them more durable and less liable to breakage and disarrangement of parts, also more readily controlled and managed.

The particular improvements consist in the construction of the furnace in three or more sections, each section being independent of the others and fitting intervening flanged rings, so as to allow for unequal expansion and contraction of the various sections. It is well known that the expansion in an assay-furnace is unequal at various points, and it is my object to prevent any possibility of this unequal expansion straining or breaking the walls of the furnace. I also construct my furnace so that a muffle to contain the scorifiers can be used which is open at both ends, and thus the examination and handling of the same be greatly facilitated, and a much larger number can be used than where the muffle is open at only one end. Another improvement is a tilting or revolving grate, which is of much convenience in cleaning the furnace, and obviates the necessity of removing the cinders too large to pass through the bars of the grate by means of the doors.

In the drawings, Figure 1 is an elevation of my improved furnace having a portion broken away to show the tilting grate. Fig. 2 is a sectional view on the line *x x* in Fig. 1, showing the muffle in place and doors communicating with its opposite and open ends, and Fig. 3 a sectional view of the rings which hold the various sections in place.

In Fig. 1, A B C are castings, each composed of one piece and set into the flanged rings *a b c*, so that no part of one section is in contact with the other. Thus the part A can

expand and contract without any influence upon the section B, the intervening ring taking up in its upper and lower section all such expansion and contraction, and allowing the section B to expand and contract within the limits of its lower half without reference to the change in the upper section, A. This is similarly carried out in all the other sections.

D represents the lower section of the body of my improved furnace for assaying purposes, cast in a single piece and similar to the sections A B C, arranged in their respective order above the same, as heretofore described. This section D rests upon the base of the furnace, which is provided with an upward-projecting flange or rim for receiving and holding the section thereon, there being a sufficient space between the rim and the outside surface of the section to permit the expansion of the same when affected by the heat during the process of assaying.

As the section B is subject to great heat, and the sections A and D to comparatively little, the advantages of this arrangement will be readily recognized. The section Fig. 3 will explain how this is prevented by the intervention between the sections of a metallic ring. A', B', C', and D' are doors of the usual form.

B' B² open to the muffle, and upon the opposite side of the furnace a similar door opens to the other end of the muffle. This muffle can be constructed with a rib running longitudinally through its top, or not, as desired, and is open at both ends, so that scorifiers can be removed or inserted at either end thereof, and thus facilitate the work of assaying.

The revolving or tilting grate E is intended to facilitate the dumping of the cinders, ashes, &c., into the lower section, D, when it is desired to clean the furnace for a new fire, the operation being performed by means of the handle F. This grate E has its bearings in opposite sides of the ring *c*, which interposes the sections C D and fills nearly all the space between the interior edges of said ring. Each section of the furnace is lined with fire-clay or suitable non-conducting material.

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

1. In combination with the base of an assay-

furnace constructed as described, the sections A, B, C, and D, forming the top and sides, respectively, of said furnace, and the flanged rings *a b c*, interposing such sections, the several parts being constructed, arranged, and operating substantially as described and shown.

2. In the assay-furnace, substantially as described, the section B, provided with a muffle, as described, and having doors communicating

with both ends thereof, substantially as described, and for the purpose set forth.

This specification signed and witnessed this 13th day of March, 1880.

W. E. JUDSON.

Witnesses:

GEO. C. TRACY,

JOHN C. SCHROEDER.