

No. 611,986.

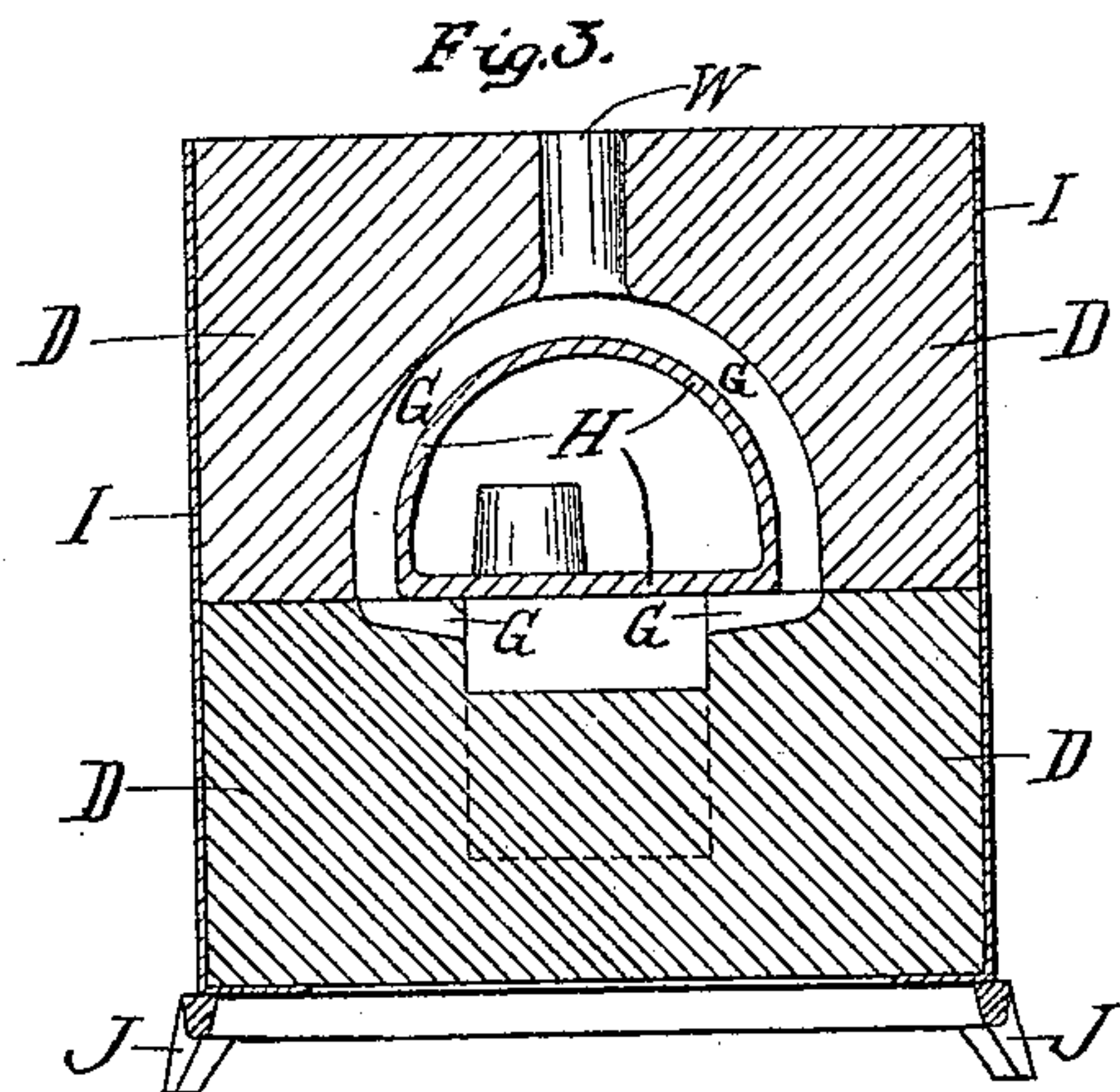
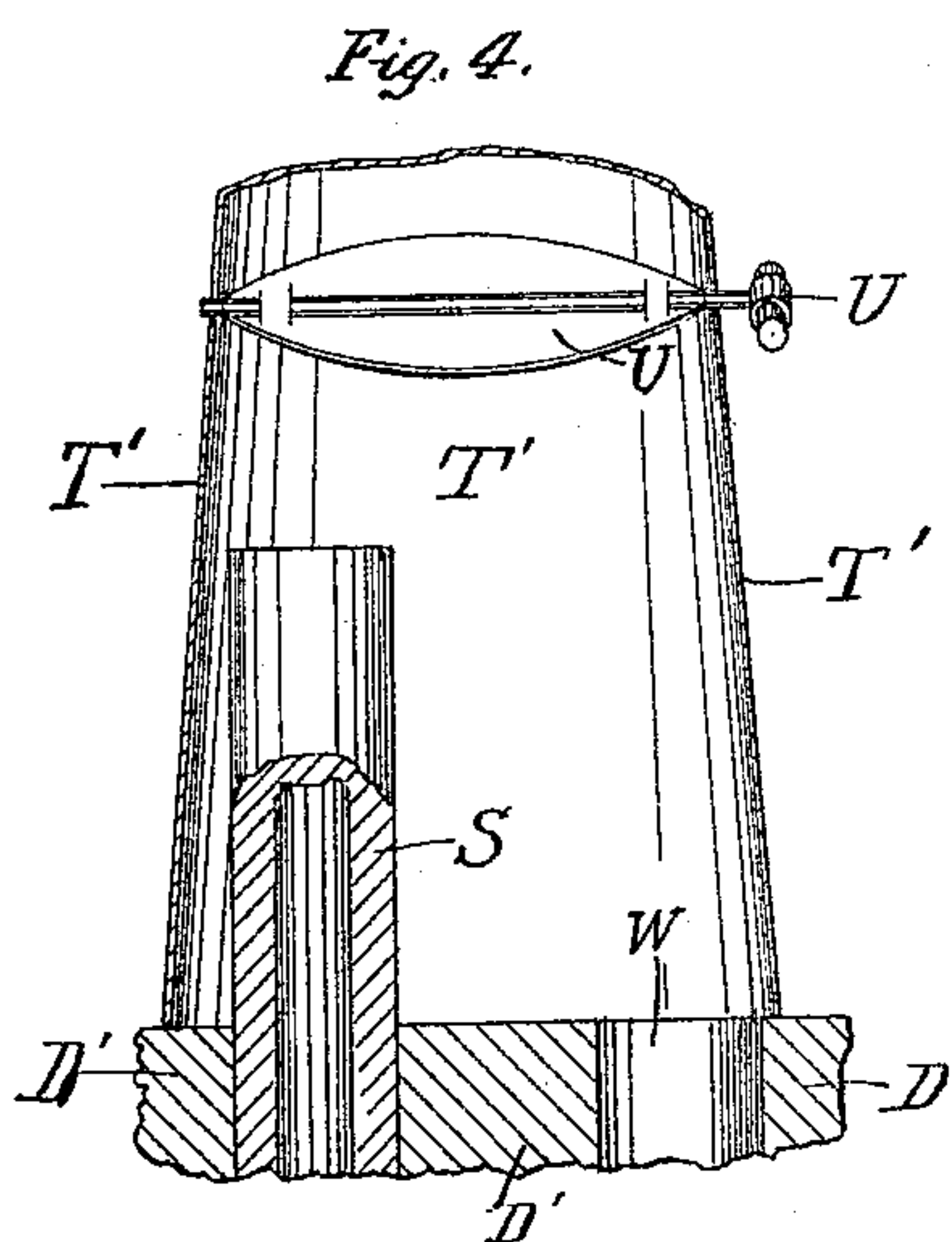
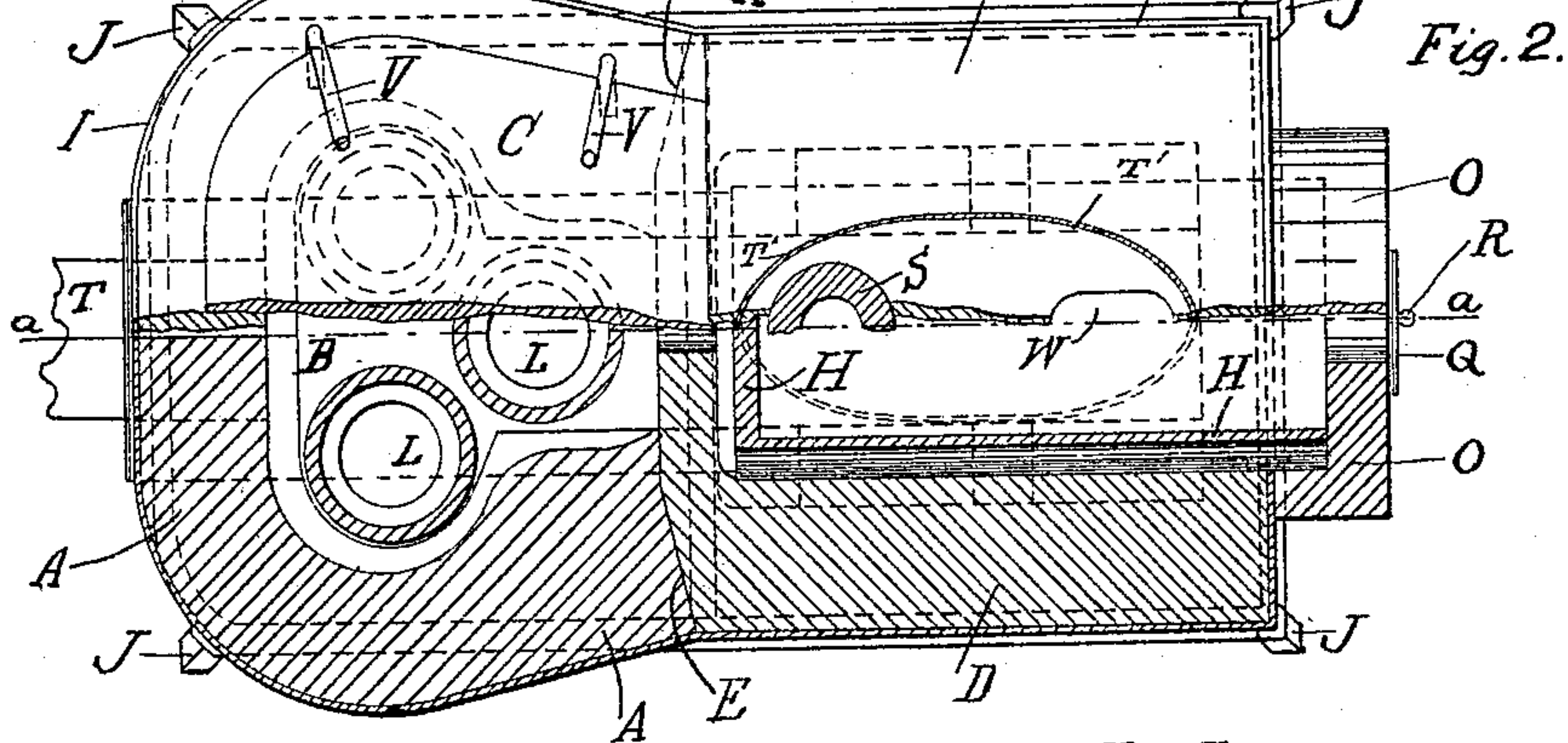
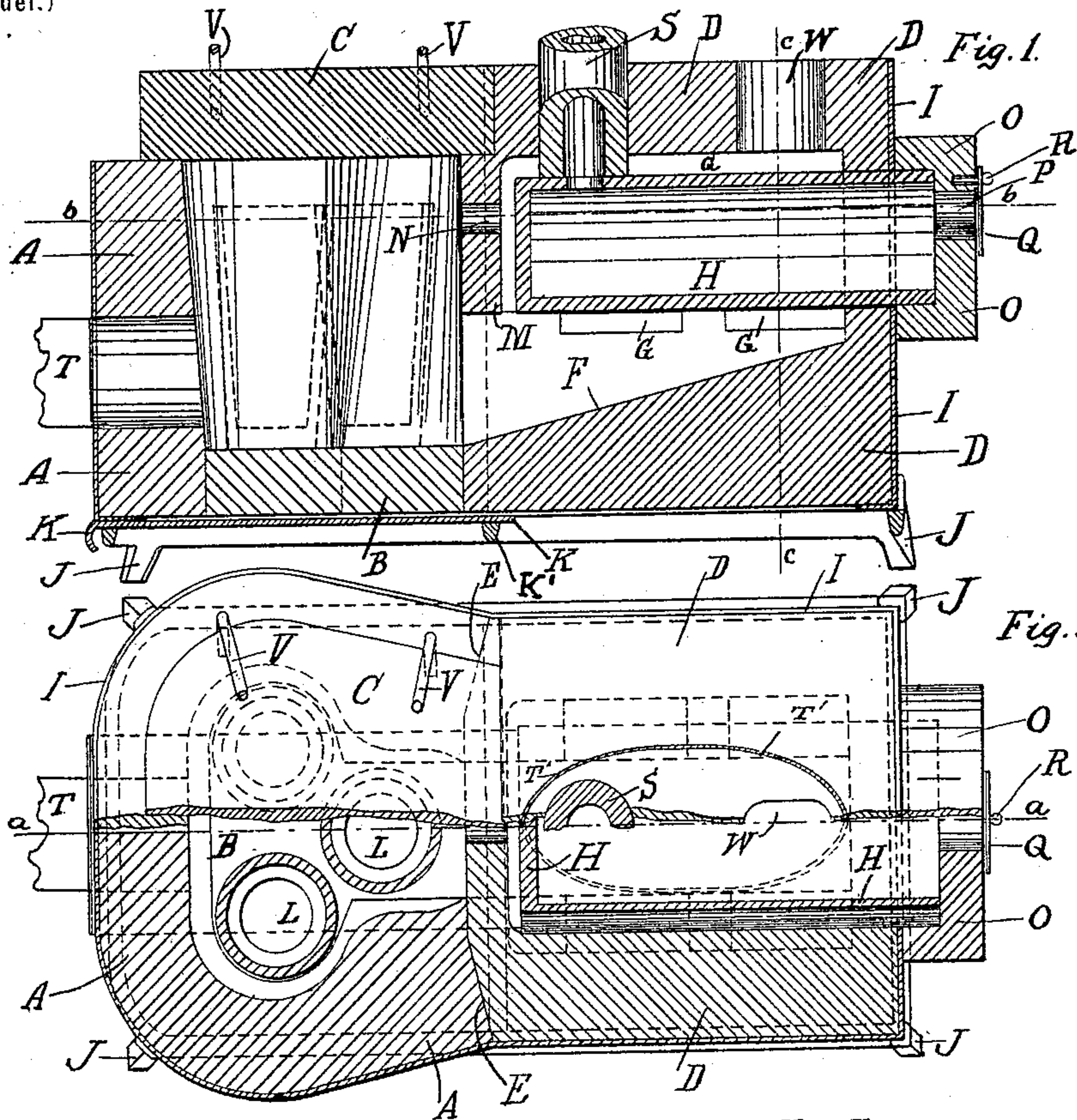
Patented Oct. 4, 1898.

W. H. ADAMS, THE YOUNGER.

ASSAYING APPARATUS.

(Application filed Jan. 20, 1898.)

(No Model.)



WITNESSES

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# UNITED STATES PATENT OFFICE.

WILLIAM HENRY ADAMS, THE YOUNGER, OF LOS ANGELES, CALIFORNIA.

## ASSAYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 611,986, dated October 4, 1898.

Application filed January 20, 1898. Serial No. 667,370. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM HENRY ADAMS, the Younger, of the city of Los Angeles, in the county of Los Angeles and State of California, have invented a certain new and useful Improvement in Apparatus for Assaying, of which the following is a full, clear, and exact description or specification, reference being had to the accompanying sheet of drawings as forming part hereof.

My invention, which relates to certain new or improved apparatus to be used in assaying, has for its principal object to combine a crucible heating-furnace and a muffle in one structure or device and in such manner that the source of heat which is used for heating and reducing the ore in the crucibles is also used for heating the muffle, so that a continuous flow of heat takes place in the chamber containing the crucibles and proceeds thence upward through a flue having an inclined bottom to other flues leading around the muffle and thence to the escaping flue or chimney. A hanging bridge is situated between the rear end of the muffle and the crucible-chamber, having a hole in it through which part of the burning flame passes to heat the end and upper part of the muffle. The outer end of the muffle is closed by means of a cover formed with a lip which passes over the muffle, and in this cover there is also an opening which is covered by a pivoted plate of mica, through which the interior of the muffle can at any time be viewed and which by being moved on its pivot enables atmospheric air to pass into the muffle for the purpose of oxidizing the lead used in the cupels placed therein. The inner end of the muffle is provided with a pipe which passes into the escape-flue of the apparatus and below a damper therein, which damper regulates the draft through the muffle, as well as the escape of the gaseous products of combustion of the burner or heater, and carries off the lead oxides from the cupels. The crucible-chamber is provided with a false bottom, which can be removed at any time by withdrawing a sliding door, and the entire apparatus is constructed of blocks of fire-clay of the requisite shape inclosed within a thin casing of sheet iron or steel, feet being attached to the bottom of the casing for the purpose of sup-

porting the assaying apparatus at any desired height above the ground or other support on which it is carried.

On the annexed sheet of drawings, Figure 1 is a longitudinal vertical section on the line *a a*, Fig. 2. Fig. 2 is a half plan corresponding to Fig. 1 and a half horizontal section on the line *b b*, Fig. 1. Fig. 3 is a transverse vertical section through the muffle and the muffle-inclosing chamber, taken on the line *c c*, Fig. 1. Fig. 4 is an elevation of a portion of the upper part of the muffle end of the apparatus, showing the escape-flue from the heating-chambers and the escape-flue from the muffle terminating below the damper in the escape-flue.

In the drawings the crucible-chamber is formed of thick blocks of fire-clay, (marked A,) which are closed at the bottom by the slab B and at the top by the slab C. The blocks of fire-clay composing the crucible-chamber abut against the other blocks of fire-clay, (marked D,) which constitute the muffle-chamber, the joint whereat the blocks of the respective chambers meet being formed with inclined faces E for the purpose of preventing them from being easily moved or shifted in their relative positions to each other.

The upper part of the muffle-chamber is formed in one block, having the necessary arch in it and the flue-hole W. The lower part of the muffle-chamber is also formed in one block, having the inclined bottom flue F and the lateral flues G, leading therefrom to the flue in the upper block, surrounding the muffle H.

The several blocks hereinbefore referred to when put together constitute the heating-chambers of the improved assaying apparatus, and they are inclosed within the sheet iron or steel casing I, as shown more particularly at Figs. 1 to 3. This casing is formed with feet J, on which the entire apparatus is carried, and at the crucible end thereof a sliding sheet iron or steel door K is situated beneath the bottom of the crucible-chamber, which, being withdrawn, admits of the false bottom B being removed below. The door K slides and rests upon the cross-bars K', forming part of the bottom frame, to which the feet J are attached. Three crucibles L are



shown as contained within the crucible-chamber; but this chamber may be constructed to contain more or less than three crucibles.

The hanging bridge M, situated at the inner end of the crucible-chamber and at the upper part thereof, is formed with an opening N, through which a portion of the heating and burning gases from the crucible-chamber pass into the muffle-chamber and spread over the end and a portion of the sides and upper part of the muffle. The muffle H has its outer end covered by the cap O, which is made with a lip all around and projecting inward, so as to inclose the end of the muffle, as shown. This lid O has a spy-hole P formed in it, which is covered by a mica plate Q, suspended on a pivot R, through which not only can the condition of the operations going on in the cupels be at any time inspected, but which also, according to the extent to which the said mica plate is moved sidewise, regulates the quantity of atmospheric air passed into the muffle for oxidizing the lead, the oxids of which escape therefrom by the pipe S into the flue T', beneath the damper U. By adjusting the damper U from time to time the draft through both the crucible-chamber, the muffle-chamber, and muffle are regulated.

The upper slab C of the crucible-chamber A is provided with iron-wire handles V for lifting it on and off the crucible-chamber whenever so required. The entire apparatus is heated from one gasoline-burner, (indicated by the part marked T.)

Having now described the nature of my said invention and the best system, mode, or manner I am up to the present time acquainted with for carrying the same into practical effect, I desire to observe in conclusion that what I consider to be novel and original and

therefore claim as the invention to be secured to me by Letters Patent is as follows:

1. The combination consisting of the crucible-chamber, the muffle-chamber, the hanging bridge between the crucible and muffle chambers, the gas-passage in the hanging bridge, the removable cover of the crucible-chamber, the false bottom of the crucible-chamber—the sliding door beneath this false bottom, the flue and damper common to both the muffle-chamber and the muffle, the lipped muffle-cover with spy-hole and pivoted cover of mica, the casing containing the crucible and muffle chambers, the connecting-passages between the muffle-chamber and chimney and the burner connected to the opening in the crucible-chamber, substantially as set forth.

2. The muffle with the pipe at the upper inner end of the muffle for allowing the escape of the gases from the muffle to the flue below the flue-damper, the flue, the lipped cover for the outer end of the muffle provided with a spy-hole and pivoted cover of mica, the hanging bridge with the passage therein for allowing the escape of burning gases from the crucible-chamber and their distribution over the muffle, the crucible-chamber, the muffle-chamber, the connecting-passages between the crucible-chamber and muffle-chamber, and the burner, substantially as set forth.

In testimony whereof I, the said WILLIAM HENRY ADAMS, the Younger, have hereunto set my hand and affixed my seal, this 7th day of October, 1897, in the presence to two subscribing witnesses.

WILLIAM HENRY ADAMS, THE YOUNGER. [L. S.]  
Witnesses:

ST. JOHN DAY,  
G. C. KIRLY.