

No. 798,950.

PATENTED SEPT. 5, 1905.

W. W. CASE.
ASSAY FURNACE.
APPLICATION FILED MAR. 11, 1905.

Fig. 1.

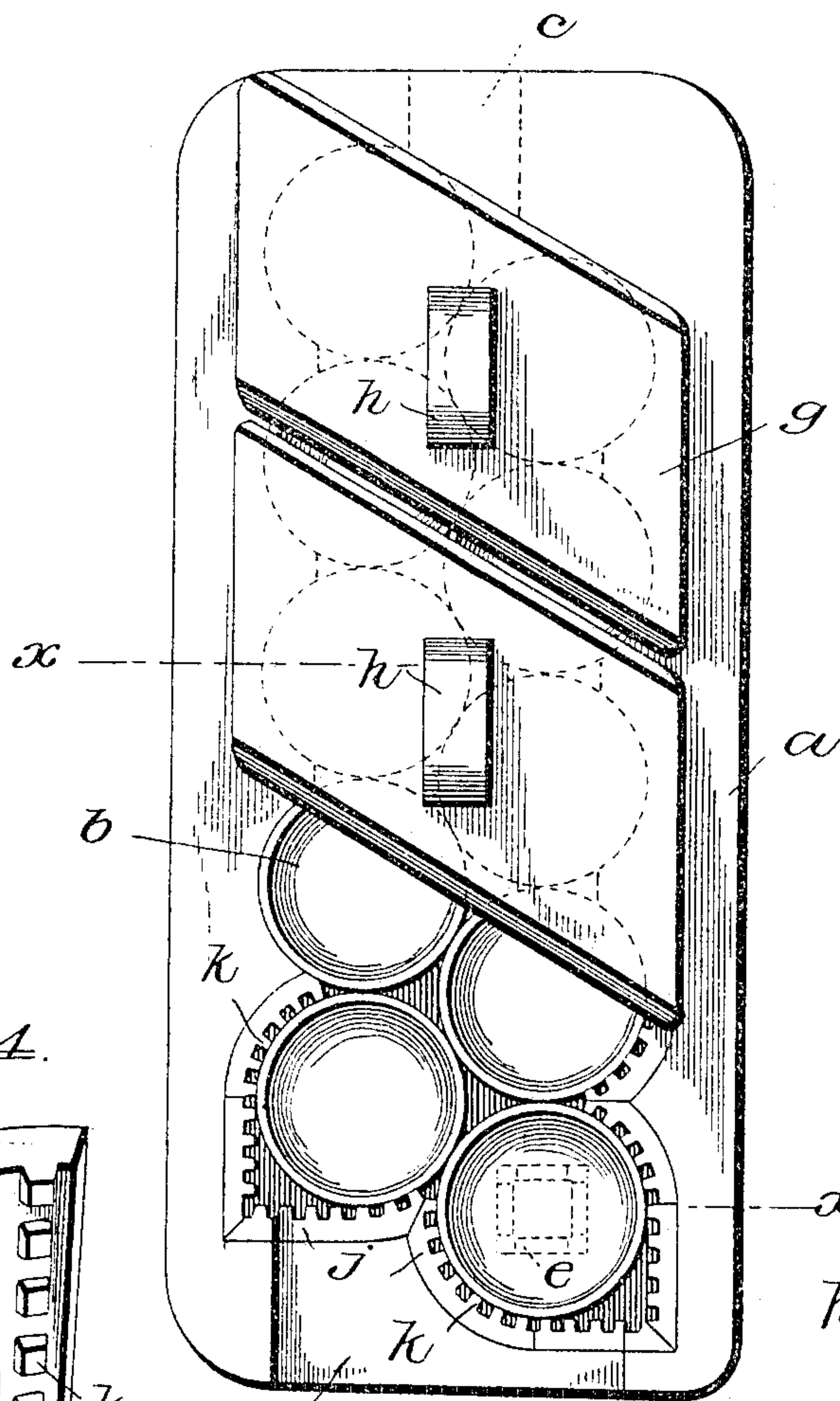


Fig. 4.

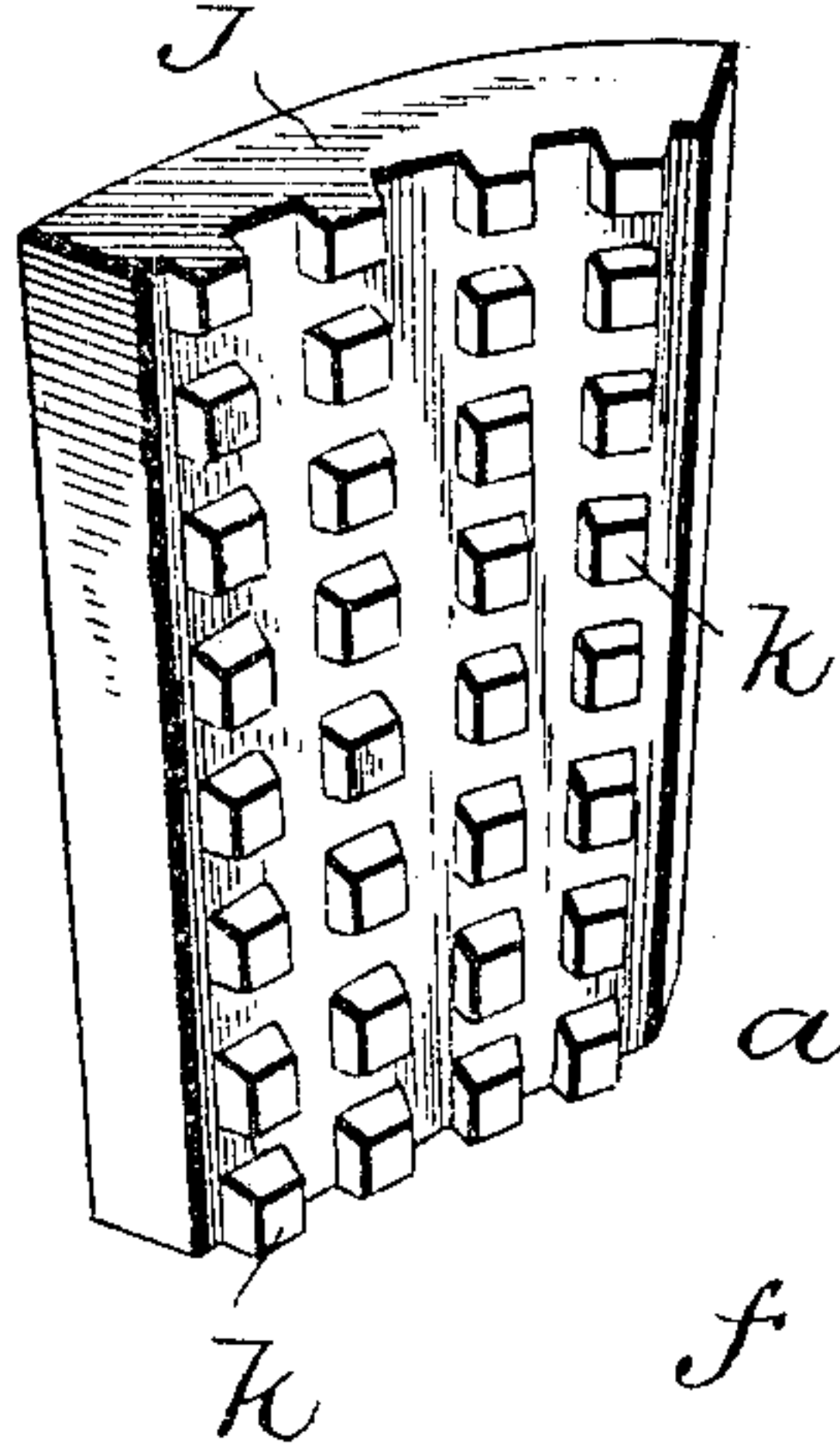


Fig. 3.

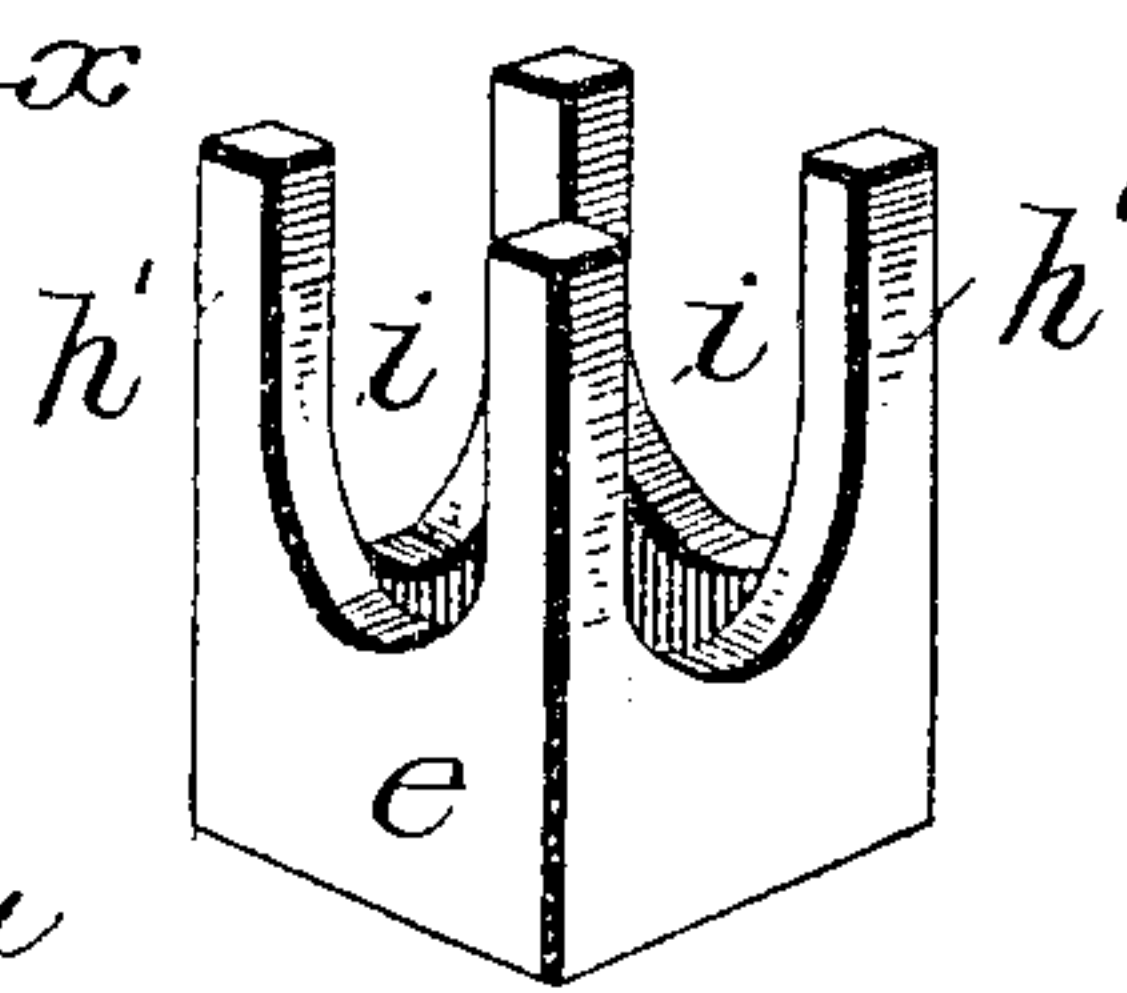
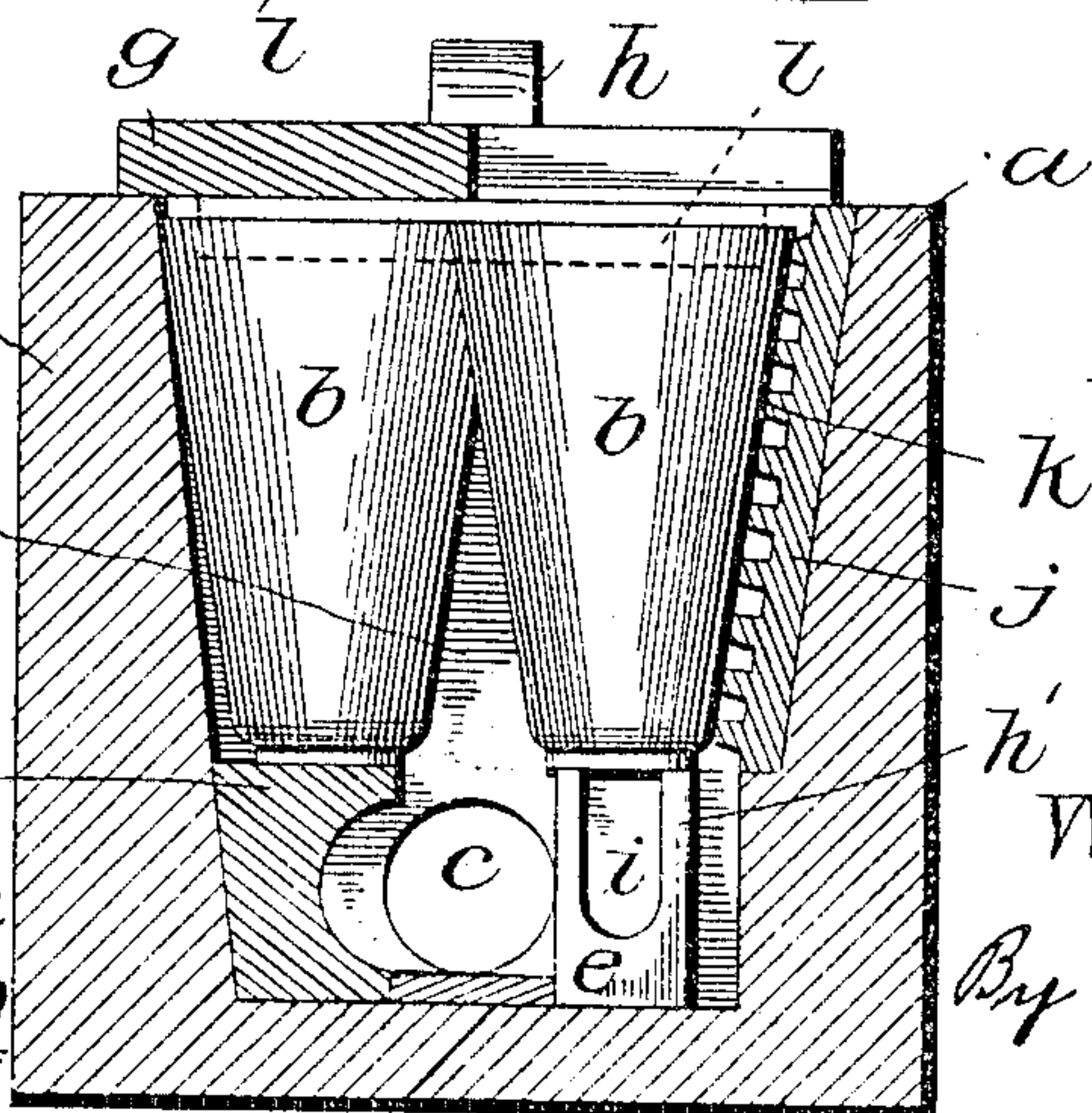


Fig. 2.



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UNITED STATES PATENT OFFICE.

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ASSAY-FURNACE.

No. 798,950

Specification of Letters Patent.

Patented Sept. 5, 1905.

Application filed March 11, 1905. Serial No. 249,629.

To all whom it may concern:

Be it known that I, WILLIS W. CASE, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Assay-Furnaces; and I do hereby 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.

My invention relates to improvements in assay-furnaces, and more especially to that kind of furnaces in which crucibles are used with gas or hydrocarbon fuel. One difficulty in the practical use of such furnaces has been that it is almost impossible to heat very large crucibles or a large number of small crucibles quickly and at an even rate. For example, it is perfectly feasible with the furnaces already known to heat up two, three, four, or even five crucibles in a single furnace at the same time and to heat them up evenly, thereby finishing the operation in each crucible at practically the same time, which is a great desideratum in this class of furnaces.

The object of my invention is to provide a furnace in which a large number of small crucibles—say from twelve to sixteen—or a very large crucible may be evenly heated up. Up to the present time this has been regarded as an impossibility.

With this object in view my invention consists in the construction and combinations of parts, as hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a top plan view of my improved furnace. Fig. 2 is a cross-section on the line *xx* of Fig. 1. Fig. 3 is a perspective view of one of the supporting and heating stools for the crucibles which are located farthest away from the burner, and Fig. 4 is a perspective view of one of the refractory heaters used adjacent to the crucibles at the rear end of the furnace.

a represents the wall of the furnace. Preferably this is of a rectangular shape, although I do not limit myself to this particular form. The interior of this wall is hollowed out and is so arranged that the crucibles can be placed therein side by side, but with the crucibles of the two rows overlapping each other, so as to occupy the least possible space. The interior of the wall is shaped to approximately fit the crucible, as shown at *b* in Fig. 1, except as to those crucibles which are located farthest away from the burner. In other words,

the crucibles nearest the burner are for about one-third of their periphery quite closely surrounded by the wall of the furnace.

c represents the inlet for the flame, which is preferably generated from gas or a liquid hydrocarbon. This inlet is located so as to deliver the heat below the bottom of the crucibles, which are supported on the benches or stools *e*. The object of having the inlet located beneath the bottoms of the crucibles and having the first crucibles partially surrounded by the casing or wall is that the main portion of the flame may be blown by its own force past the first crucibles (although a portion of it will inevitably pass upward into the space, such as *f*, between the crucibles) in order that the crucibles nearest the fuel-inlet will not be heated up too quickly, as would otherwise be the result unless some means were present for heating the rear crucibles as rapidly as those subjected directly to the incoming flame.

The top of the furnace is open and is closed by a series of covers *g*, having handles *h*, which covers rest loosely on the top of the furnace. These covers are preferably made in sections with their sides beveled off at an angle approximating thirty degrees, so that by placing said covers a short distance apart or by slightly moving them the operator can look down into the crucibles and watch the operation.

At the end of the furnace farthest away from the fuel-inlet special means must be provided for heating the crucibles at and near this end faster than would otherwise be the case in order that they may be heated up as quickly as the crucibles located nearer the fuel-inlet. The special means which I have devised are as follows: The last two to five crucibles, according to the number used, are mounted on stools *e*. These stools, as shown in Fig. 3, are made of highly-refractory material and consist of a base and upwardly-projecting parts *h'*, separated by spaces *i*. The spaces *i* are for the passage of the flame or hot products of combustion, and the upwardly-extending parts *h* become highly heated and transmit the heat to the crucibles which rest thereon. Of course the flame or hot products of combustion play directly upon these crucibles and aid in heating them up. Furthermore, the rear part of the furnace-wall is lined with plates of refractory material *j*, provided with numerous projections or heaters *k*. These projections *k* either come into con-

tact with the crucibles or as close thereto as the manufacture thereof will permit. These are preferably arranged in rows, leaving vertical and horizontal channels between; but I do not restrict myself to this particular form nor to the particular form of the stool as shown in Fig. 3. The essential feature of this part of my invention is, where the crucibles are large or located at a distance from the burner, to provide refractory supports and linings having as many projections or heaters as the circulation of the gases of combustion will permit, against which the flame or hot products of combustion may strike, thereby heating them to a high degree—practically to incandescence—and thereby acting in the manner of a clean coke-fire against the crucible to heat the same.

The products of combustion escape through a slot *l*, located at the rear and near the top of the furnace. The flame enters through the opening *c*, and the main portion thereof sweeps along the bottom of the furnace, although a part thereof works upwardly, so as to heat the first and intermediate crucibles, and at the rear end rises around the crucibles and escapes through the opening *l*, the result being that the entire battery of crucibles is heated up evenly from beginning to end.

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

1. In an assay-furnace, the combination of the wall thereof having a flame-inlet near the bottom and near one end thereof, a series of crucibles located in said furnace, the crucibles nearest the fuel-inlet being partly surrounded by the wall of said furnace to protect them from too rapid heating, said wall being provided with an exit for the products of combustion located in proximity to the rear and

to the top thereof, and a series of projections, or heaters, arranged within the wall of the furnace and around the crucibles located at or near the rear end thereof, in order to heat up the latter rapidly enough to keep pace with the heating of the crucibles located nearer the fuel-inlet, substantially as described.

2. In an assay-furnace, the combination of the wall thereof having an open top, a series of crucibles located within said wall, movable covers therefor having their sides beveled off to permit the inspection of the crucibles by leaving small spaces between said covers, said wall being provided with a fuel-inlet near the bottom and at one end thereof, and with an exit-opening near the top and located at another end thereof, and a series of refractory linings and supports, some of which are provided with projections, or heaters, and located in proximity to the crucibles located nearest to the exit-opening whereby an even heating of all the crucibles is attained, substantially as described.

3. In an assay-furnace, the combination of the wall thereof having an open top and covers therefor, a series of crucibles located in said furnace, a fuel-inlet located well below the bottom of the crucibles, and supports of refractory material for said crucibles, some of said supports being in the form of benches approximately solid and others of said supports being in the form of stools provided with projections, or heaters, upon which the crucibles rest, substantially as described.

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

WILLIS W. CASE.

Witnesses:

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