

C. S. BRAND.  
EXTRACTION OF ZINC.  
APPLICATION FILED FEB. 16, 1910.

963,416.

Patented July 5, 1910.

Fig. 1.

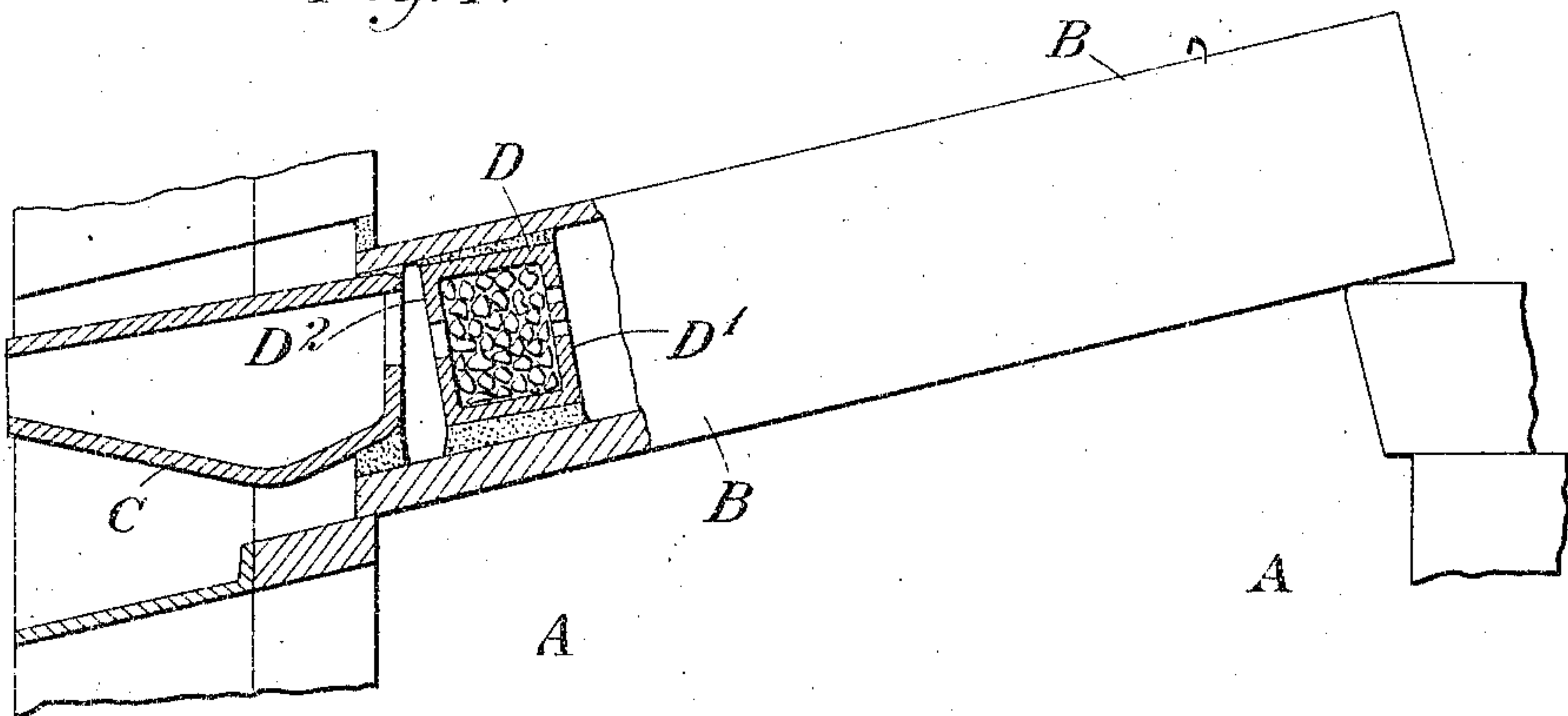


Fig. 2.

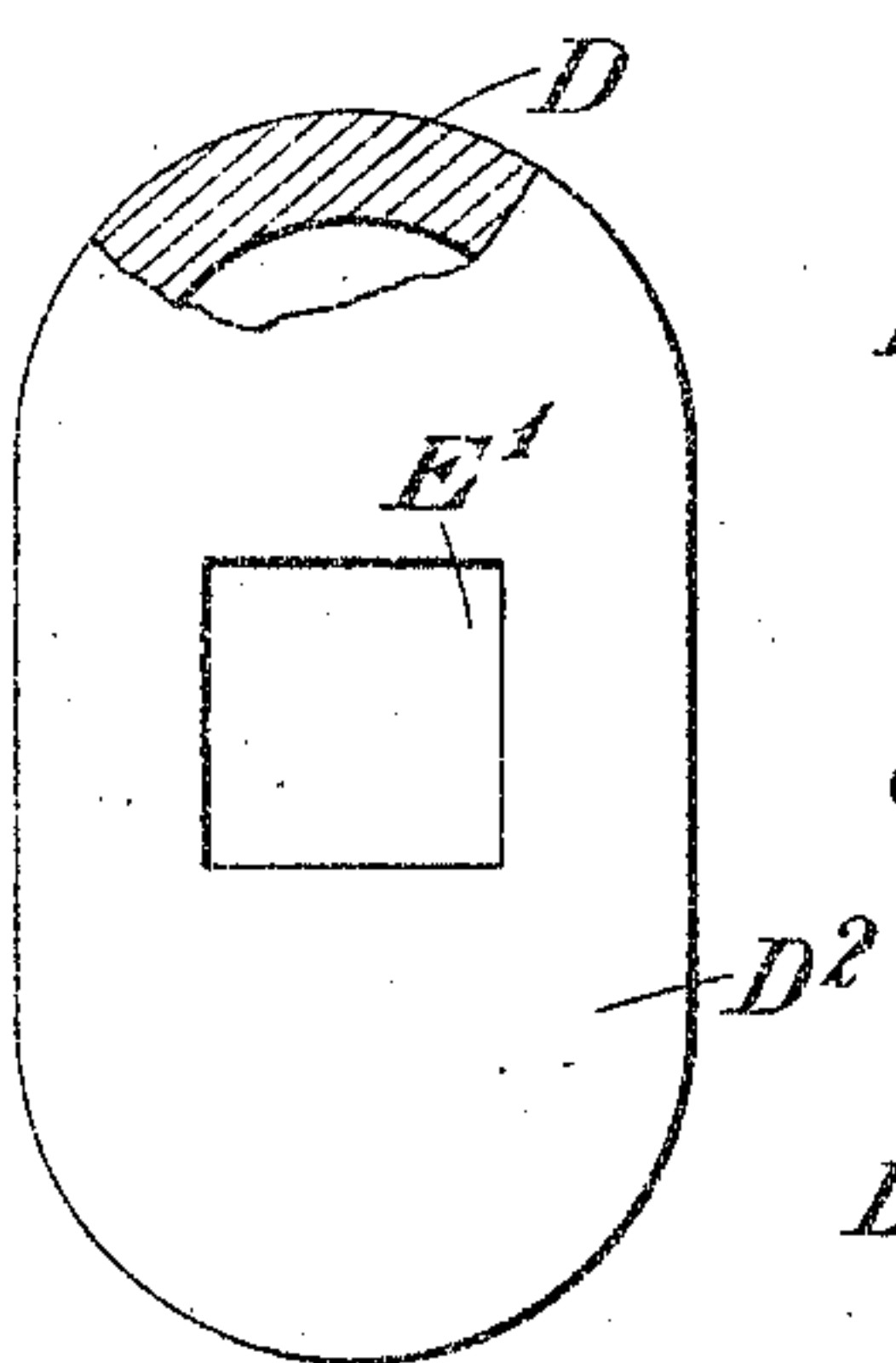


Fig. 3.

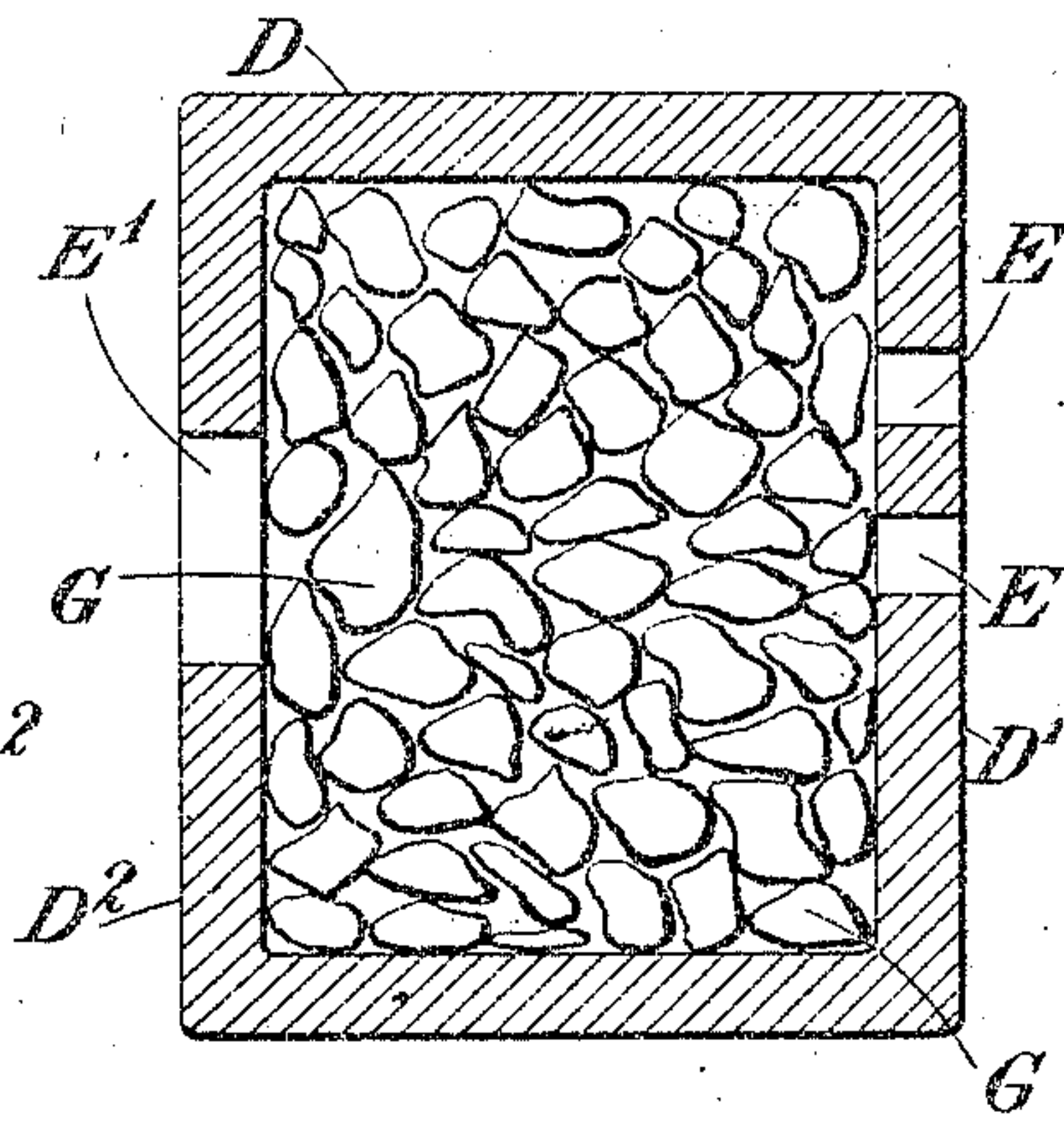
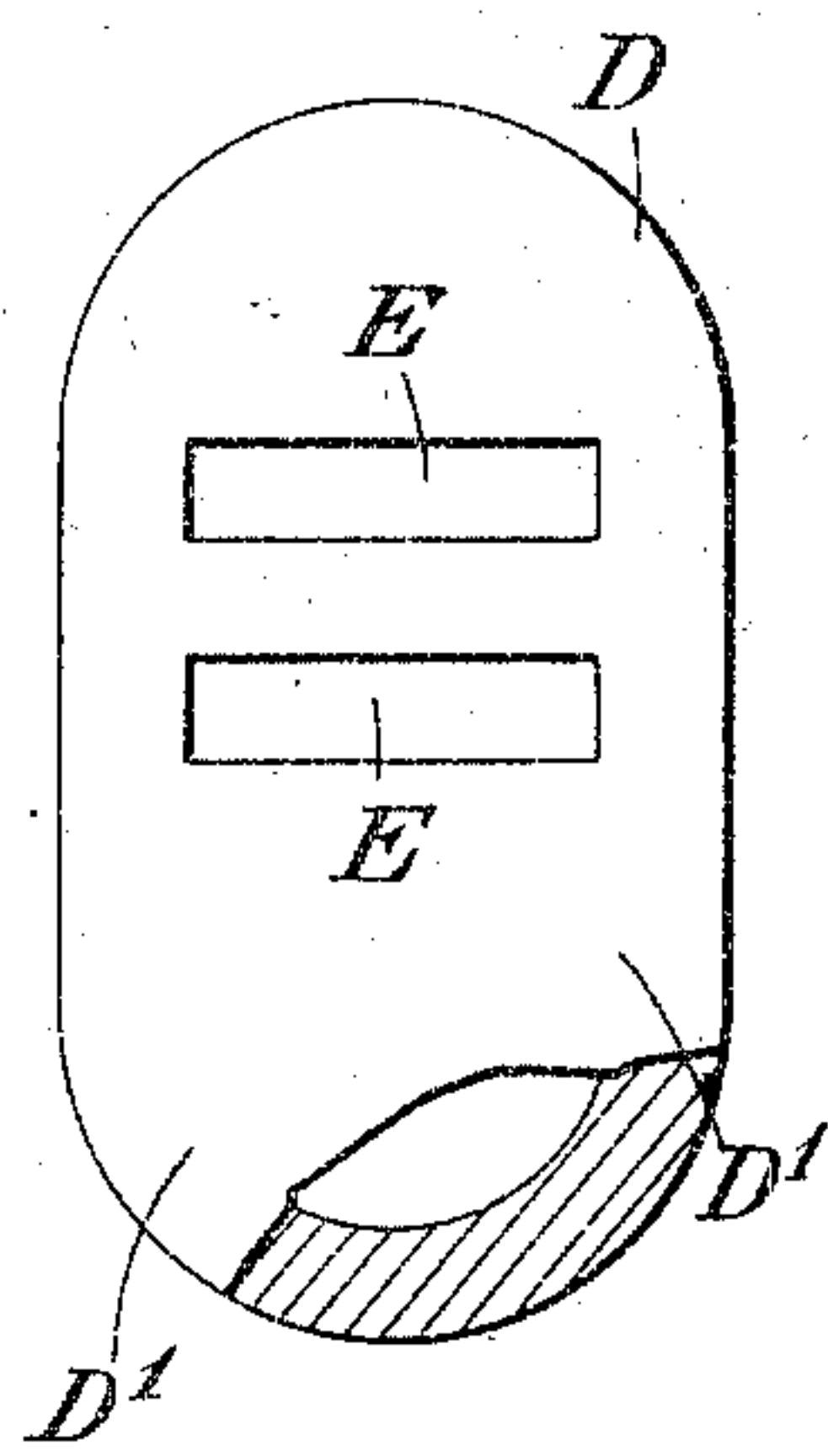


Fig. 4.



Witnesses

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# UNITED STATES PATENT OFFICE.

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## EXTRACTION OF ZINC.

963,416

Specification of Letters Patent.

Patented July 5, 1910.

Application filed February 16, 1910. Serial No. 544,214.

*To all whom it may concern:*

Be it known that I, CHARLES SKINNER BRAND, a subject of the King of Great Britain and Ireland, residing at Bentinck Drive, Troon, in the county Ayr, Scotland, have invented new and useful Improvements Relating to the Extraction of Zinc, (for which I have made application for a patent in Great Britain, No. 9,955, bearing date April 27th, 1909,) of which the following is a specification.

In the process of distillation for the extraction of zinc a retort is used associated with a condenser, and in order to reduce the quantity of impurities which may pass from the retort and be deposited in the condenser with the zinc, provision has been made whereby the vapors in passing from the retort to the condenser are caused to pass through a body of material located in what may be termed the filtering area. Apparatus of the type referred to, has in some forms comprised a retort of tubular formation presenting at the front end a mouth open to the full extent of its bore, and a condenser has been associated therewith by introducing its rear end into the mouth of the retort, and as the rear end of the condenser is commonly of materially less diameter than the bore of the mouth of the retort it has been customary to effect a joint by luting, which results in partially insulating the condenser from the heated walls of the retort. In providing a filtering area in appliances of this type it has been the practice in one method to charge the rear end of the condenser with filtering material, and as the rear end projects but slightly into the retort, the said material is practically insulated from the heated walls of the retort. In this form the rear end of the condenser pipe may be fully open or be formed with apertures. In other cases it has been proposed to form the rear end of the condenser with a restricted aperture and to provide a tube, charged with filtering material, adapted to be inserted and fit therein and arranged to project partly into and partly from the rear end of the condenser, and filters of this character have been constructed having a well formed in the base of the tube intended to retain lead intercepted by the filtering medium. In this as in the former case the filtering material is

practically insulated from the heated walls of the retort.

A filter associated with the condenser in one or other of the manners hereinbefore described has been used, particularly in the treatment of zinc residuals, such as galvanizer's dross and zinc ashes, but it is found, in dealing with zinc ores, Australian zinc concentrates and the like, where a higher retort temperature is needed, that the filtering medium associated with the condenser does not act efficiently but it becomes choked or blocked, whereupon it is necessary to displace or remove the filtering medium and complete the process by allowing the vapors, subsequently given off, to pass unfiltered to the condenser. It has also been suggested that filtering material might be placed in the retort itself at a position adjacent to the condenser or where the temperature is not high enough to prevent the arrested lead from falling down in the liquid form. This, however, although not impossible, is not very practicable owing to the difficulty of packing and retaining the filtering material in position in the retort.

This invention relates to improvements in the extraction of zinc, and particularly to the extraction of the metal from zinc ores; and the object of the invention is to provide an improved form of filter comprising a charge of material refractory relative to the temperatures to which it is subjected adapted to be readily inserted, suitably positioned and readily withdrawn, of sufficient capacity to intercept the constituents of the vapors, principally lead and other heavy vapors, which it is desired to prevent from passing into the condenser from the retort; at the same time the improved filter may collect the intercepted lead vapors in a condensed form and prevent the return thereof to the retort, while maintaining freedom for the passage of the zinc vapors from the retort to the condenser throughout the whole process of distilling the charge of the retort.

According to this invention a filter is provided comprising a hollow container charged with refractory material, which is externally formed to fit or approximately fit, or be readily fitted within the bore of the retort, and adapted to be positioned at such a distance from the mouth thereof as to be directly subjected to the heat of the walls



of the front portion of the retort heated by the furnace, whereby the filter is subjected to a temperature sufficient to prevent condensation or solidification of the zinc vapors passing through the filtering area, but by which the vapors to be intercepted are condensed. The container has end walls, and a well may be formed at the base, apertures in the end walls above the well serving to permit the container to be charged with refractory material, preferably composed of small pieces of refractory material, such as broken clay retorts, pieces of silica brick, or material preferably of a silicious nature, or other material refractory relative to the temperatures to which it is subjected. The apertures in the end walls also permit the vapors from the retort to enter into the filtering area at the inner end of the container and to permit the issuing vapors to pass from it into the condenser at the outer end of the container. A filter fitting the retort in this manner has the effect of retaining some of the heat so that there is a saving of fuel in heating the retort.

In the accompanying drawing Figure 1 represents in sectional side elevation an example of appliances embodying the features of this invention. Fig. 2 is a front view partly in section, Fig. 3 is a side sectional elevation and Fig. 4 is a back view partly in section of a container to be hereinafter described.

In the drawings A designates the furnace heating area, B a retort, C a condenser, and D a container. In the form illustrated the container D is of approximately elliptical cross-section and conforms externally to the bore of the retort B. The container, which for example may be composed of fire clay, is provided with end walls  $D^1$   $D^2$ , in the back wall  $D^1$  of which vapor admission apertures E are provided, and in the front wall an aperture  $E^1$  is formed to serve as the exit for the zinc vapors, and which may be used for the insertion of the refractory material. By this formation the base portion of the container located below the apertures E,  $E^1$ , constitutes a well, G designates the charge of refractory material.

In the drawings the container is shown in its service position. At the completion of the distillation of a charge, the filter is removed from the retort and the intercepted lead in a molten condition may be poured out through either of the end apertures E,  $E^1$ .

In construction, the container is preferably of material length in order to provide a filtering area of sufficient capacity to deal with a whole charge, for example its length may be of say approximately six inches. In order that the charge may present sufficient surface for causing the condensation of the vapors to be intercepted, pieces of refrac-

tory material may be adopted approximating to a cubic inch or less in size.

What I do claim as my invention, and desire to secure by Letters Patent, is:—

1. A furnace heated retort furnished with a filter comprising a container, a charge of refractory material within the container, the container approximately filling the bore of the retort and being situated entirely within the retort at a place toward the front thereof where the retort is directly heated by the furnace, substantially as set forth.

2. A furnace heated retort furnished with a filter comprising a container, a charge of refractory material within the container, the container approximately filling the bore of the retort and being situated entirely within the retort at the front thereof where the retort is directly heated by the furnace, and formed capable of being readily introduced into, fitted within and removed from the retort, substantially as described.

3. A furnace heated retort furnished with a filter comprising a container, a well in the base of the container, a charge of refractory material within the container, the container being situated within and toward the front of the retort at a place where the retort is directly heated by the furnace, substantially as set forth.

4. A furnace heated retort furnished with a filter comprising a container, a well in the base of the container, a charge of refractory material within the container, the container being situated within and at the front of the retort at a place where the retort is directly heated by the furnace, and formed capable of being readily introduced into, fitted within, and removed from the retort, substantially as described.

5. A furnace heated retort furnished with a filter comprising a container, a charge of small pieces of refractory material within the container, the container approximately filling the bore of the retort and being situated entirely within the retort at a place toward the front thereof where the retort is directly heated by the furnace, substantially as set forth.

6. A furnace heated retort furnished with a filter comprising a container, a well in the base of the container, a charge of small pieces of refractory material within the container, the container being situated within and toward the front of the retort at a place where the retort is directly heated by the furnace, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES SKINNER BRAND.

Witnesses:

J. ALFRED BREWER,  
WM. CH. COOLD.