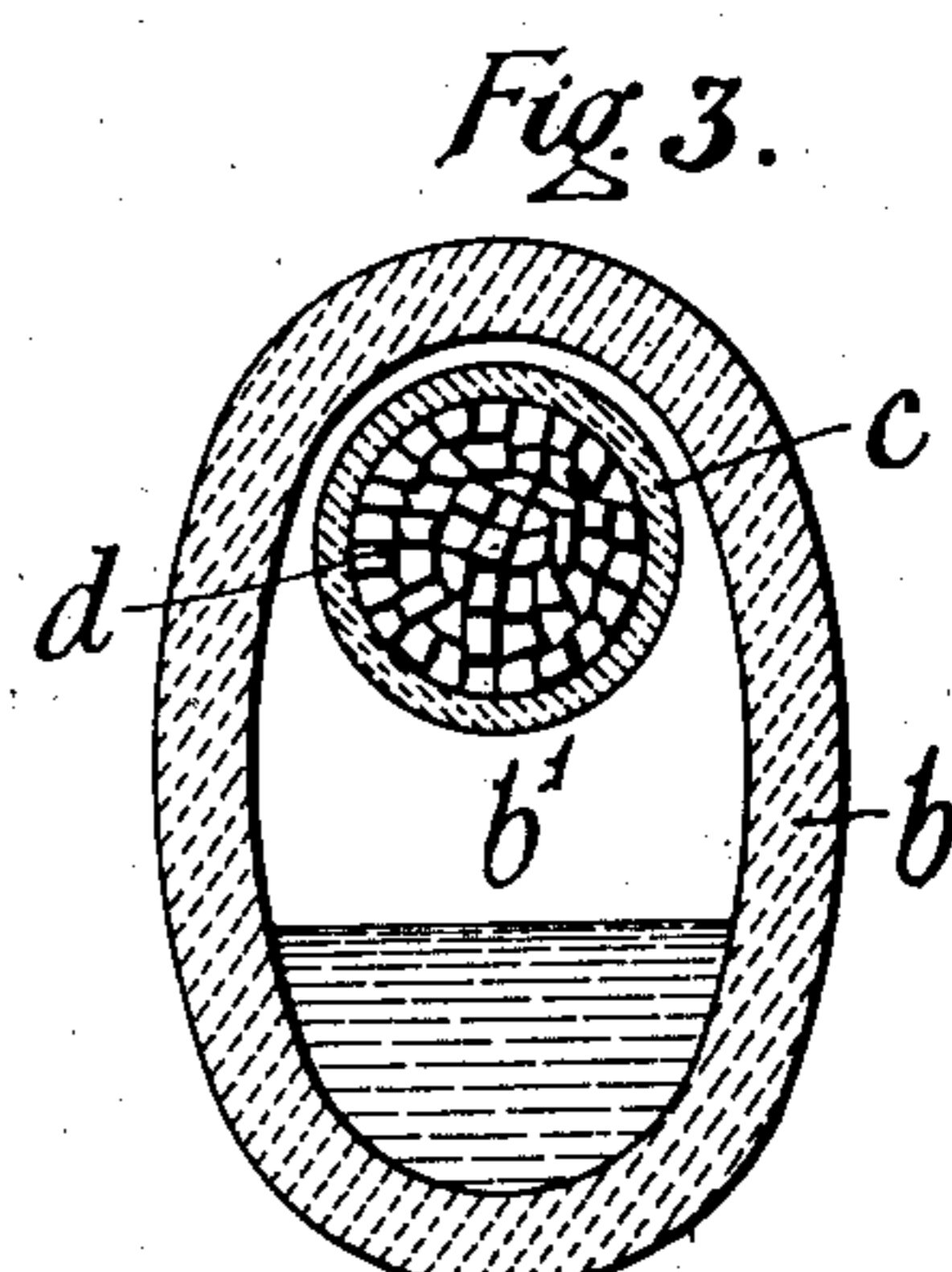
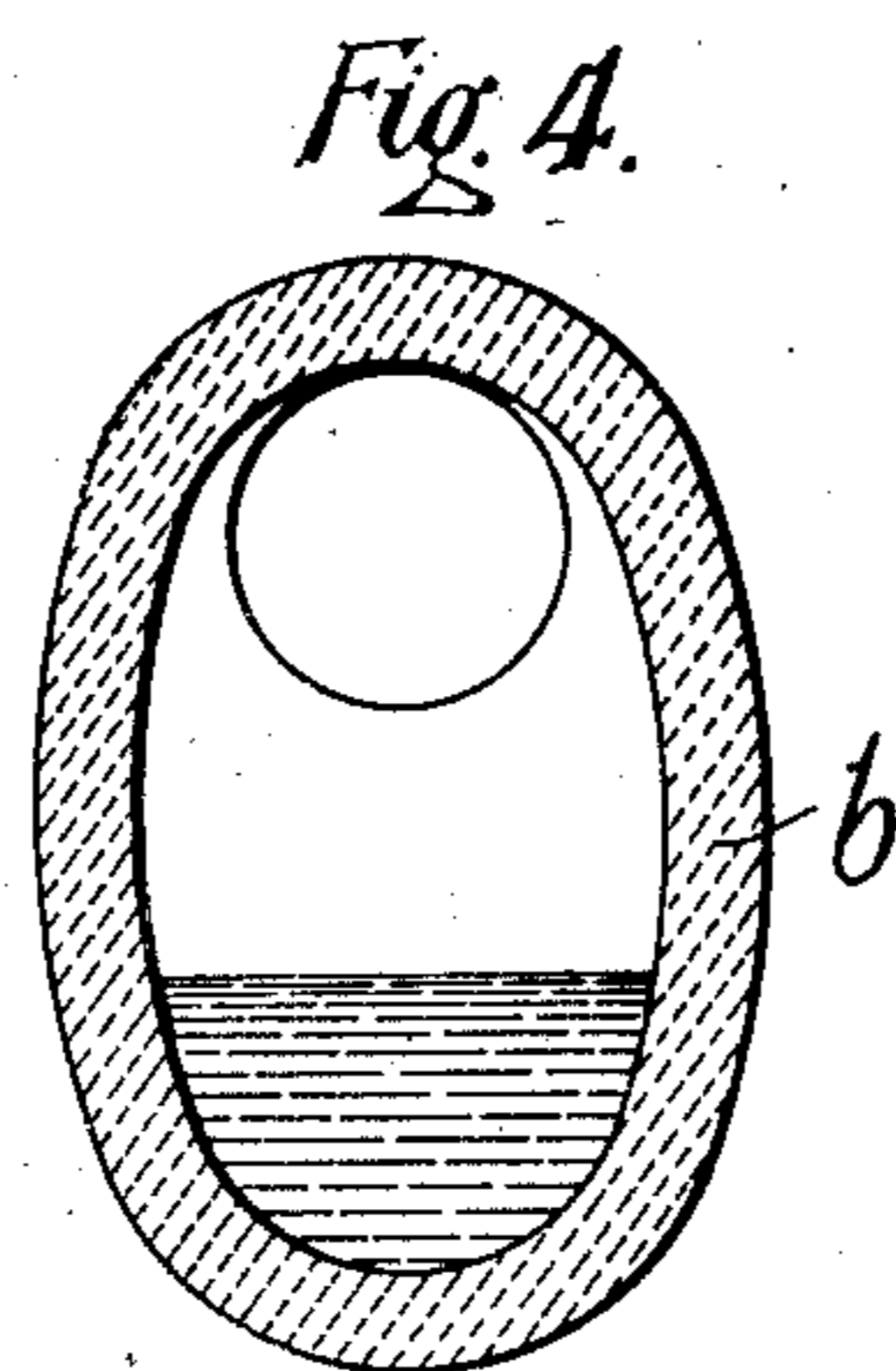
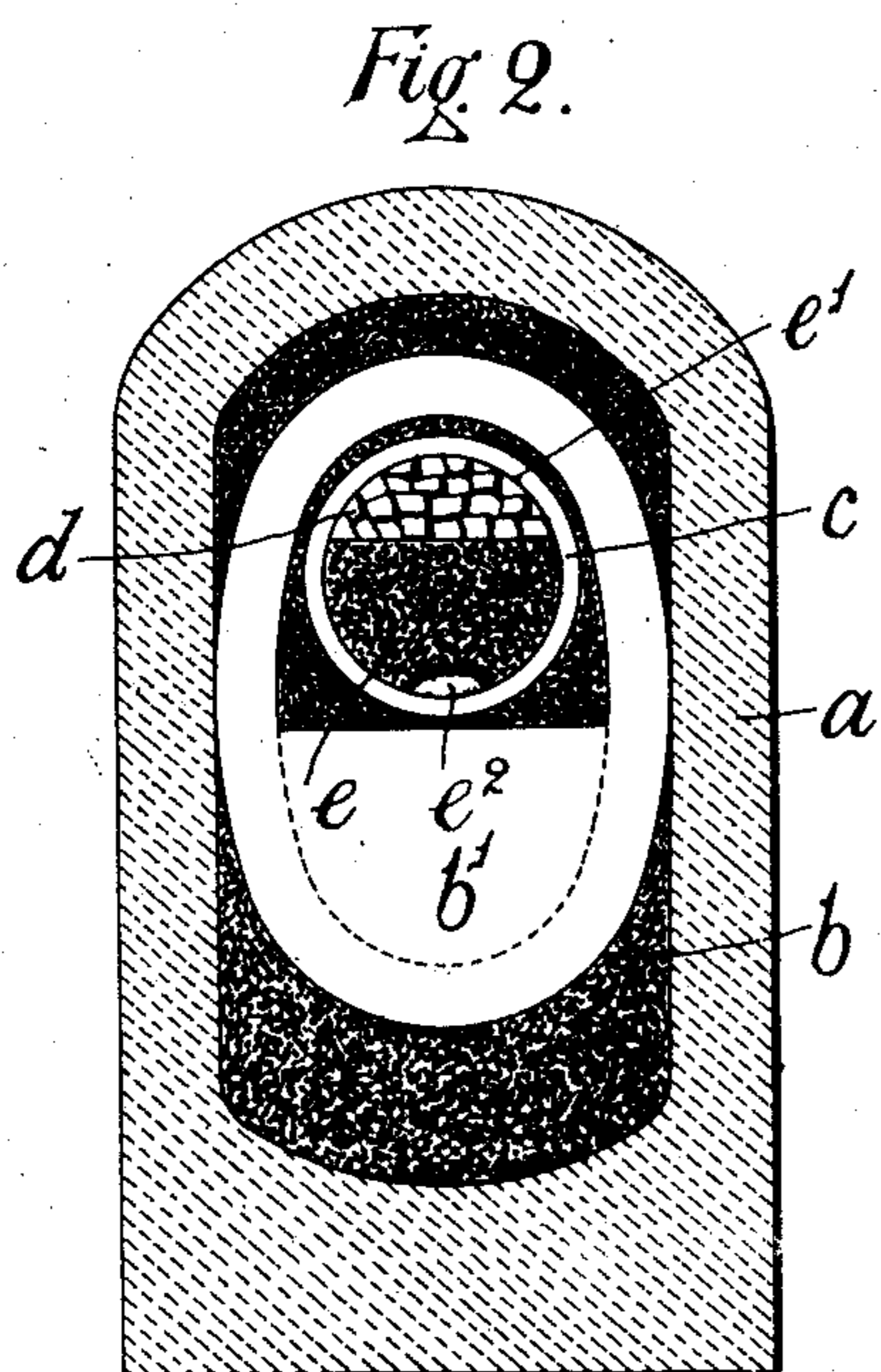
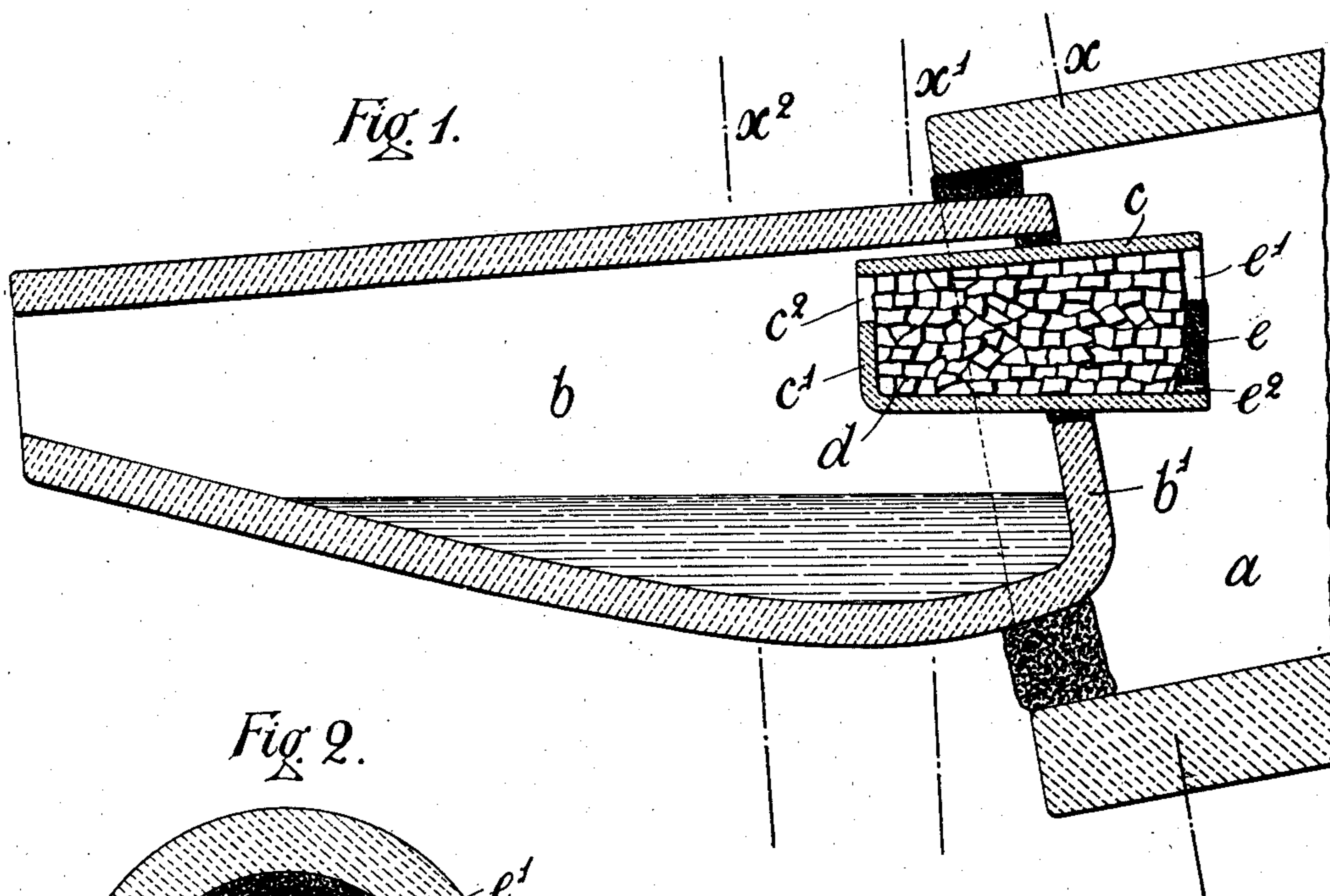


E. H. SHORTMAN.
 PROCESS OF EXTRACTING ZINC.
 APPLICATION FILED DEC. 13, 1907.

905,753.

Patented Dec. 1, 1908.

2 SHEETS—SHEET 1.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 5.

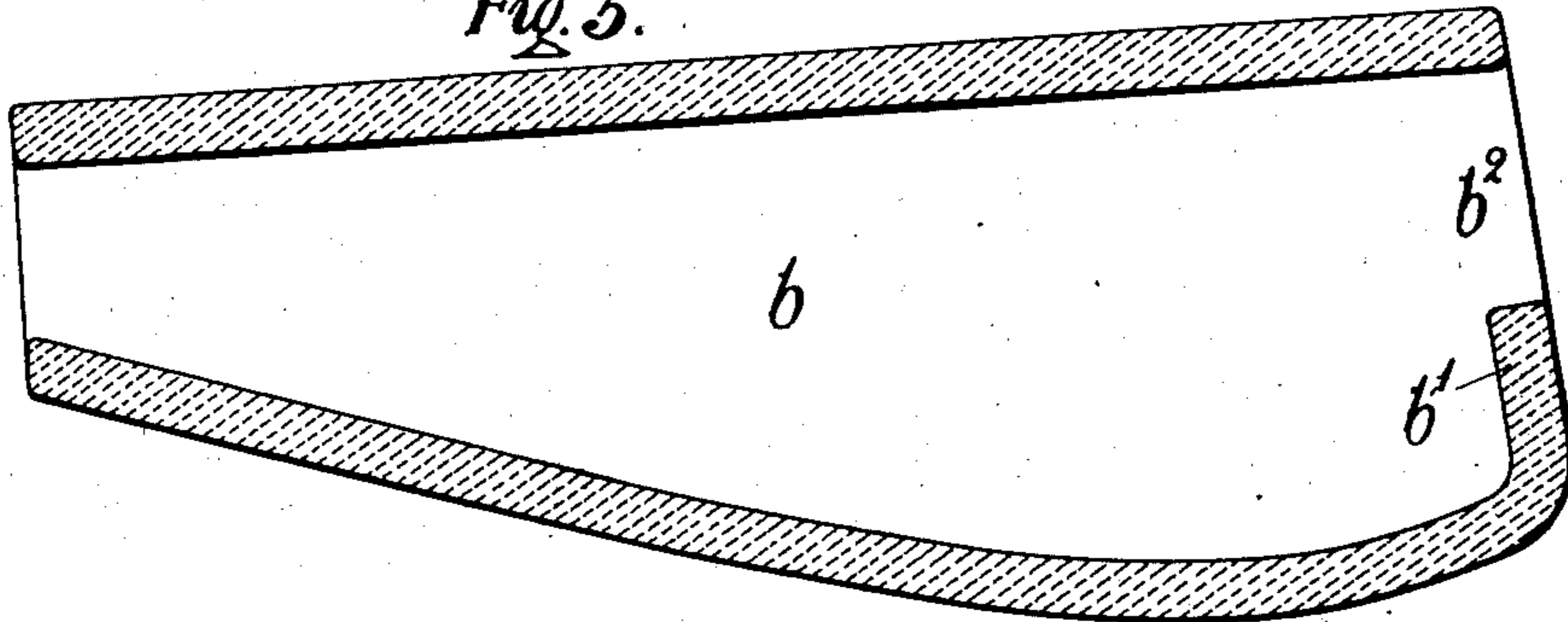


Fig. 7.



Fig. 6.

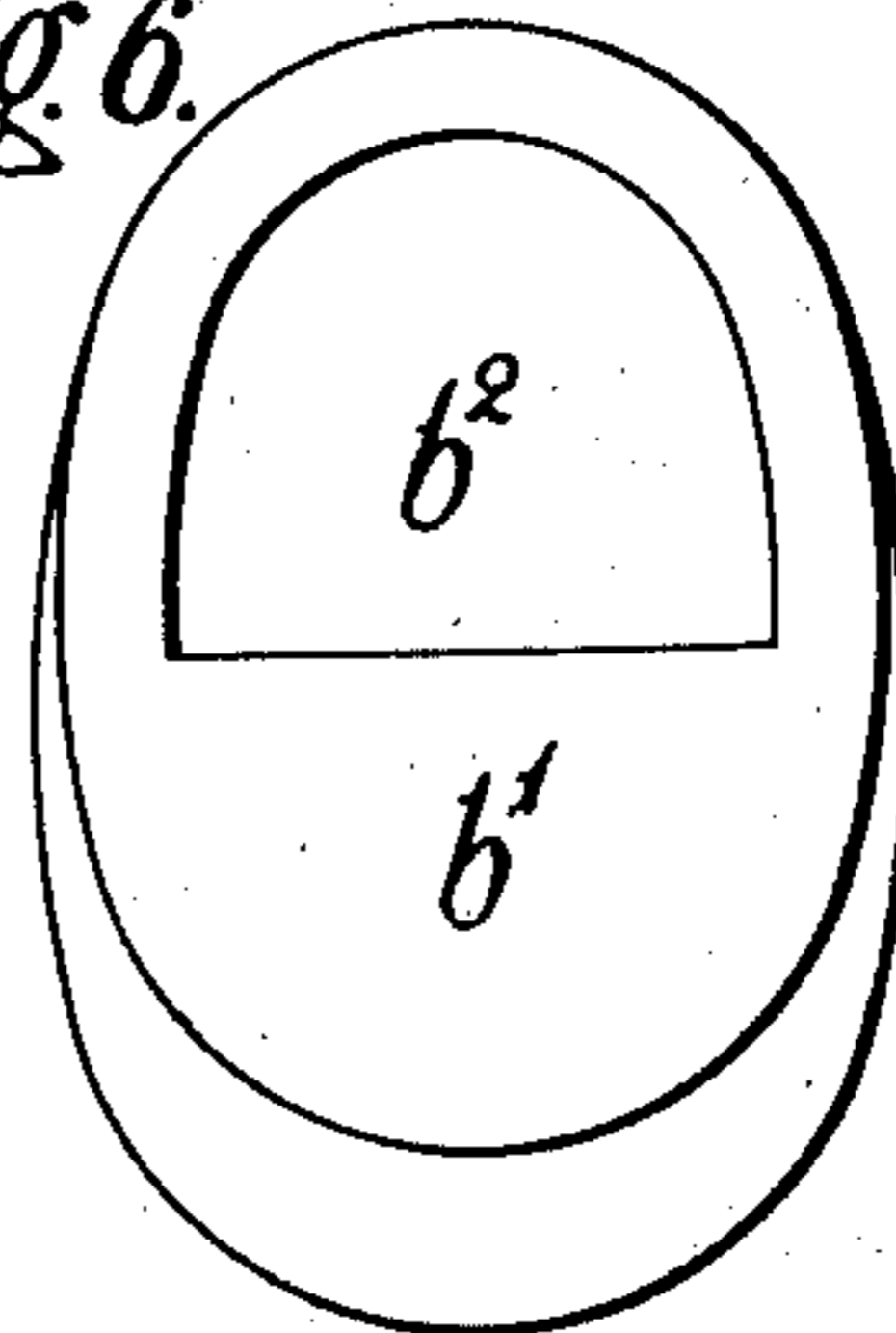


Fig. 8.

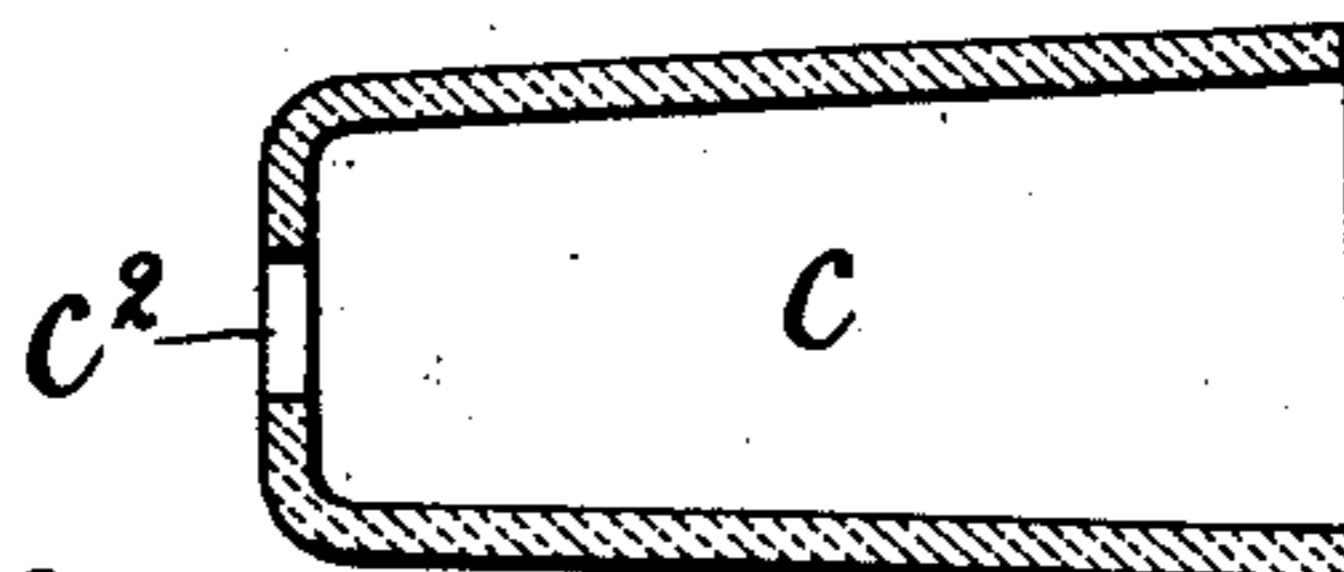
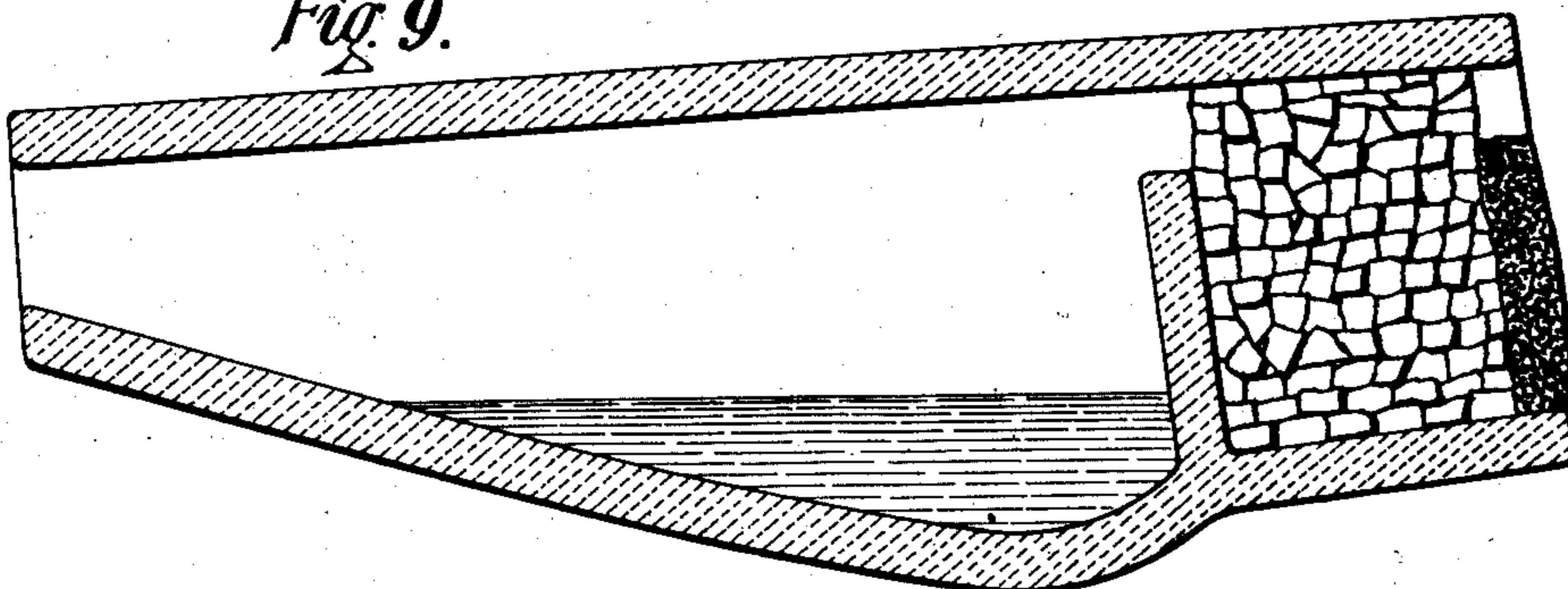


Fig. 9.



WITNESSES

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UNITED STATES PATENT OFFICE.

EDWARD HENRY SHORTMAN, OF BLOXWICH, ENGLAND, ASSIGNOR OF ONE-HALF TO THE
NEW DELAVILLE SPELTER COMPANY LIMITED, OF SPRING HILL, ENGLAND.

PROCESS OF EXTRACTING ZINC.

No. 905,753.

Specification of Letters Patent.

Patented Dec. 1, 1906.

Application filed December 18, 1907. Serial No. 406,391.

To all whom it may concern:

Be it known that I, EDWARD HENRY SHORTMAN, subject of the King of Great Britain, residing at Station street, Bloxwich, in the county of Stafford, England, have invented certain new and useful Improvements in Processes of Extracting Zinc, of which the following is a specification.

This invention has reference to that process of extracting zinc in which provision has to be made for the separation of the lead that is usually present in the zinc vapors distilled over from the furnace retorts to the external receiver wherein the nearly pure zinc is condensed and collected.

Hitherto it has been one practice to use, in the process of separating lead from the vaporized zinc, pieces of refractory material, which are arranged as an intercepting or filtering medium within the mouth or entrance to the receiver in such a manner that while the whole of the zinc vapor is permitted to pass from the retort to the receiver practically all the lead that would otherwise be carried over with such vapor is intercepted by the medium.

The employment of refractory material as the intercepting medium is attended by several disadvantages, the principal one being that only one "tapping" of high purity zinc is possible, and when the intercepting efficiency of a charge of medium becomes impaired by the clogging of its pores by the intercepted lead and other matter such as oxid of zinc dust and dirt (as it does after the process has been in operation for a comparatively short time) it cannot be conveniently removed or disposed of without detaching the receiver from the retort, and the primary object of the present invention is to remedy the disadvantages above referred to by the substitution for the refractory material, of a medium which can, at any time, or at any stage in the extraction process, be removed or disposed of without risk of contaminating the purified zinc in the receiver, and without necessitating the detachment of the said receiver from its retort, while two "tappings" of high purity zinc can be obtained. To attain this object, it is proposed, according to the present invention, to use as the intercepting medium, small pieces of coal or coke, preferably anthracite or other coal of a similar non-bitu-

minuous character, which I have discovered has the property of mechanically intercepting lead from zinc vapors without affecting the purity of the zinc. This coal or coke remains in a comparatively cold condition during the whole of the period that it is being used as the lead-intercepting medium.

To insure that the whole of the vapors from the retort shall pass over and be subjected to the intercepting action of the coal or the like and also to facilitate the removal of the said medium after its purifying efficiency has deteriorated, I propose to provide the inner end of the receiver with a fire-clay or other refractory receptacle or sleeve which constitutes the only means of communication between the retort and receiver and serves both as a displaceable carrier for the intercepting medium and as a trap or intermediate receiver for the intercepted lead.

Figure 1 of the accompanying drawings is a longitudinal sectional view showing an improved lead-interception arrangement above referred to and adapted to be used in carrying out the improved process, wherein the charge of intercepting medium is contained within a displaceable sleeve-receptacle carried by the inner end of the receiver. Fig. 2 is a cross section of Fig. 1, taken through the retort upon the dotted line a , and looking towards the receiver and lead-interception sleeve. Fig. 3 is a cross section taken through the receiver and sleeve upon the dotted line x^1 Fig. 1. Fig. 4 is a cross section upon the dotted line x^2 Fig. 1 taken through the receiver. Fig. 5 is a separate longitudinal section of the receiver and Fig. 6 is an end view thereof. Fig. 7 shows a longitudinal section and two end views of the displaceable receptacle. Fig. 8 is a longitudinal sectional view of a modified form of receptacle. Fig. 9 is a like view of another modification.

The same letters of reference indicate corresponding parts in each of the figures of the drawings.

The accompanying drawing illustrates an apparatus adapted for use in carrying out my improved process, wherein a is the retort and b is the receiver for the purified zinc, the latter being provided with a partially-closed inner end b^1 , which extends into the interior of the retort when the

receiver is luted in position and is provided with an opening b^2 for the reception of the lead-interception sleeve or receptacle c , wherein a filling or charge d of anthracite coal or other suitable intercepting medium is contained and is secured therein by a stopping of clay e , placed in the inner end of the said sleeve in such a manner that an aperture or opening e^1 , is left at the said inner end of the sleeve to provide for the passage therethrough of the whole of the zinc vapors that are distilled over from the retort, and when it is desired for the intercepted lead to run back into the receiver, a suitable drainage hole e^2 may be made through the bottom of the clay stopping e . Further, to provide an effectual trap for the lead which is intercepted by the charge of medium and to leave a free outlet into the receiver for the purified zinc vapors, the forward end of the sleeve (which is in the receiver) is provided with a baffle or partition c^1 which extends for a suitable height from the bottom edge but leaving a top opening c^2 wherethrough the purified vapors may issue into the interior of the receiver.

The interception sleeve, after having been first filled with the anthracite medium, is adapted to be luted in position in the opening b^2 in the retort end of the receiver and is arranged so that when the charge has become so contaminated with intercepted lead and other matter as to be rendered useless, the said sleeve can be pushed back into the retort by the introduction of a suitable appliance through the open end of the receiver, and then lies in the bottom of the said retort where there is no risk of the purity of the zinc in the receiver being affected by the intercepted lead and other matter or by the displaced medium which is left in the retort during the final stage of the process.

By the use of anthracite intercepting medium within a displaceable receptacle as above described, I am enabled to obtain two tappings of high-purity zinc before the interception charge becomes so far contaminated with the intercepted lead and other matter as to necessitate the displacement of the sleeve or receptacle into the retort and the continuation of the process without making any provision for the interception of the lead, for obtaining a final tapping of ordinary-grade spelter.

Fig. 8 shows a longitudinal section of a modified form of receptacle in which the outlet c^2 leading therefrom into the receiver is arranged in the middle of the end walls instead of at the top thereof as in the previously-described form. This disposition is found to facilitate the interception and sheading of the lead from the zinc vapors, as the solid walls above and below the said outlet constitute baffles against which the vapors impinge and are thereby made to

circulate more thoroughly through the medium so that a higher degree of purity is obtained in the zinc vapors which escape through the outlet into the receiver.

I wish it to be understood that instead of introducing the anthracite medium between the retort and receiver by means of a displaceable receptacle such as herein described, said anthracite may, in some cases, be charged loose into the inner end of the receiver and be retained therein by a stopper of clay which is inserted in the said end of the receiver and is provided with one or more drainage holes leading back into the retort. With such an arrangement, the vapors pass into the part of the receiver which contains the medium through a space or opening which is left between the clay stopping and the top or crown of the receiver, while the lead which is condensed and intercepted by the medium will run back through the drainage-holes in the stopping and be collected in the outer end of the retort.

I have shown in the accompanying drawing an apparatus which may aid in carrying out the process embodying the subject matter of the present application. It will be understood, however, that the performance of the improved process is not limited to an apparatus of the specific character set forth in the drawing and, moreover, this apparatus forms no part of the present application, it being covered in a divisional application, Serial No. 453,482 filed September 17, 1908.

Having fully described my invention, what I desire to claim and secure by Letters Patent is:—

1. The improvement in the art of extracting zinc by distillation which consists in passing the metallic vapors prior to condensation through a lead-intercepting medium consisting of anthracite or hard non-bituminous coal or hard coke in a condition that renders it chemically inert but active by its physical or mechanical properties.

2. The improvement in the art of separating lead and zinc vapors in the extraction of zinc by distillation which consists in passing the metallic vapors prior to condensation through a lead-intercepting medium which separates the lead by a mechanical or physical action, the said medium being used until its lead-intercepting properties are impaired, and then displacing said intercepting medium into the retort and continuing the zinc condensing process without interruption but without providing for the interception of the lead.

3. The improvement in the art of separating the lead and zinc vapors in the extraction of zinc by distillation which consists in passing the metallic vapors prior to condensation through a mechanically-acting lead-intercepting medium arranged between the vaporizing and condensing areas, then dis-

placing the lead-intercepting medium with its contaminated charge into the vaporizing area and continuing the distilling process.

4. The improvement in the art of extracting zinc by distillation which consists in separating lead from the zinc vapors by passing the metallic vapors prior to condensation through a lead-intercepting medium of anthracite or hard bituminous coal or hard coke inclosed in fire clay, said medium being kept relatively cool and in a chemically inert condition which insures the separation of the lead mechanically or by the physical properties of said medium.

5. In the extraction of zinc by distillation

a process of separating lead from zinc vapors prior to the condensation of the latter wherein the metallic vapors are passed through a lead intercepting medium of anthracite or hard bituminous coal or hard coke kept relatively cool and in a chemically inert condition to effect the separation of the lead.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

EDWARD HENRY SHORTMAN.

Witnesses:

HENRY NORTON SKERRETT,
HAROLD GRIFFITHS.