

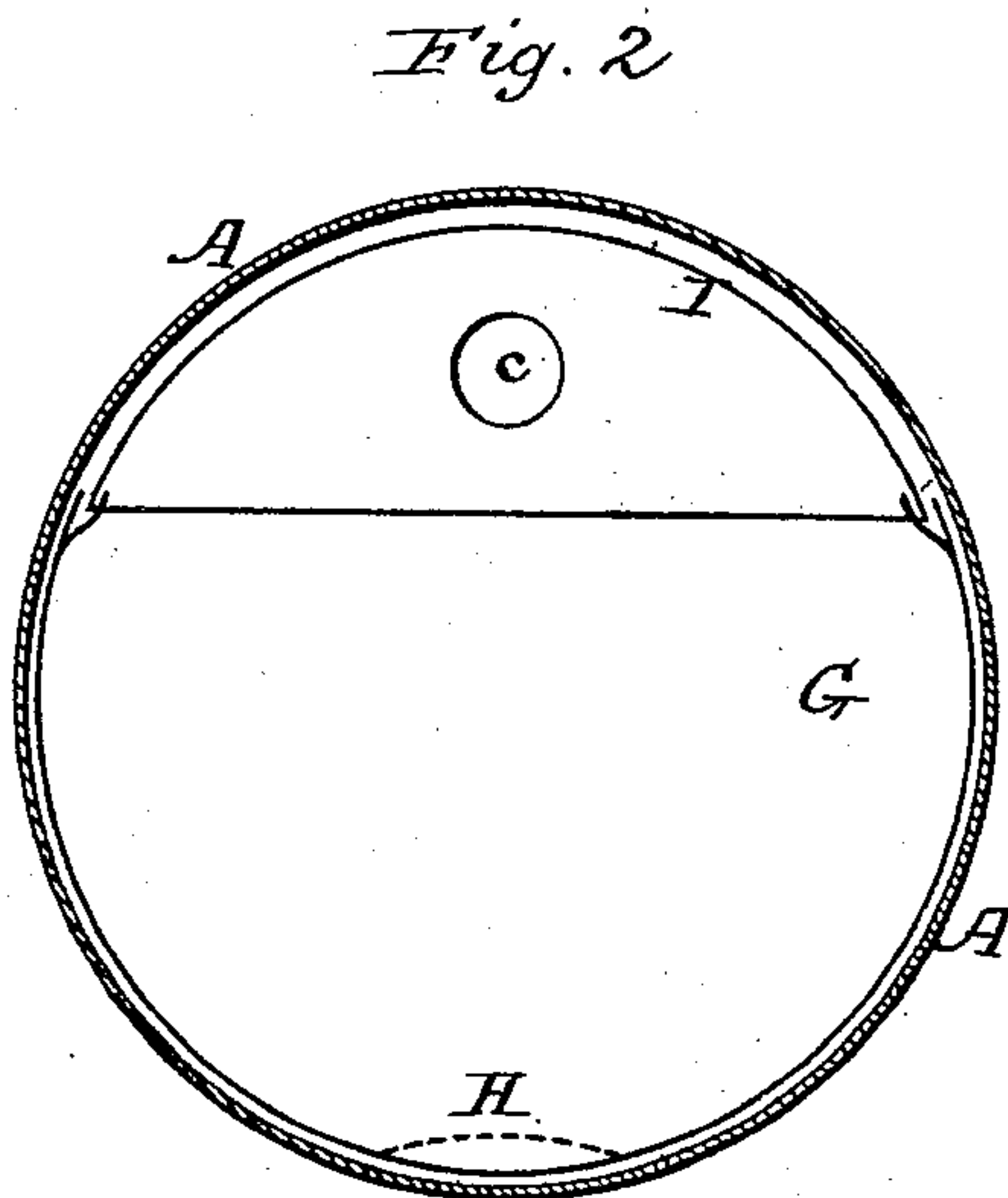
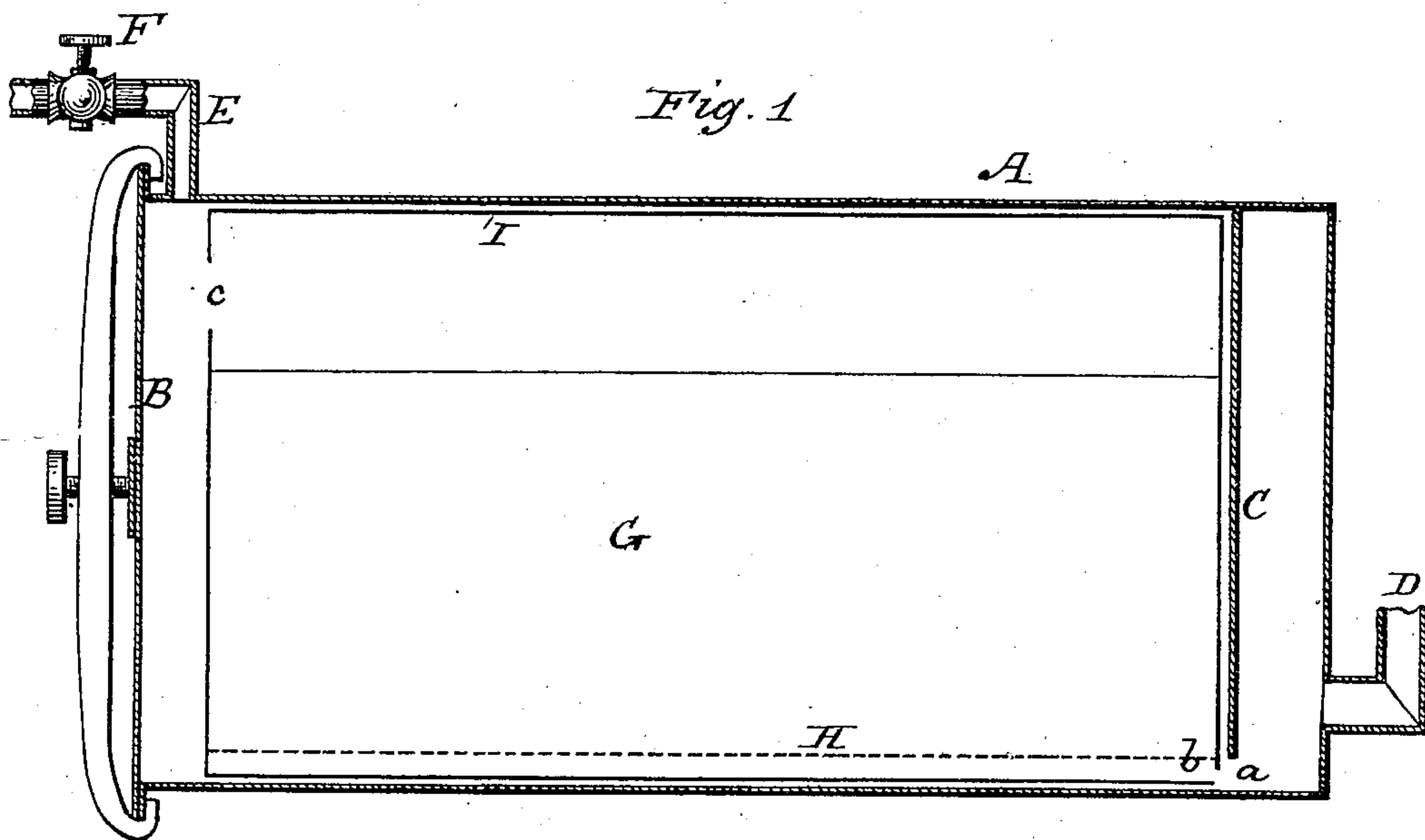
(No Model.)

C. MARCHAND.

MANUFACTURE OF BINOXIDES OF BARIUM AND CALCIUM.

No. 267,551.

Patented Nov. 14, 1882.



Witnesses:

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# UNITED STATES PATENT OFFICE

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## MANUFACTURE OF BINOXIDES OF BARIUM AND CALCIUM.

SPECIFICATION forming part of Letters Patent No. 267,551, dated November 14, 1882.

Application filed July 6, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES MARCHAND, of New York city, in the county and State of New York, have invented a new and useful Improvement in the Manufacture of Bin oxides of Barium and Calcium, which improvement is fully set forth in the following specification.

This invention has reference to the manufacture of the anhydrous bin oxides of the metals of the alkaline earths, barium and calcium, for use in making hydrogen peroxide and for other purposes.

It has long been known that barium monoxide or baryta ( $\text{BaO}$ ) when exposed to a current of air or of oxygen at a low red heat becomes converted into barium bin oxide ( $\text{BaO}_2$ ) by absorption of oxygen. The same reaction I have found to take place with calcium monoxide or lime, ( $\text{CaO}$ ).

The present invention utilizes the above reaction by new methods and means, so that the manufacture of the bin oxide can be carried on with greater facility, economy, and efficiency.

In the accompanying drawings is represented an improved apparatus for effecting the desired conversion, Figure 1 being a vertical longitudinal section, and Fig. 2 a cross-section.

A is a retort set horizontally in a furnace similar to those in common use in gas-works, or in a furnace adapted to be heated by the waste-gases from a reverberating-furnace. The retort is made of cast-iron or of other suitable material. The front end (left-hand, Fig. 1) is closed by a cover, B, held in place like the covers of gas-retorts. The rear (right-hand) end may in like manner be closed by a removable cover, or the end wall may be cast with the body of the retort. At a short distance from the rear end wall is a partition, C, cast in one piece with the retort. A small chamber is thus formed, with which the inlet-pipe D communicates. A small opening, *a*, at the bottom of the partition C puts the rear chamber in communication with the body of the retort. At the front end of the retort A is an outlet-pipe, E, provided with a cock or valve, F.

G is the vessel for receiving the baryta or lime. It is separate from the retort, and fits loosely therein, so that it may freely be inserted or removed. This vessel, which may be of sheet-iron, has a perforated false bottom or partition,

H, and is provided also with a detachable cover, I. An opening, *b*, is made through the rear wall of the vessel, and it is so placed that when the vessel G is pushed back into the retort the two openings *a b* coincide, and the small chamber at the rear of the retort is put in communication with the space under the perforated false bottom or partition H. In the front of the cover I is a hole, *c*, opening into the front of the retort. Gas admitted through the pipe D will thus be delivered under the partition or false bottom, will pass up through the material thereon, and will pass off by the outlet E, or it may be confined to the retort by closing the cock or valve F. Anhydrous baryta or anhydrous lime having been obtained in a porous condition by any known suitable process—as, for example, by heating barium nitrate or calcium carbonate—is broken into small lumps and is placed in the vessel to the height, say, of two-thirds, less or more, no particular height being essential. The retort being brought to the proper temperature, about  $1,000^{\circ}$  to  $1,100^{\circ}$  Fahrenheit, and the cover B being removed, the vessel G, with its contents, is inserted into the retort until its rear wall is in contact with the partition C. The cover B being replaced, ozonized air or ozonized oxygen is then admitted through the inlet-pipe D. During the first part of the operation the cock or valve F is opened to allow the contained air to be driven off. If ozonized oxygen is used, the cock or valve is then closed, and the oxygen is admitted until the baryta or lime is saturated and converted into barium or calcium bin oxide. If ozonized air is used, the cock or valve F is left part way open to allow the nitrogen to escape.

To prepare the oxygen or air, the impurities—such as carbonic acid and water—are removed by passing over lime and over hygroscopic materials, and the air or oxygen is then ozonized by any known or suitable means.

As the production of the ozone forms no part of the present invention, it is unnecessary to describe it here. It may be said, however, that it has been found effective to ozonize the air by electric discharge through the air or pure oxygen in the dark.

Any desired pressure may be maintained in the retort, but a pressure of three inches of



water gives good results. Ordinarily about four to eight hours are required to saturate the baryta, and seven to fourteen hours to saturate lime. The completion of the operation  
5 may be ascertained by testing the escaping gas for oxygen, the pressure of which should be ascertained by proper means.

After the operation is finished, inflow of air and oxygen is shut off, the cover B is removed,  
10 the vessel G is withdrawn, and the binoxide of barium or calcium is removed, and the vessel filled with a new supply of baryta or lime and introduced, the cover B is replaced, the ozonized air or oxygen again admitted, and the  
15 operation proceeds as before.

Modifications may be made in the details without departing from the spirit of the invention. For example, in place of a horizontal retort, as shown, a vertical one may be used,  
20 the oxidating agent being introduced at the bottom beneath a perforated false bottom in the receptacle containing the material to be peroxidated.

Instead of using ozonized air or oxygen, ordinary pure air or oxygen may be employed;  
25 but in such case it is obvious that the first part of the invention, which consists in subjecting the baryta or lime to ozonized oxygen or ozonized air, is not employed. With ozone a superior product is obtained.  
30

No claim is made herein broadly to converting baryta or lime into binoxide by means of ordinary air or oxygen, as this, as already pointed out, has long been done, nor is any  
35 claim made to passing air through baryta or lime supported on a perforated shelf in a retort and kept at a red heat, as this is also old.

Having now fully described my said inven-

tion and the manner of carrying the same into effect, I claim the new improvements herein  
40 described, all and several, to wit:

1. The method of making barium or calcium binoxide by subjecting baryta or lime to the action of ozonized oxygen or ozonized air, substantially as described.  
45

2. The method of making barium or calcium binoxide by charging the baryta or lime into a receptacle, inserting said receptacle and its contents into a retort, heating the baryta or lime to a red heat, subjecting it to the action of an  
50 oxidating agent, and removing the said receptacle and the contained binoxide from the retort, substantially as described.

3. The combination, with a retort having an inlet for admitting an oxidating agent, of the  
55 independent receptacle provided with a perforated partition or false bottom, the said retort and receptacle being constructed and arranged substantially as shown and described, so that the oxidating agent may be admitted  
60 through said inlet under the said perforated partition or false bottom of the receptacle inserted in said retort, substantially as described.

4. The retort provided with a removable cover, an interior partition, an inlet, and an  
65 outlet, in combination with the vessel adapted for insertion into said retort and provided with a cover and perforated false bottom, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.  
70

CHAS. MARCHAND.

Witnesses:

H. S. MARSTON,

W. S. WHITCOMB.