

(No Model.)

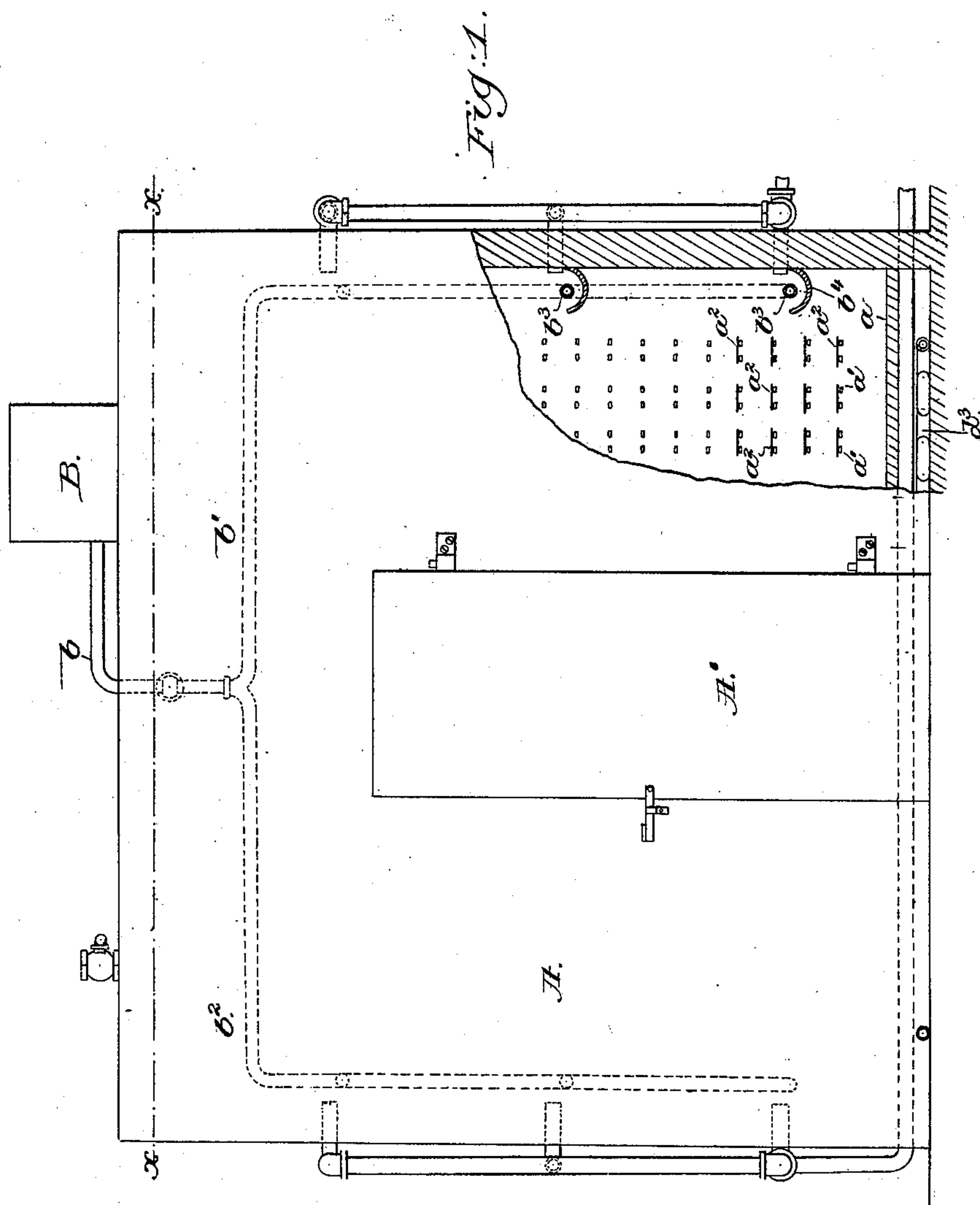
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N. K. MORRIS & W. WEST.

## PROCESS OF MAKING WHITE LEAD.

No. 389,591.

Patented Sept. 18, 1888.



*Witnesses.*

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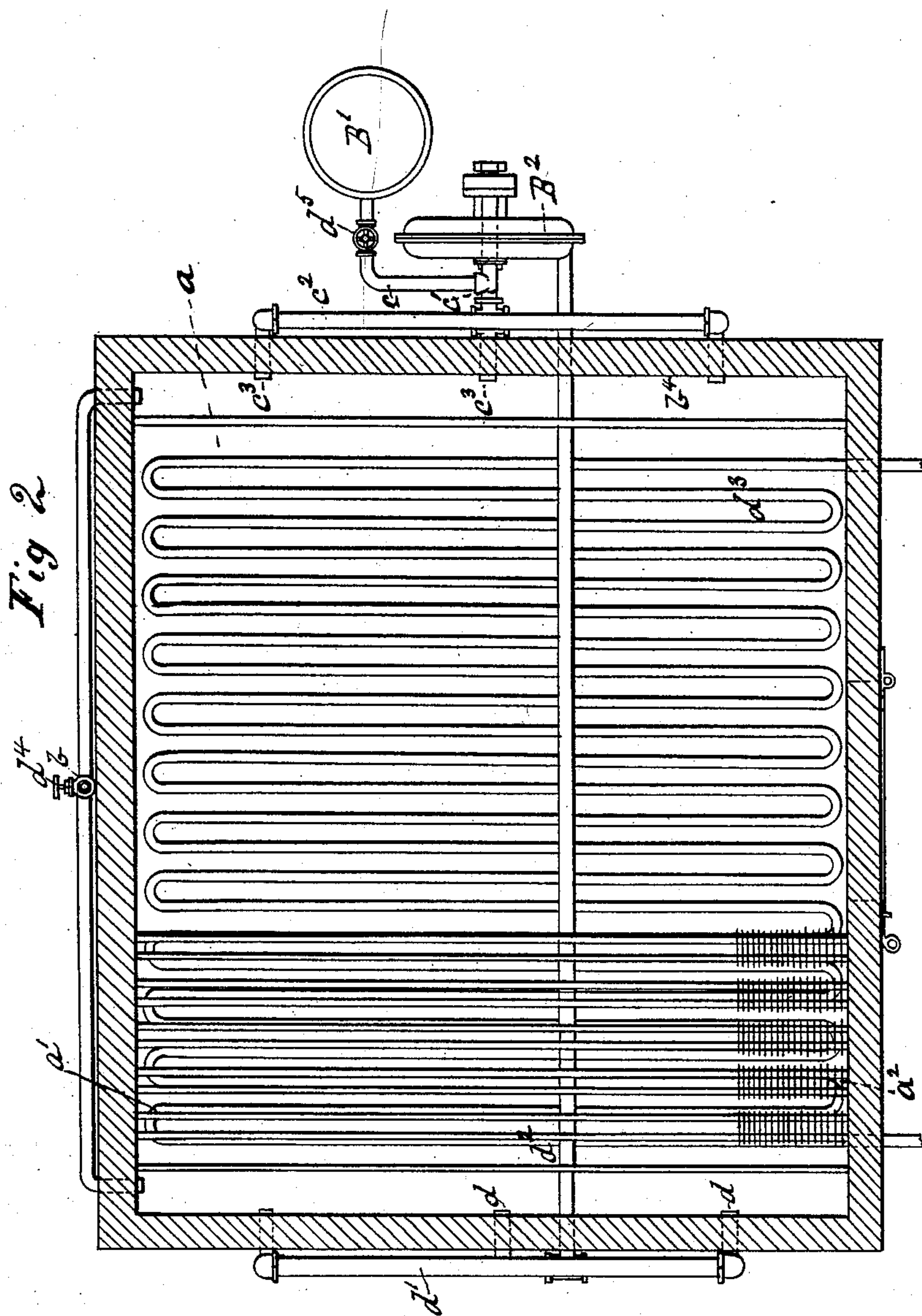
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Witnesses

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# UNITED STATES PATENT OFFICE.

NORMAN K. MORRIS AND WILLIAM WEST, OF DENVER, COLORADO.

## PROCESS OF MAKING WHITE LEAD.

SPECIFICATION forming part of Letters Patent No. 389,591, dated September 18, 1888.

Application filed May 13, 1887. Serial No. 238,096. (No model.)

*To all whom it may concern:*

Be it known that we, NORMAN K. MORRIS and WILLIAM WEST, both of Denver, county of Arapahoe and State of Colorado, have invented an Improvement in the Manufacture of White Lead, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to a novel method for producing lead carbonate or white lead.

Prior to our invention metallic lead has been converted into the carbonate by means of acetic acid and carbonic-acid gas, the acetic acid being contained in pots located in a chamber into which carbonic-acid gas is introduced, a predetermined or desired quantity of carbonic-acid gas being admitted into the chamber to produce the corrosion or conversion of the metallic lead; also, carbonic-acid gas has been passed through vats containing acetic acid before being admitted into the converting-chamber. With the methods referred to a considerable length of time is required to effect the formation of the carbonate, it often requiring as long as one hundred to one hundred and twenty days to convert any considerable quantity of lead.

In accordance with our invention we make use of carbonic-acid gas and acetic acid, but maintain the latter in the form of vapor and cause the said gas and vapor to be circulated through the corroding-chamber, they being forced into the said chamber preferably at one side and withdrawn from the opposite side and again forced into the chamber. The metallic lead in the corroding-chamber will preferably be in the form of a fine wire or sponge placed upon shelves or racks located therein. The acetic acid may be supplied from outside the chamber by means of a pipe or pipes which lead from a suitable tank or source of supply to pots or shallow trays or receptacles located in the corroding-chamber, the said acid being converted into a vapor within the chamber by the heat of the said chamber, the latter being heated, preferably, by a system of steam-pipes located below the floor, the said floor being composed, preferably, of tile set in soluble glass or silicate of soda or other material unaffected by acids. The circulation of gas and

vapor may be accomplished by means of a single blower connected to the carbonic-acid-gas supply.

The particular features of our invention will be pointed out in the claims at the end of this specification.

Figure 1 is a front elevation of one form of apparatus by which to practice our invention, it being partially broken out to show the racks or shelves to support the lead and the shallow trays or receptacles for the acetic acid; and Fig. 2 is a section of Fig. 1 on the line  $x x$ , looking down, the floor being omitted and also part of the shelves or racks supporting the lead.

The converting or corroding chamber or room A may have its walls made of wood or other suitable material, the said chamber being preferably air-tight, and having a door, A', by which access may be had to it.

The chamber A has a floor,  $a$ , preferably made of tile laid in soluble glass or silicate of soda, or it may be of any other material not affected by acids.

The chamber A contains within it, as shown, a series of superimposed racks or shelves,  $a'$ , extended across the said chamber, they being shown as supported by the sides thereof. The shelves or racks  $a'$  support the metallic lead to be converted into the carbonate, the said lead being preferably in the form of a sponge, or, as herein shown, in the form of a fine wire,  $a''$ . The lead wire  $a''$  is converted into the carbonate by means of acetic acid and carbonic-acid gas, the acetic acid being changed to vapor by heat supplied as will be described.

The acetic acid is supplied to the chamber A, as herein shown, by a pipe,  $b$ , connected to a tank, B, which may be located upon the chamber, as shown, or it may be in any other desired place; or the said acid may be forced in by a pump. (Not shown, but which may be connected to the pipe  $b$  in well-known manner.) The pipe  $b$  is provided, as shown, with branch pipes  $b' b^2$ , leading to opposite sides of the chamber, each branch pipe  $b' b^2$  being provided, as shown, with extension pipes or nozzles  $b^3$ , located above and so as to empty the acetic acid preferably into shallow trays or receptacles  $b^4$ , extended across the chamber A.

The carbonic-acid gas is taken, as shown,



from a reservoir or gasometer or kiln, B', (see Fig. 2,) by a blower, B<sup>2</sup>, of any suitable or well-known construction, the said blower, as herein shown, drawing the gas from the reservoir B' through the pipe c, communicating with the pipe c', connected to the eye of the blower, and also to a pipe, c<sup>2</sup>, having branch pipes c<sup>3</sup>, extended into the chamber A, the said gas being drawn through the blower B<sup>2</sup> and forced into a pipe, d<sup>2</sup>, extended across the chamber A, and connected to a pipe, d', having branch pipes d, extended into the said chamber.

The carbonic acid gas and the vapor of acetic acid are caused to circulate through the chamber A by the blower B<sup>2</sup>, which exhausts the mixed gas and vapor out of the said chamber through the branch pipes c<sup>3</sup> of the pipe c<sup>2</sup>, and through the pipe c', connecting the pipe c<sup>2</sup> with the eye of the blower B<sup>2</sup>. The rotation of the blower is regulated so that but a mild circulation and not a forcible current of the carbonic-acid gas and acetic-acid vapor is maintained through the chamber. The acetic acid in the trays or receptacles b<sup>4</sup> is vaporized by heat supplied, preferably, by steam-pipes d<sup>3</sup>, located below the floor a and connected with a suitable source of supply; but instead we may employ any other suitable means of heat, such as a furnace.

The acetic-acid pipe b and the carbonic-acid-gas pipe c are provided with valves or cocks d<sup>4</sup> d<sup>5</sup>, respectively.

In the operation of the apparatus herein shown the cock d<sup>4</sup> is closed when a sufficient quantity of acetic acid has been admitted to the chamber, the cock d<sup>5</sup> opened, and the blower started, and when a sufficient quantity of gas has been forced into the chamber A the cock d<sup>5</sup> is closed sufficiently to regulate the supply of carbonic-acid gas as fast as it is absorbed by the lead. The heat of the chamber vaporizes the acetic acid, so that as the blower continues to operate a circulation of carbonic-acid gas and acetic-acid vapor is maintained through the chamber A, whereby the lead is converted into the carbonate in the compara-

tively short time of four or five days, any acetic acid which may be condensed in the chamber A being immediately vaporized when it comes in contact with the floor A.

We have herein shown only one chamber; but it is evident we may cause the mixture of gas and vapor to be passed through any desired number of chambers. Further, we do not desire to limit ourselves to any particular form of apparatus, as we may employ for the purpose of carrying out our process any apparatus of the general character described and which is adapted to the purpose.

We claim—

1. That improvement in the art or method of manufacturing white lead which consists in maintaining a circulation of carbonic-acid gas and acetic-acid vapor through a chamber containing metallic lead, substantially as described.

2. That improvement in the art or method of manufacturing white lead which consists in introducing carbonic-acid gas and acetic acid into the converting-chamber and vaporizing the acetic acid therein, and maintaining a circulation of carbonic-acid gas and acetic-acid vapor through the converting-chamber to corrode or convert metallic lead, substantially as described.

3. That improvement in the art or method of manufacturing white lead which consists in acting upon metallic lead in a finely-divided condition or form with a current of carbonic-acid gas and acetic-acid vapor, which is introduced into the chamber at one point and exhausted or withdrawn at another point, to be again passed through the said chamber, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

NORMAN K. MORRIS.  
WILLIAM WEST.

Witnesses:

ERNEST RUBIDGE,  
ARTHUR I. FONDA.