

G. CARY.  
Making White Lead.

No. { 2,333, }  
      { 33,337. }

Patented Sept. 24, 1861.

Fig. 1.

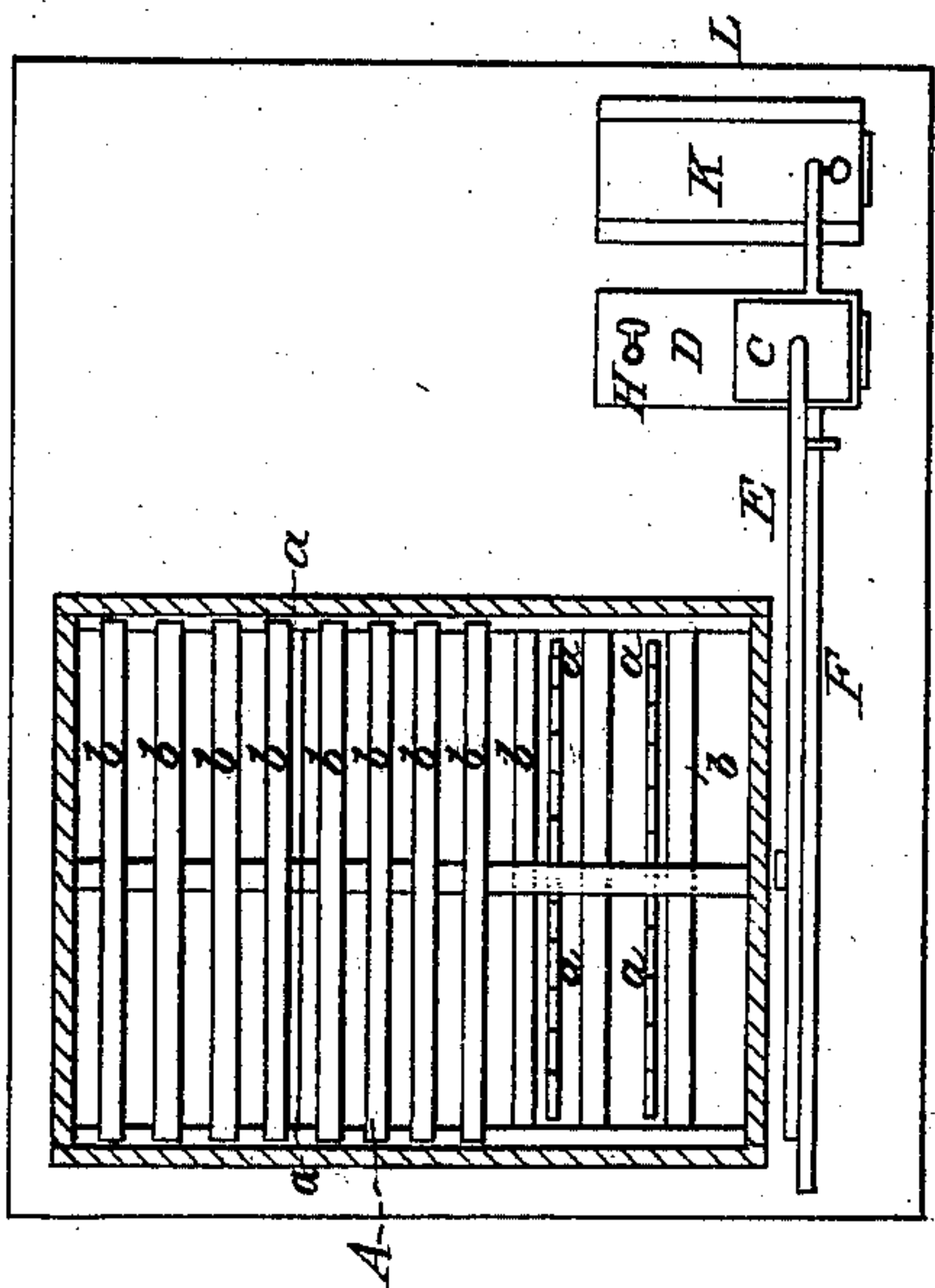


Fig. 2.

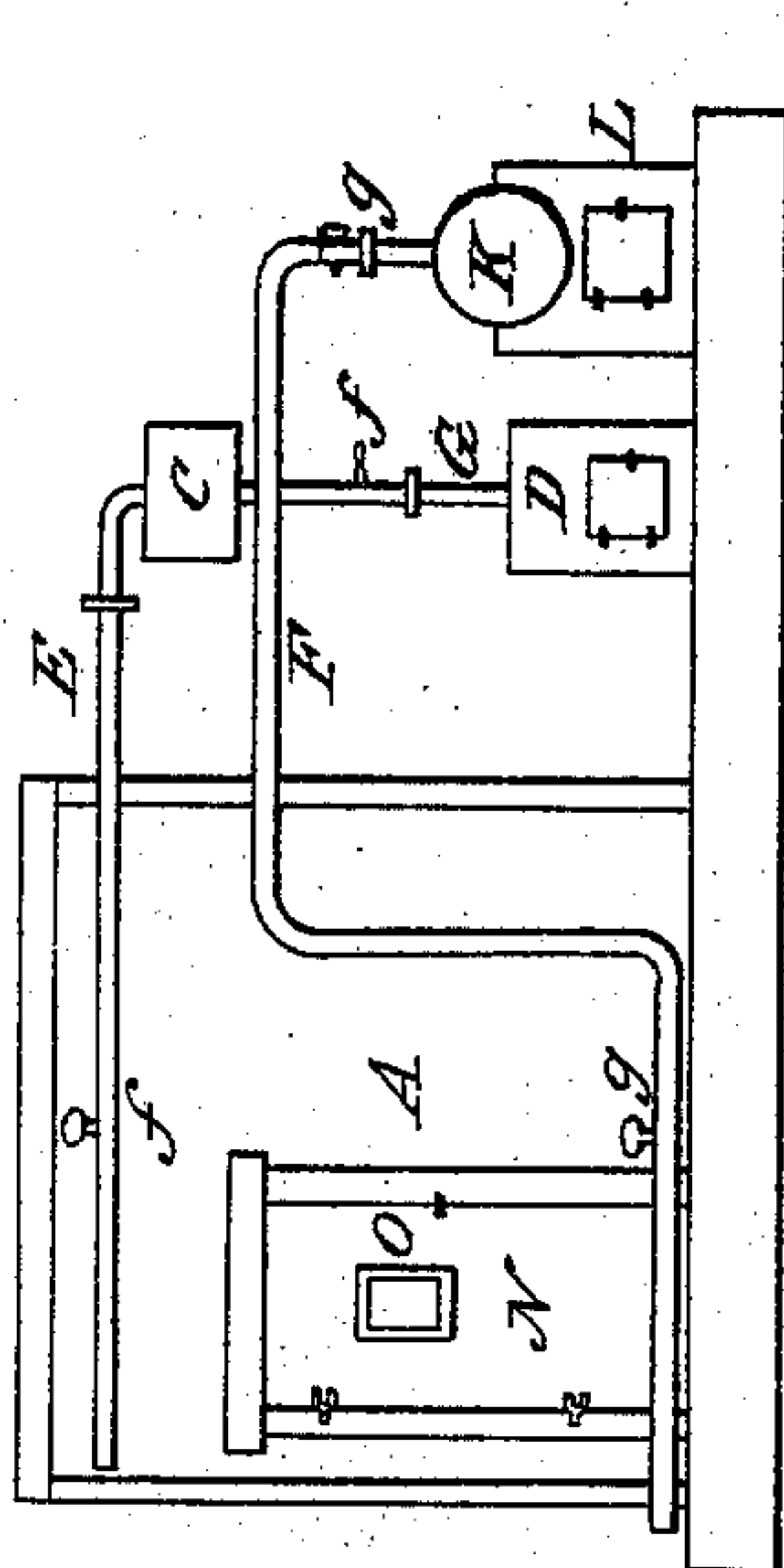


Fig. 4.

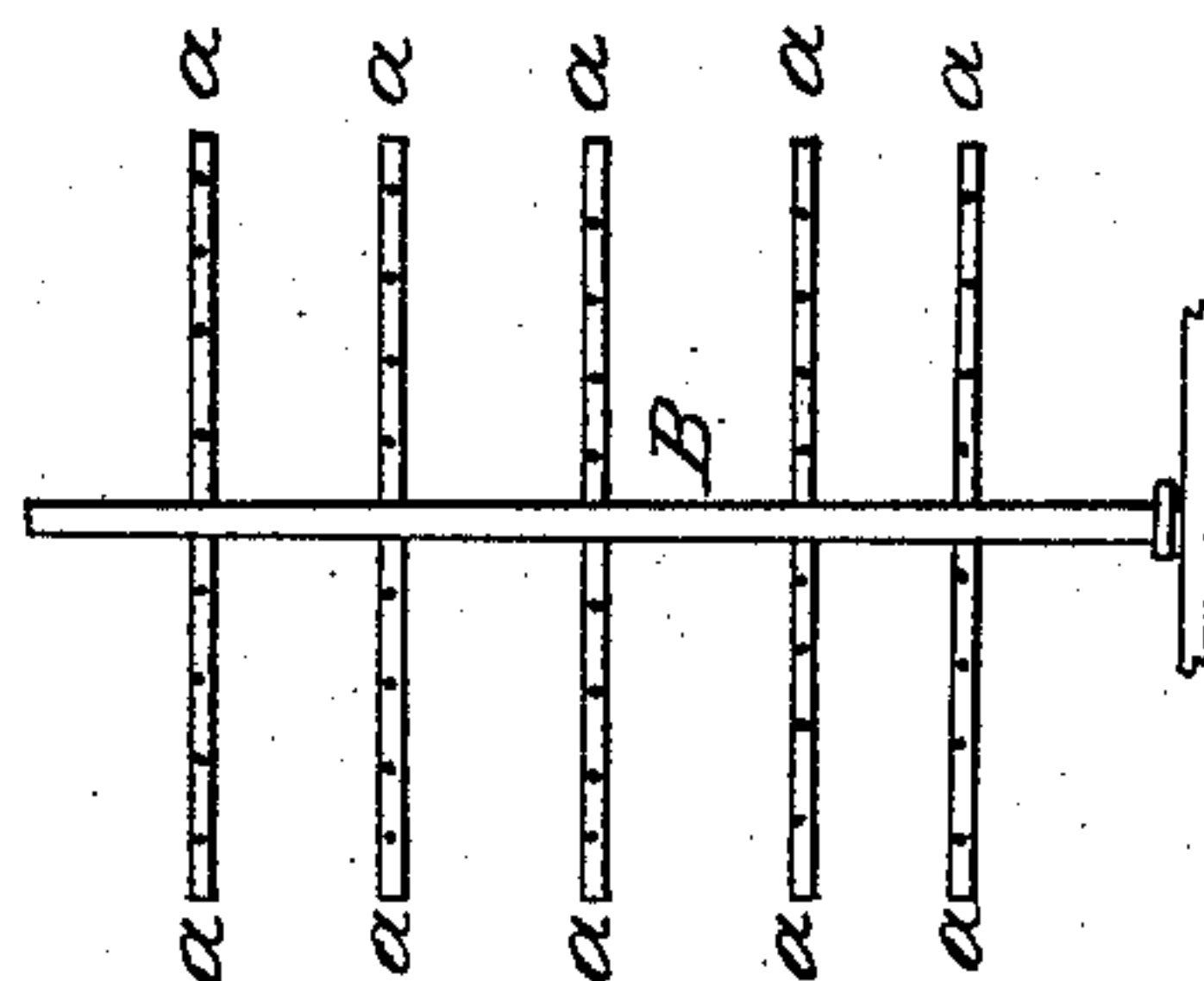


Fig. 3.

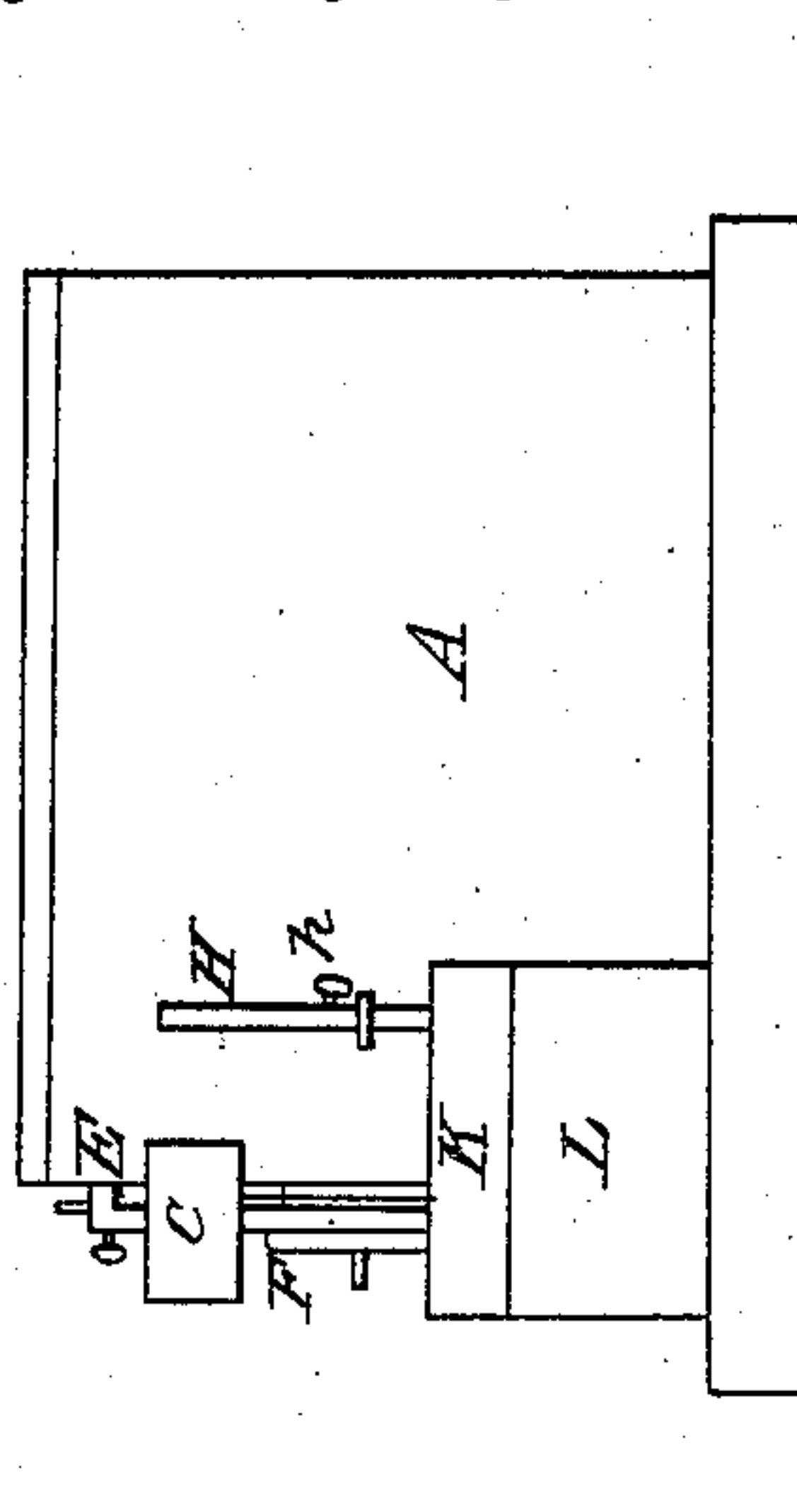
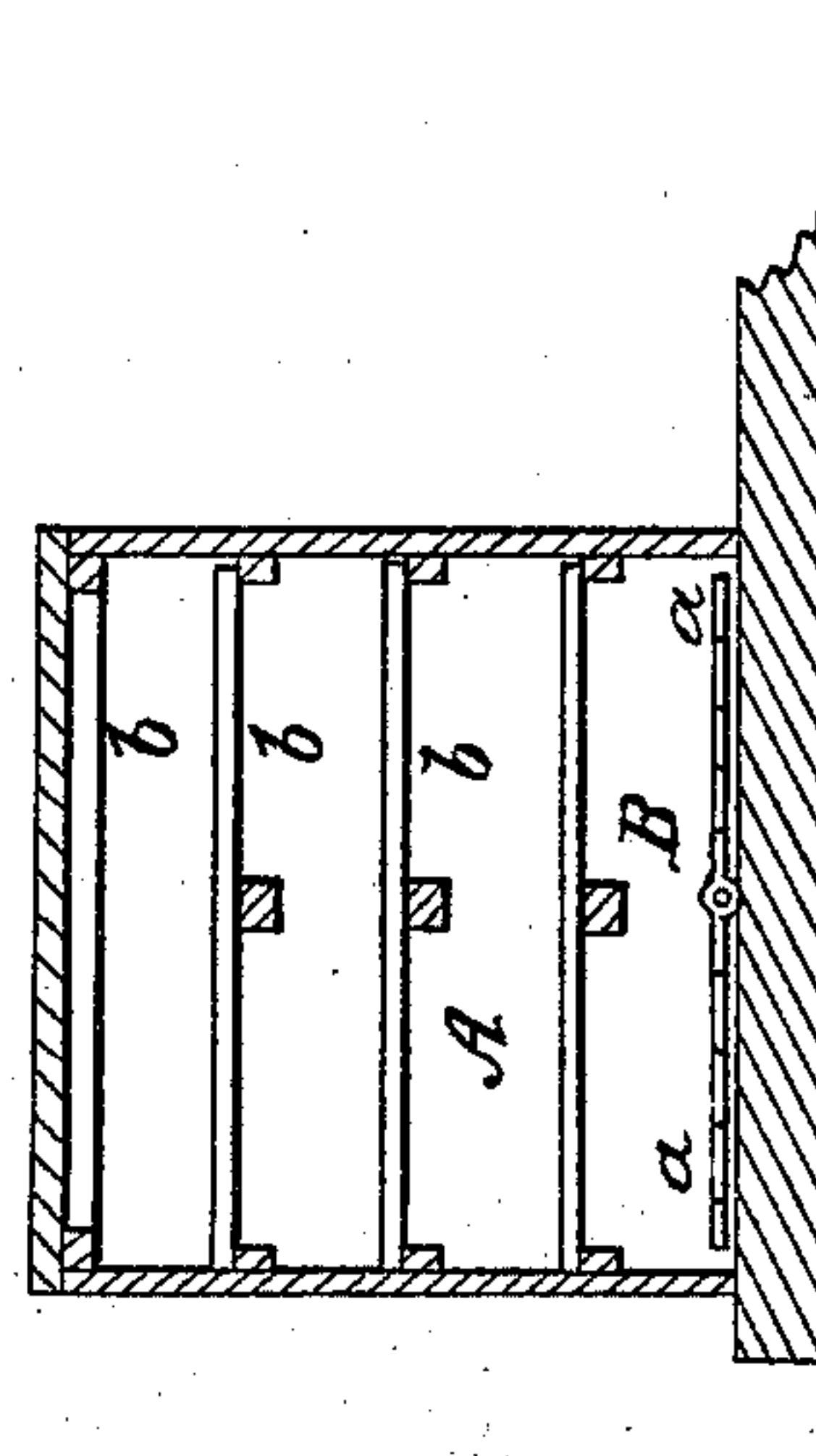


Fig. 5.



Witnesses:

W. H. Burdette  
Henry Both

Inventor:

Geo. Cary

# UNITED STATES PATENT OFFICE.

GEORGE CARY, OF CLEVELAND, OHIO.

## IMPROVEMENT IN THE PROCESS OF MANUFACTURING WHITE LEAD.

Specification forming part of Letters Patent No. 33,337, dated September 24, 1861.

*To all whom it may concern:*

Be it known that I, GEORGE CARY, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in the Process of Manufacturing White Lead; and I do hereby declare that the following is a full and complete description of the construction of the apparatus used and of the ingredients and manipulations therein concerned.

My improvement consists in subjecting metallic lead to the action of vapors arising from heated vinegar of low proof, which gives at once sufficient aqueous vapor to corrode and acetic-acid vapor to form the subacetate of lead, and thus prepare it to receive the carbonic-acid gas which forms the carbonate of the protoxide or white lead. The above-named agents are introduced into suitable chambers or rooms fitted up for that purpose and charged with metallic lead, the said agents being introduced simultaneously and continuously, as hereinafter specified. The rooms are made as tight as practicable with matched boards, but are not absolutely air-tight, and are not opened at any time during the entire process for the purpose of introducing or allowing the circulation of atmospheric air, or for the introduction of any other material than those mentioned above, or for allowing any of the agents employed to escape. By these means I not only greatly accelerate the process of corroding and carbonizing the lead, but do it in a manner more effectually and economically and in a manner less prejudicial to the health of the workmen than by any other process with which I am acquainted.

In the accompanying drawings, Figure 1 is a top view of the apparatus with the cover of the chamber removed for the purpose of showing the interior. Fig. 2 is a front elevation. Fig. 3 is a side elevation. Fig. 4 is a view of the pipes for the distribution of the aqueous and acetic-acid vapors; and Fig. 5 is a vertical section of the chamber, showing also a cross-section of the main distributing-pipe in Fig. 4.

A in the several figures represents a chamber about eight or ten feet square and about seven or eight feet high with a door upon one side opening outward. In Fig. 1 it is represented as having the top removed for the purpose of showing the interior. This chamber

may be made of good matched boards and as tight as practicable without luting the joints; but it is not necessary that it should be absolutely air-tight.

In the top view shown in Fig. 1, *b b* represent the upper range of slats, upon which the coils of lead are placed. These slats are placed about an inch apart. There are several of such ranges for supporting the coils of lead during the process, and they are placed about eighteen inches apart, as shown in Fig. 5, the lowest range being a little above the pipe for the admission of the vapors of water and acetic acid from the boiler K.

E represents the pipe for the admission of carbonic-acid gas, and enters the room near the top. This pipe is furnished with two stop-cocks *f f*, by means of which the gas can be admitted into the room or shut off, as desired.

B, Fig. 4, represents the distribution-pipes for the aqueous and acetic-acid vapor after they enter the chamber, and shows the manner in which these vapors are admitted into the room at the bottom thereof, as seen in Fig. 5.

The pipe F, leading from the boiler K, enters the room near the bottom, as above stated, and continues to the opposite side, two series of pipes branching off on either side parallel with the bottom of the room and extending nearly to the sides thereof. These branches or pipes are provided with a number of small holes on each side and on the top for the purpose of distributing through the room the vapors admitted by the pipe F. The pipe F is furnished with a stop-cock *g* for the purpose of controlling the admission of vapor.

C represents a reservoir for the carbonic-acid gas, and is connected with the furnace D by the pipe G. The furnace D, in which the carbonic acid is generated by means of the combustion of charcoal, is furnished with two pipes G and H. The pipe G leads to the reservoir C, and is provided with a stop-cock *f* for the purpose of turning all the products of combustion through the pipe H at pleasure, in order to allow the escape of smoke arising from the combustion of any uncharred wood when the furnace D is freshly charged. By closing the stop-cock *h* and opening the stop-cocks *f* the carbonic acid will pass up



into the reservoir C and into the chamber A. It will be observed by reference to Fig. 3 that the pipe H opens into the open air for the purpose above stated.

K represents a boiler in which the vapor of water and acetic-acid vapor are generated. This rests upon the furnace L and communicates with the chamber or room A by means of the pipe F, as before stated, for the purpose of conveying and distributing the vapors thus formed, as set forth.

Figs. 2 and 3 represent the outside of a chamber in which the lead is placed, showing the arrangement of the pipe E for the admission of carbonic acid, and of the pipe F for the admission of the vapors of acetic acid and water from the boiler K. The door N is furnished with a piece of plate-glass O, through which the operator may watch the progress of the process. In order to keep up the requisite heat in the chamber A, a steam-pipe may be introduced from the boiler K and coiled around the chamber on the inside and the condensed vapor conveyed again into the boiler.

Having thus fully described the apparatus necessary for carrying my improvement into effect, I will now describe the process.

In the first place the metallic lead rolled into suitable coils is placed upon each series of the slats *b b*, Figs. 1 and 3, until the chamber is filled. The room is then closed, and not again opened for any purpose until the operation is completed. Vinegar of about one-third the commercial strength is then placed in the boiler K, and by means of heat in the furnace L the vapors of acetic acid and water are evolved therefrom and carried conjointly and gradually into the chamber A by means of the pipe E and distributed by

the system of pipes B *a a*, (seen in Figs. 4 and 5,) and equally diffused throughout the chamber, first corroding the metallic lead, the protoxide thus formed being instantly converted into the subacetate by virtue of the presence of acetic-acid vapor. Conjointly and simultaneously with this part of the process, by the combustion of charcoal in the furnace D, carbonic-acid gas is generated, which, by means of the pipe E, is admitted at once into the chamber A, and by means of its superior specific gravity is diffused throughout the room or chamber. The carbonic acid thus introduced decomposes the subacetate of lead, and thus is formed the carbonate of the protoxide or white lead. This manipulation is continued without interruption until the metallic lead has undergone the desired change. The product is then removed from the chamber, a new supply introduced, and the same process repeated.

I am aware that the vapor of water, acetic-acid vapors, and carbonic acid have been used in various ways in the manufacture of white lead. I therefore do not claim their use, broadly; but

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

Subjecting metallic lead placed in a room or chamber made and kept tight throughout the process, as specified, to the action of aqueous and acetic-acid vapors conjointly and continuously with carbonic-acid gas until the process is completed, in the manner substantially as and for the purpose set forth.

GEO. CARY.

Witnesses:

W. H. BURRIDGE,  
HENRY VOTH.