(12) **United States Patent**
Clark

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(45) **Date of Patent: Jun. 20, 1836**

(54) **LEAD, WHITE**

(76) Inventor: **Edward Clark**

Edward Clark

The Schedule referred to in these Letters Patent and making part of the same containing a description in the words of the said Edward Clark himself of his improvement in the manufacture of Metallic salts usually denominated Acetate or Carbonate of Lead, Carbonate of Copper, Acetate of Lead, Acetate of Copper, & the Acetate or per Acetate of Iron," to which Letters Patent were granted, dated the 4th day of December 1841 which Letters Patent were cancelled on account of a defective Specification of these Letters Patent granted on the 3d day of July 1841 which last Letters Patent are hereby cancelled also on account of a defective Specification—

To all to whom these Presents shall come:

Be it known that I Edward Clark of the town of Saugerties State of New York & a citizen of the United States have discovered & invented a new and useful improvement in the manufacture of the Carbonate of Lead or White Lead, or if the operator chooses to so apply the process in the Manufacture of the Acetate of Lead, the Carbonate & Acetate of Copper and Acetate & per Acetate of Iron— The process will produce all the above results in manner varying the metal exposed to the acetic acid or vinegar when the manufacture of the Acetates are required & altogether omitting the Carbonic acid when the Acetate or per Acetate of Iron is intended to be produced. But the process is principally useful in the manufacture of white Lead, a Carbonate of Lead, to the full extent & the Manufacture of the sugar or Acetate of Lead. I shall confine myself in this description— The terms or annual Ground rent for which Patent to be issued in lieu of the above Patent surrendered.

To carry into effect my improvement in the manufacture of White Lead. I construct a subterranean Vault of brick ten or twelve feet in height & about the dimensions. Which vault

should be made of split staves enough to reach from pressure frame within. This is called the forcing chamber. It may also be made in the form of a box two or fifteen feet long, eight or ten feet high & four or eight feet broad, or of any other convenient shape or size, as the price & quantity of metal to be smelted to be operated upon shall require.

The sheets of lead cast in the manner & form, and being supported on wooden rods or pegs which are supported by cleats secured to the inside of the forcing chamber, & disposed and placed as before by way of partitions, & not fixed over the heat of lead may be rolled & pressed in the press prepared with pulleys & upon any kind of mill with rollers & in manner & containing hinges, but not in conjunction with it & in any other manner so as to expose their surface to the action of the lead vapours & other agents brought to act on them.

The agents I use to corrode particular lead & make the metal called antimony of lead & white lead, are the vapour of vinegar, common lead and & oxygen gas & other substances & combinations in sufficient quantity in their atmospheres are & these agents are made known under specific appellations by being treated & mixed in proper quantities & proportions & manner, & in separate forcing chambers appointed to the same purpose & in the same manner & by means of all which & precautions & methods & results

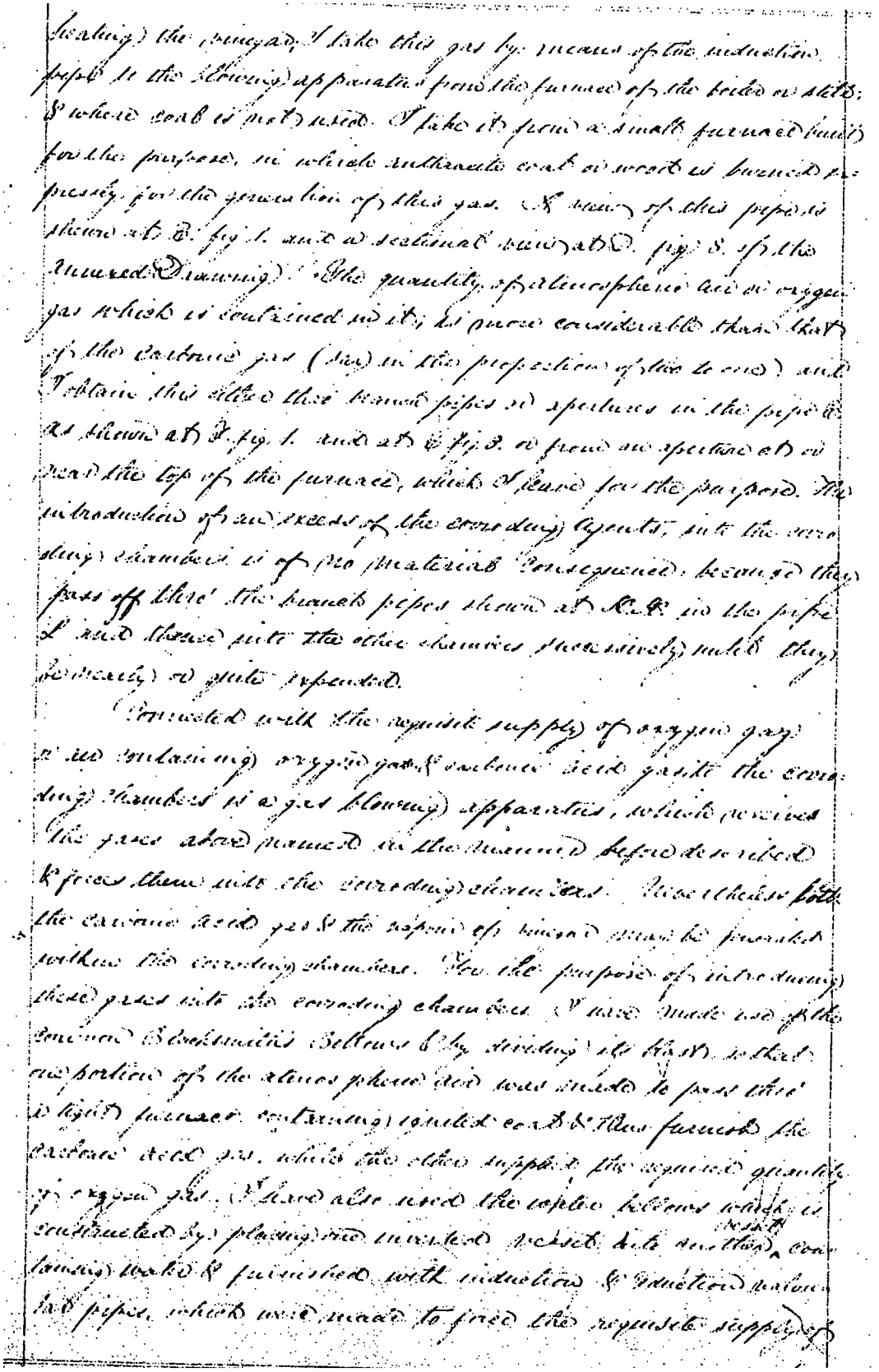
To direct the vapour of vinegar & so to fill the corroding chamber & to accomplish these ends with & in the most effectual manner & my object & the vapour is produced in various ways, without being able to give a detailed preference to either.

Thirdly. I put the vinegar into a copper still as shown at C fig 1. of the annexed drawing & then by applying heat to the furnace below, generate the vapour of vinegar, which passes from the still into the pipe G and thence along with the other agents thro' the branch pipes H H. & H. and the vapour enters H. into

the corroding chambers A & B. shown also in fig 1. Plan. the method is made to the corroding agents pass from the branch pipes H & H. Be into the long boxes of three or four inches depth & breadth, which are placed on the tops of the chambers & are perforated in their sides with a number of small holes for the more equal distribution of the corroding agents.

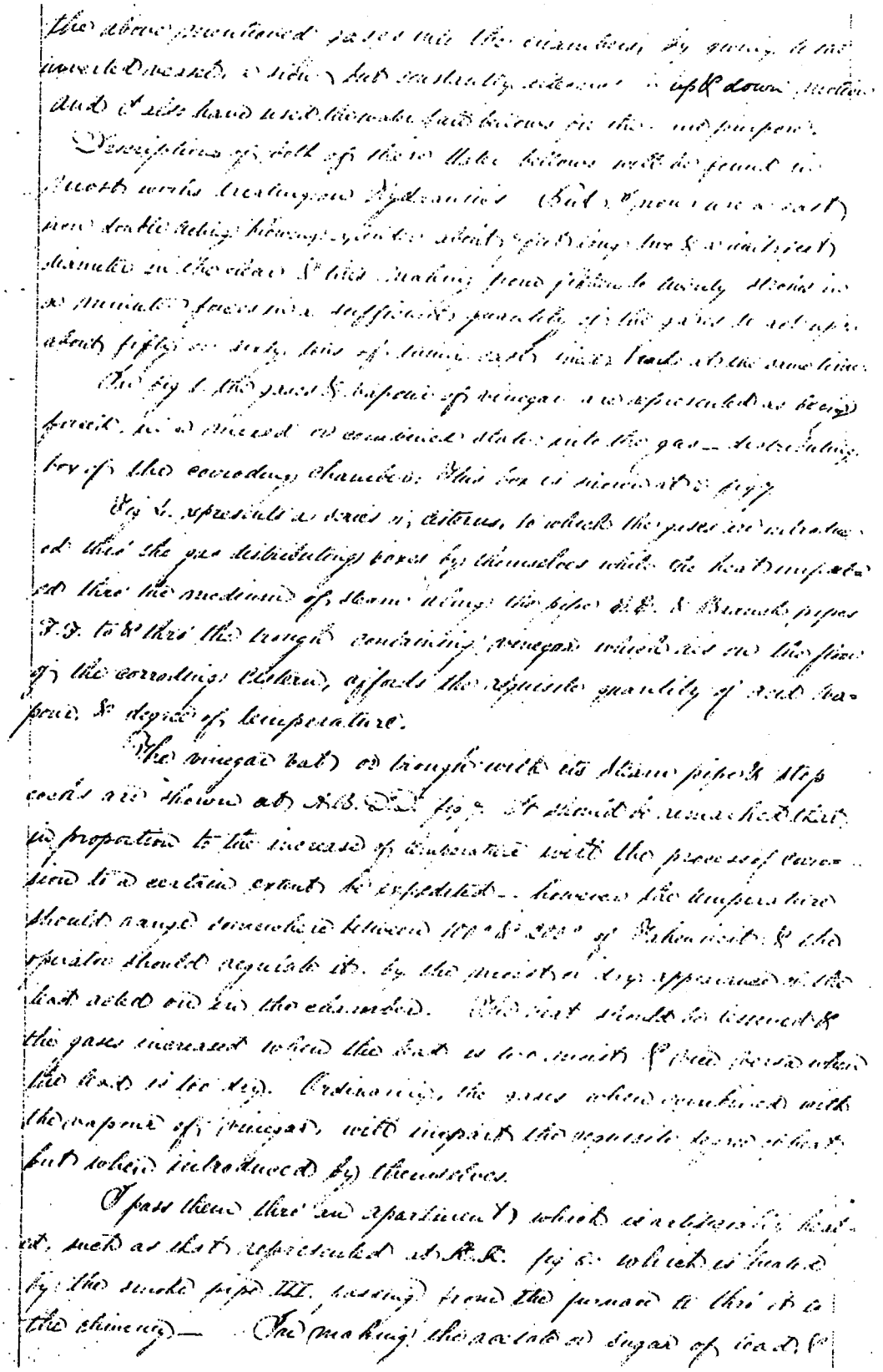
Secondly. After vinegar is put into the chambers & boxes & brought to the boiling of the corroding chambers and their which is kept a close pipes which communicate with the steam generator shown at N. fig 1. are passed one or more times and the steam of the fruit is according to the quantity of work upon required to corrode the metals acted on, in the mode aforesaid mentioned.

Thirdly. If pickle vinegar the vessels &c. as shall be thence above mentioned. & place each of which two. & filling up the chambers with these bodies, introduce the carbonic acid gas & atmospheric air heated to such a temperature as to produce the required evaporation of the vinegar — a fourth & place is made on the outside of the corroding chambers, which is furnished with a charging discharging & steam pipes each inserted by a stop cock. One of these pipes for the vinegar is made into the boiler and is to have a right off. & this also is to conduct the steam from the & communicate the requisite degree of heat to the corroding chambers for the evaporation of the vinegar. This pipe is conducted thro a tube or passage box with the corroding chambers. Into the pipe which contains the vinegar is inserted a valve & pressure & is there, formed in convenient part of the corroding chamber taken out like a tube or funnel. And the pipes likewise furnished with stop cocks to regulate the supply of water & steam pipes &c. Lastly the corroding chambers are provided with thermometers to ascertain the depth or quantity of vinegar which the tubes & shelves, or chambers may contain. The quantity of carbonic acid gas necessary to be introduced into the corroding chambers upon each. Pressure is used for



Sealing) the (purged) Air like this gas by means of the induction
pipes A the (lower) apparatus from the furnace of the boiler or stove
where coal is not used. I take a small furnace built
for the purpose, in which anthracite coal or wood is burned pre-
viously for the generation of this gas. A view of this apparatus
shown at B. fig 1. and a sectional view at B. fig 2. of the
annexed Drawing. The quantity of carbonic acid or oxygen
gas which is contained in it, is more considerable than that
of the carbonic gas (dog) in the preceding of this (second) and
I obtain this either these burnt pipes or apertures in the pipe A
as shown at B. fig 1. and at B fig 2. or from an aperture at B
near the top of the furnace, which I leave for the purpose. The
introduction of an excess of the (condensing) agents, into the (con-
densing) chambers is of no material consequence, because they
pass off thro' the burnt pipes shown at K.K. in the pipe
L and hence into the other chambers successively until they
(nearly) are quite expended.

Connected with the requisite supply of oxygen gas
& air containing oxygen gas & carbonic acid gas into the (con-
densing) chambers is a gas (blowing) apparatus, which receives
the gases above named in the manner before described
& forces them into the (condensing) chambers. Now whether both
the carbonic acid gas & the oxygen gas should be pumped
within the (condensing) chambers. For the purpose of introducing
these gases into the condensing chambers I have made use of the
common Bellows by fixing the head or solid
end portion of the (lower) pipe (box) was made to pass thro'
a (tight) furnace containing (ignited) coals & then furnished the
carbonic acid gas, which the other supply of the required quantity
of oxygen gas. I have also used the (upper) bellows which is
constructed by (placing) two (valved) pipes into the (condensing)
(chambers) made & furnished with induction & (suction) valves
to pipes, which were made to force the requisite supplies of



the acetate of copper, & is only necessary when the load of copper becomes exhausted, to shut off the gas in one of the said supply until the carbonates which have been previously formed are converted into acetates & then evaporating the liquor which remains in the corroding chamber.

(In) making the per acetate or acetate of lead the vapour of vinegar and atmospheric air only are admitted & the quantity of the latter must be such as is regarded, as the said oxygen said in solution by the acid will be sufficient. Lead formed this material should therefore be put into very small pieces & kept till required for use.

The carbonate of copper is made in precisely the same way as the carbonate of lead, but is converted from the metallic state by much more slow & difficult than that of lead: it is found expedient to conduct this process by applying the nearly exhausted residue of the last corroding chamber to it.

Where the corroding agents are to be abundantly supplied (I place a few preceding that of the gas distributor pipe as fig 7. but containing about half the number of holes on the inside and upper part of the corroding chamber & connect it by the branch pipe K to the pipe L. which leads to the discharges through one of seven chambers in succession which are supplied with sheet lead or copper, with a view of ensuring the residue of the corroding agents should any have escaped the first application. The blowing cylinder is made similar to the cylinder of a steam engine with the valves, rods arranged & it may be put into operation, by steam, or animal power.

(Any) impairment consists in applying the combined means before described & also other substances by which may be arranged for forcing oxygen gas & carbonic acid gas, either pure or in a state of combination with other substances into chambers or cisterns sealed or not

heated which have previously been furnished with linings
or sheets of lead or copper according to the metals designed
to be acted on. Therefore claim as my invention the plan
of forcing atmospheric air into close lights & strong
corroding chambers & connecting with carbonic acid gas
& the vapour of vinegar & increasing their action by artificial
heat, pressure & motion, by which the corroding agents
are kept into close contact with the sheets of lead or copper,
and are made to act more vigorously than in any other
way heretofore known & practiced – also the combination
with said plan, & with the above described corroding chambers,
pots, pans, stages, boxes, boilers, & apparatus for conducting &
forcing the agents for corroding the sheets of copper, into the
corroding chambers in the manner above described & in
any other manner substantially the same. The accom-
panying drawings with further illustrate my specification.

Witnesses
Jos. Richards Jun
Jno. Curtis.

Edmund Davis

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Description of the annexed drawings – fig 1. represents
a mass of corroding cells with its belongings & apparatus, for
supplying them with atmospheric air, carbonic acid gas,
& the vapour of vinegar. A A represents the corroding
cells or chambers. B the belonging cylinder & apparatus
& the sheets of copper, & C the boiler containing vinegar. D the furnace
for heating the vinegar & also for supplying carbonic acid gas
& the induction pipe for supplying the closing apparatus with
carbonic acid gas from the furnace. E the apparatus to work
& supply the atmospheric air into the belonging cylinder thro'
the pipe F. G the conducting pipe for conveying the carbonic
acid gas, the atmospheric air & the vapour of vinegar into

the corroding cisterns or chambers. A A &c the lateral branch pipes for supplying the distributing boxes marked B.B. fig II. with the corroding materials from the main pipe C.

D D &c the stop cocks to regulate the admission or exclusion of the corroding materials at the pleasure of the attendant.

E E &c the exhausting branch pipes, with their cocks. F the main exhausting pipe.

Fig II, represents an interior view of the corroding cisterns or chambers, partially supplied with sheet castings of vulcanized lead, disposed for corrosion in various ways A A. represents two chambers such as B.B. the boxes perforated with small holes for distributing the corroding materials in the chambers C.C. & D. sheets of lead suspended or coiled as exposed for corrosion.

Fig III represents a sectional view of the burning apparatus, formed of tiles, as shown entire in fig I.

Fig IV. representing a series of corroding cisterns with the gas distributing apparatus as described in fig I. with an additional apparatus for heating the gases & also for generating the acid steam within the chambers. A A &c. A main of the chambers or corroding cisterns. B the burning cylinder. C the steam boiler. D the furnace. E E. steam steam pipes. F F &c. branch steam pipes leading from & through the troughs G, in the chambers. G G &c the ends of the troughs as shown projecting from the corroding cisterns or A. Fig VII for receiving the vinegar which is to be heated by the steam pipes & fitted the apertured tiles shown at G.

H H &c the pipes for conveying the gases thro' the lead chambers of the furnace as shown at E E. fig VIII from the burning cylinder, thro' the branch pipes A A &c to the corroding chambers. I I &c the lateral branches of the main gas pipe for conveying the gas to the distributing boxes and at B. fig I. & furnished with stop cocks the same

as shown and the steam pipes. C. the smoke pipe. Fig V. (two of the chambers opened to view) A.A. the two chambers containing) retorts B.B. troughs for containing) oxigene (for distributing) the gases. (D.D. rods with balls for suspending) sheets of lead E.E. the sheets of lead suspended over the retorts.

Fig VI. A vertical section of one of the chambers with its door (removed). A.A. the rods or balls for suspending the sheets of lead. C the trough for containing the oxigene & gas distributing box

Fig VII. a ground plan of one of the chambers with its troughs, box & pipes. A.A. the troughs for containing oxigene. B. the steam pipe running thro the troughs heating them & the pipe for conveying off the water steam & condensed vapours D.D. stop cocks for regulating the supply of the consuming material. E. the gas distributing box & the branch of thermometer pipe connected with the distributing box.

Fig VIII. A sectional view of the Blowing Cylinder, & chambers for heating the gases. A represents the piston head & rod of the cylinder. B.B. the induction valves. C.C. the eduction valves. D the induction pipe for supplying carbonic acid gas from the gasometer & from the upright steam pipe E. E. the upright for admitting atmospheric air. F the eduction pipe which conveys the gas from the blowing cylinder to the heated chambers. G.G. pipes for conveying water into steam for heating the oxigene in the troughs. H.H. the furnace. I.I. the smoke pipes. K.K. the chambers for heating the gases on their passage thro the pipes L to be distributed thro the retorts M pipes leading from the heated chambers for the conveyance of the heated gases as above described.

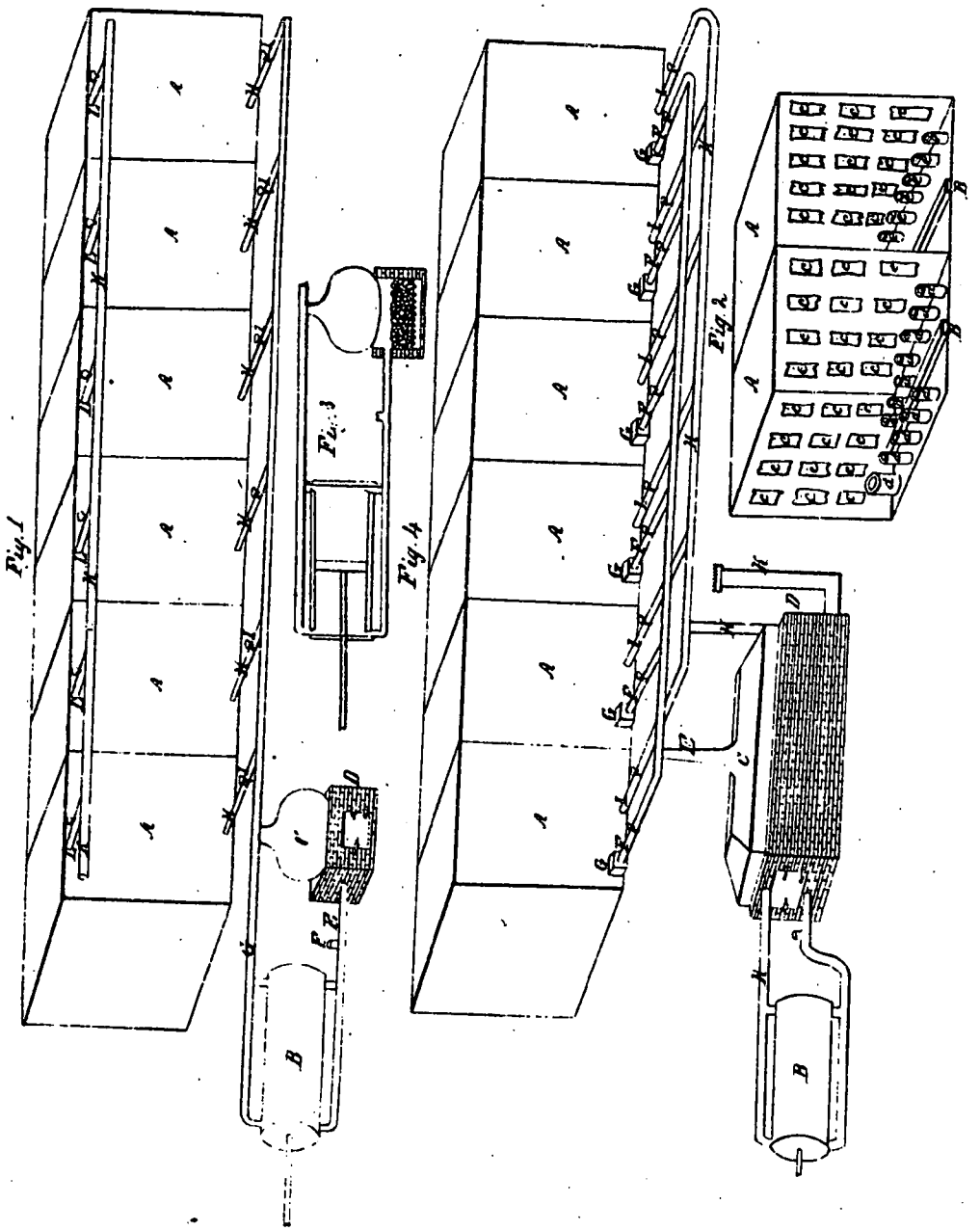
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Manufacture of White Lead.

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