

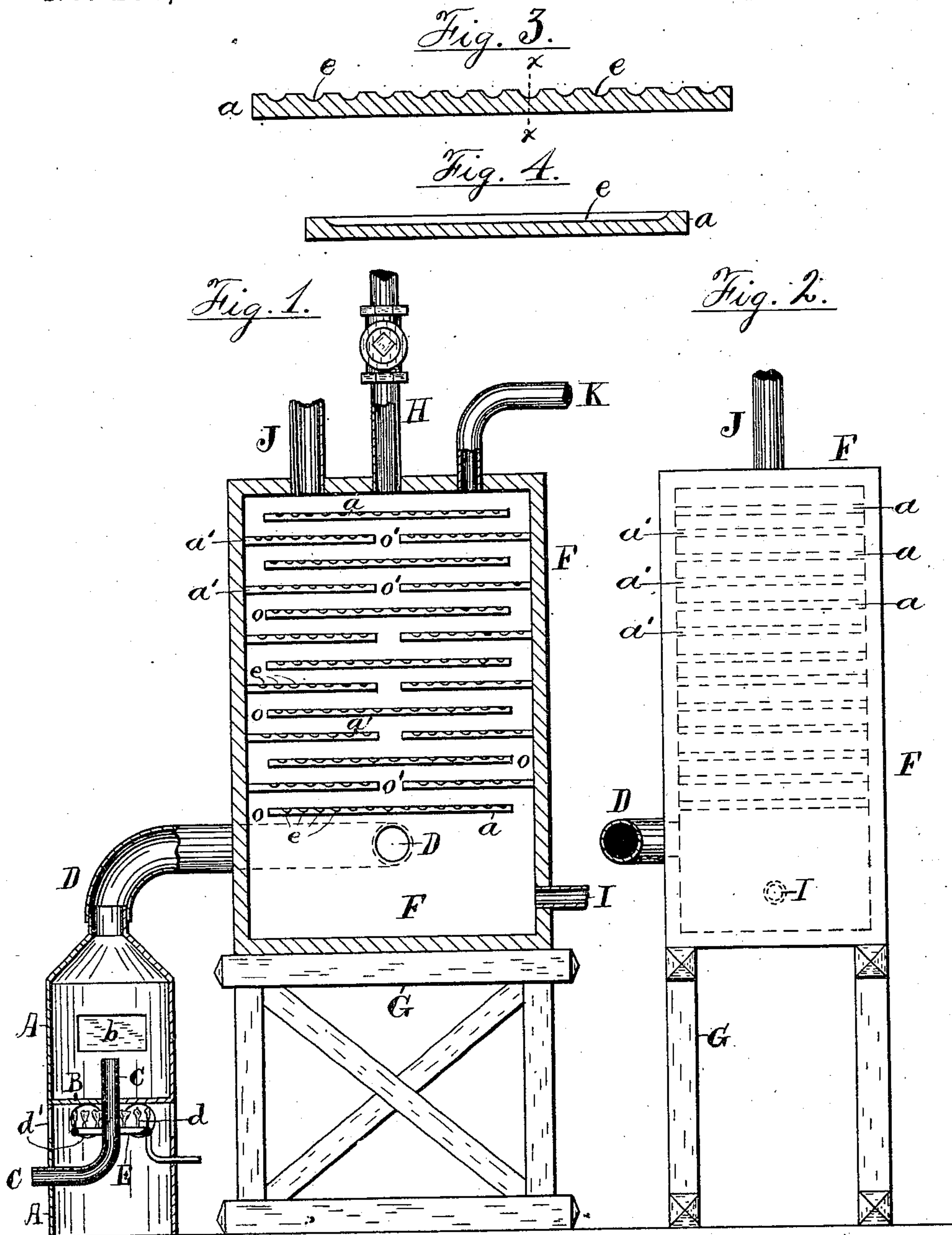
(No Model.)

F. CARLISLE.

APPARATUS FOR THE MANUFACTURE OF HYDRATED SULPHUROUS ACID.

No. 284,817.

Patented Sept. 11, 1883.



Attest:

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UNITED STATES PATENT OFFICE.

FREDERICK CARLISLE, OF NEWARK, N. J., ASSIGNOR TO THE NATIONAL
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PLACE.

APPARATUS FOR THE MANUFACTURE OF HYDRATED SULPHUROUS ACID.

SPECIFICATION forming part of Letters Patent No. 284,817, dated September 11, 1883.

Application filed December 16, 1882. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK CARLISLE, a
citizen of the United States, residing in the
city of Newark, county of Essex, and State of
New Jersey, have invented certain new and
useful Improvements in Apparatus for the
Manufacture of Hydrated Sulphurous Acid,
fully described and represented in the follow-
ing specification and the accompanying draw-
ings, forming a part of the same.

This invention relates to an improved con-
struction for the condenser and the furnace em-
ployed in such machines as are provided with
a series of shelves over which water flows in
contact with the sulphurous-acid fumes.

The improvement in the condenser consists
in the construction of the shelves, and the im-
provement in the furnace consists in the con-
struction of the sulphur-receiver, and the com-
bination with it of an inlet air-pipe to fur-
nish the oxygen required for the most efficient
combustion.

The nature of the invention will be under-
stood from the annexed drawings, in which
Figure 1 is a vertical section at the center of
a condenser and furnace provided with my
improvement; and Fig. 2 is a side view of the
condenser at right angles to the position
shown in Fig. 1. Fig. 3 is an end view of
shelf *a*, and Fig. 4 a section of the same on
line *x x* in Fig. 3.

A is the shell of the furnace, having a plate,
B, extending across its body inside, below the
level of the door *b*, to receive the charge of
sulphur and form a retort. In the plate *B*
is fitted an air-inlet pipe, *C*, which enters the
furnace below the plate *B* and passes up
through it far enough to prevent any outflow
of sulphur. A gas-pipe, *E*, provided with
burners *d*, is supplied beneath the plate *B* to
heat it for the first melting of the sulphur, and
openings *d'* are formed in the casing for light-
ing the burners and supplying them with air.
From the combustion-chamber above the plate
B a vapor-pipe, *D*, extends to the condenser
F, which is usually formed of two-inch yellow-
pine planks bolted securely together in the
shape of a square box, and supported upon
legs *G*, so as to receive the vapor at one side
a little above the bottom. A water-inlet, *H*,

at the top admits the water for absorbing the
gas, and an outlet, *I*, at the bottom removes
the liquid product as it accumulates at that
point. An escape-pipe, *J*, at the top carries
off the vapors that have passed through the
condenser, and a similar pipe, *K*, may be
placed at an equal distance on the opposite
side to equalize the draft. The shelves are
arranged horizontally to secure the slowest
possible movement of the descending water-
current over them, and to further retard the
movement of the water and to expose it more
perfectly to contact with the sulphurous fumes
the shelves are formed with transverse grooves
or gutters, across which the water flows in its
passage through the machine. To further di-
vide the body of water the shelves are formed
preferably of unplanned and roughly-sawed
boards, having fibers projecting from their sur-
face upon the ridges between the grooves.

The boards or shelves are lettered *a a'* and
the grooves *e e*, the spaces between the edges
of the shelves being marked *o o'*. To secure
a tortuous channel for the upward passage of
the vapor, the shelves are arranged as shown
in the section, a single broad shelf (having an
opening between two of its edges and the sides
of the condenser) being alternated with two
narrower shelves in a continuous series from
the top of the condenser-box to the space at
the bottom, where the gas is admitted.

a are the wide shelves and *a' a'* the narrow
ones which are secured to the sides of the con-
denser and arranged with a space, *o'*, between
them, underneath the middle of the wider
shelves, *a*. The gas-inlet *D* is arranged beneath
the middle of a wide shelf, *a*, placed at the bot-
tom of the series, and the water-inlet *H* is simi-
larly inserted in the top, over the middle of a
wide shelf. The entering gas and water are
therefore diverted toward the sides of the box
F, whence they pass by the spaces *o* along the
surfaces of the narrow shelves *a'* to the cen-
tral opening, *o'*, between them, and similarly
to the other shelves in the entire series. The
water is necessarily obstructed by the numer-
ous transverse grooves *e*, all of which it has
to cross in its progress through the machine,
as well as by the rough surface of the spaces
between the grooves. The horizontal position

of the shelves also retards the movement of the fluid, and the ascending gas is thus kept in contact therewith in the most efficient manner.

5 As a result of these improvements, I find that my apparatus will acidulate more than twice the amount of water that any other machine of the same size will produce. The water, after absorbing the gas, falls into the bottom of the machine, whence it is drawn off by the pipe I into any suitable receptacle.

10 In the furnace I secure the heat necessary to melt the charge of sulphur and to start the primary combustion by igniting the gas-jets *d*, which are turned off as soon as the vaporizing is established, and a great saving in fuel and time in operating the machine secured.

By the insertion of the air-pipe C through the bottom of the sulphur-retort I secure a perfect admixture of the air with the sulphur fumes and greatly increase and improve the combustion. The door *b* affords access to the sulphur-retort for supplying the charge and renewing it when necessary, and any other feeding arrangements may be made that are found desirable. The object of the inlet-pipe C is obviously to inject air into the midst of the retort, and the pipe may therefore be constructed differently without affecting the result. It may therefore be originated inside the shell A, and receive its air-supply from the openings *d'*.

I am fully aware that various arrangements

of perforated and imperforate shelves have been used in machines analogous to mine, and I do not therefore claim the same, except as herein set forth. 35

The method of joining the parts of the box F and attaching the shelves and pipes I have not shown herein, as that does not constitute any part of my invention. 40

I claim—

1. The combination, with the imperforate shelves *a a'*, of the grooves *e*, substantially as and for the purpose set forth. 45

2. In combination with a condenser for hydrating sulphurous acid, the furnace A, constructed with the air-inlet C, substantially as and for the purpose set forth.

3. The combination, with the sulphur-retort provided with an air-pipe, C, of the gas-burners D, for starting the preliminary combustion, as herein shown and described. 50

4. The combination, with a condenser for hydrating sulphurous acid, of shelves formed of rough or unplanned wood, and provided with grooves, as *e*, substantially as and for the purpose set forth. 55

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses. 60

FREDERICK CARLISLE.

Witnesses:

THOS. S. CRANE,
W. F. D. CRANE.