

J. F. GESNER.
 Manufacture of Ethyl-Chloride.

No. 218,671.

Patented Aug. 19, 1879.

Fig 1

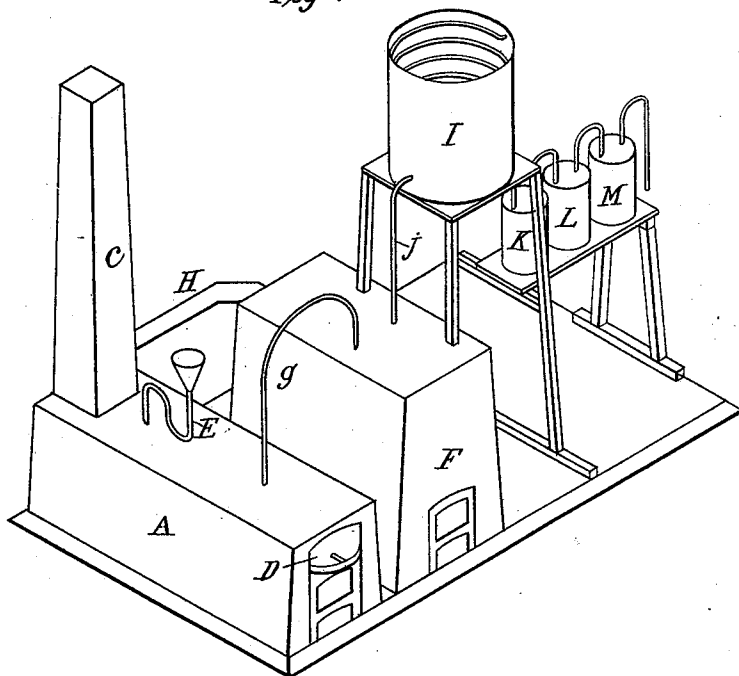
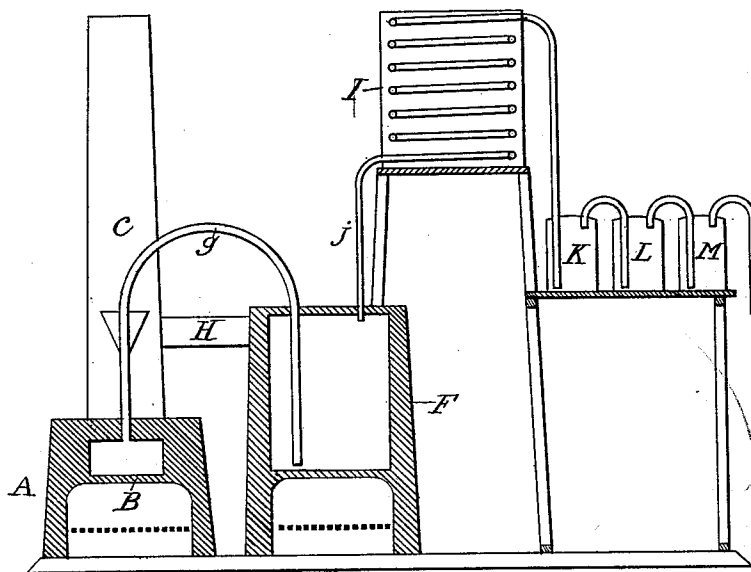


Fig 2



Witnesses
 D. B. Lander.
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 John F. Gesner
 per J. L. Boone
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UNITED STATES PATENT OFFICE.

JOHN F. GESNER, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN MANUFACTURE OF ETHYL-CHLORIDE.

Specification forming part of Letters Patent No. **218,671**, dated August 19, 1879; application filed October 16, 1878.

To all whom it may concern:

Be it known that I, JOHN F. GESNER, of the city and county of San Francisco, in the State of California, have invented certain Improvements in the Manufacture of Ethyl-Chloride; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings.

My invention has reference to an improved process and apparatus for manufacturing the liquid ethyl-chloride, or chloride of ethyl, (C_2H_5Cl).

My improved process consists in passing a current of hydrochloric-acid gas through boiling alcohol or alcoholic solution, and conducting the resulting gas through a separator, in which it is drained of any water and alcohol that may be carried along with it, while the chloride-of-ethyl vapor passes on through washers and driers, all as hereinafter more fully specified.

My apparatus and process are fully described in the annexed specification, referring to the accompanying drawings, in which—

Figure 1 is a perspective view. Fig. 2 is a vertical section.

Let A represent a furnace, which is divided horizontally by a partition, B, into two compartments, the lower compartment forming the fire-place, and communicating with the stack C, while the upper compartment forms a heating-chamber, in which hydrochloric-acid gas is manufactured or generated. D is a door at the front end of the furnace, which opens into the upper chamber, and through which the salt is introduced and spread upon the floor or partition B, after which it is tightly closed; and E is the pipe through which sulphuric acid is introduced into the upper chamber. This pipe, it will be noticed, is bent into the shape of an S, so as to form a trap, which prevents the escape of any of the gas through the pipe.

F is another furnace, similarly constructed, which is located near the furnace A. The upper chamber of this latter furnace should be of larger size than that of furnace A, as it is intended to contain the alcohol through which the hydrochloric acid-gas is passed in order to form the ethyl-chloride vapor. It is better

to make this chamber high and narrow, so as to give a considerable depth of alcohol, for the reason hereinafter explained. A pipe or flue, H, connects the fire-place of furnace F with the stack C.

A pipe, g, connects the upper chamber of the furnace A with the upper chamber of the furnace F. This pipe simply passes through the top of the chamber in furnace A, so as to draw off the gas from the upper part of the chamber; but it passes directly down to the bottom of the alcohol-chamber in furnace F, so as to deliver the hydrochloric-acid gas below the level of the alcohol.

I is a tank, which is located upon a framework, near the furnace F. A pipe, j, leads from the alcohol-chamber of furnace F directly up and enters the bottom of tank I. Inside of tank I this pipe is coiled upward, so as to form an inverted coil or worm, in which the gas will ascend spirally. At the top of the tank the pipe passes out and down into a series of Woulfe's bottles, K L M, as shown.

I first fill the upper chamber of furnace F about two-thirds full of alcohol. Next I introduce the salt into the upper chamber of furnace A and close the door tightly. I then introduce sulphuric acid, through the pipe E, into the upper chamber of furnace A, and fire up the furnace underneath it. The action of the sulphuric acid upon the salt generates hydrochloric-acid gas, which, rising through pipe g, is conducted into and enters the upper chamber of furnace F, near its bottom, so that it is delivered below the surface and into the midst of the alcohol contained in the chamber. The chlorine of the hydrochloric acid enters into combination with the ethyl of the alcohol, and chloride-of-ethyl gas is formed, which rises through the pipes j into the inverted coil in tank I. This coil is submerged in water contained in the tank, so that as the gas rises in the coil the heavier particles are condensed. A proportion of alcohol and water will be carried upward with the ethyl-chloride vapor into the inverted worm; but, being specifically heavier than the chloride-of-ethyl vapor, they will be condensed in the coil and returned into the alcohol-tank, while the ethyl-chloride vapor, being very light and volatile, will pass over and enter the bottles K L M successively.

The first and second bottles, K and L, contain water, into which the gas is delivered, so that it is washed of any remaining particles of alcohol and water and hydrochloric-acid gas that may have been carried over with it. The third bottle contains strong oil of vitriol, through which the gas is compelled to pass, thus drying it, after which it may be conducted into a gas-holder or into a vessel surrounded by a freezing-mixture of ice and salt to condense it.

After the alcohol in the chamber of furnace F has become thoroughly saturated with the hydrochloric acid, I apply heat to it by firing up the furnace underneath it, thus causing the gases to evolve more rapidly and unite more thoroughly, so that the process is hastened and continued until the alcohol is entirely decomposed.

I thus provide an apparatus and process by which the liquid ethyl-chloride, or chloride of ethyl, can be manufactured in commercial quantities with little trouble and expense, whereas the process heretofore in use—that of heating a mixture of hydrochloric acid and alcohol—has

been slow and useless for manufacturing purposes.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The described improvement in the manufacture of ethyl-chloride, the same consisting in the preparation of the liquid by the saturation of the alcohol with hydrochloric-acid gas, and in the distillation and purification of the same, the whole being conducted by one cotemporaneous operation, as set forth.

2. The furnace A, with its gas-generating chamber, and the furnace F, with its alcohol-chamber, said chambers being connected by the pipe *g*, in combination with the pipe *j*, tank L, with its inverted worm, and the bottles K L M, all combined and arranged to operate substantially as and for the purpose described.

In witness whereof I have hereunto set my hand and seal.

JOHN F. GESNER. [L. s.]

Witnesses:

J. H. BLOOD,

CHARLES D. COLE.