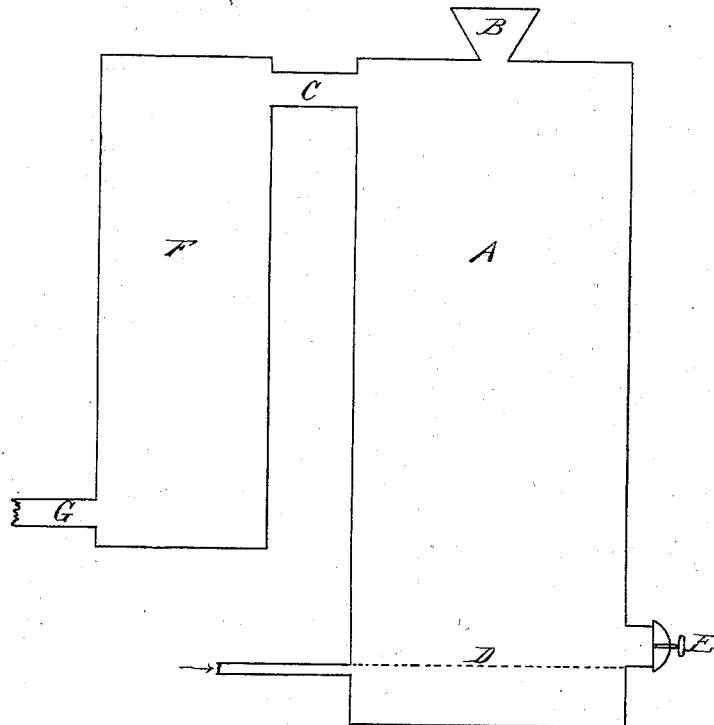


F. GUTZKOW.

Manufacture of Boracic Acid.

No. 137,072.

Patented March 25, 1873.



Wm Smith
Philip Mahler

Frederick Gutzkow

UNITED STATES PATENT OFFICE.

FREDERICK GUTZKOW, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN THE MANUFACTURE OF BORACIC ACID.

Specification forming part of Letters Patent No. 137,072, dated March 25, 1873.

To all whom it may concern:

Be it known that I, FREDERICK GUTZKOW, of the city and county of San Francisco, State of California, have invented an Improved Process of Obtaining Boracic Acid from Borate of Lime; and I do hereby declare that the best mode which I have discovered for performing the said process is described in the following specification, together with the best apparatus known to me for that purpose.

The nature of my invention consists of a new method of separating, by superheated steam, the hydrate of boracic acid from the native borate of lime.

The apparatus which I prefer to use for that purpose is set forth in the accompanying drawing; and consists of an upright cylinder, A, made of common brick, about two feet in diameter and ten feet high. Through the cover which closes it at the top a funnel, B, passes, and serves to introduce the mass to be distilled. Underneath that cover a pipe or flue, C, branches off to remove the products of distillation. About one foot above the bottom of the cylinder A a loose grating or false bottom, D, serves to support the contents. On a plane with the grate D an opening provided with a well-fitting door, E, is left in the side of the cylinder to remove the exhausted mass. Below the grate D the superheated steam enters. The pipe C leads into a brick or metal-lined chamber, F, from which another pipe, G, opens into another similar chamber, and thence into the atmosphere.

The superheating of the steam may be done in the well-known manner, by conducting steam through an iron apparatus heated from the outside, but I prefer to employ ordinary high-pressure steam, to make it issue in a jet from a nozzle, which jet sucks up and carries along the hot gas produced by the combustion of coles in a separate fire-place, as the presence of such gas does not interfere with the operation.

The temperature of the steam entering the cylinder A ought to be so high that it will leave the cylinder at the top, after having traversed the contents, with a temperature above the boiling-point of water, so that no condensation of steam can take place within the cylinder.

The manner in which I operate is the following: I place a suitable quantity of powdered

borate of lime into a trough, sprinkle over it so much diluted sulphuric acid as, in the following operation, the decomposition of the borate will require, and mix the stiff pulp with half the weight of ordinary coles in order to facilitate the passage of the steam. Then I bring this mixture through the funnel B into the cylinder A, which is still partially filled with the hot residue of a former operation, close the funnel, and apply steam. The hydrate of boracic acid will immediately commence to escape, with the steam, through the pipe C, and cover the windings of the chamber F in fine large crystals. The temperature of the chamber F must be not much below the boiling point of water, which is effected by proper dimensions and material. The steam escaping through G carries along still a comparatively small percentage of boracic acid, and passes, therefore, a second chamber, in which a temperature of about 190° Fahrenheit allows a portion of the steam to condense. The steam which leaves this second chamber contains practically no more boracic acid, and may escape into the atmosphere, together with the sulphurous gas formed by the action of the coles on any excess of sulphuric acid employed. In the first chamber F only the dry hydrate of boracic acid will settle and form at once an article of commerce; in the second chamber, a weak solution of boracic acid in water, which, while still hot, is mixed with a little caustic lime. After cooling, the borate of lime, which is nearly insoluble in cold water, will separate. It is added to the native borate of lime and worked over. From time to time—say, every two hours—the steam is shut off, the door E unscrewed, the lowermost portion of the contents withdrawn, while bars, not shown in the figure, temporarily support the bulk. Then the door is secured, a fresh portion of the borate of lime is let in through the funnel, steam turned on, and the operation resumed.

The mass withdrawn is entirely exhausted, and I consider it my discovery that boracic acid can be completely expelled by steam alone in the manner described. The residue consists principally of sulphate of lime and coles. It is thrown into a trough provided, as false bottom, with a large-holed sieve. Water is added, which is rapidly absorbed by the gypsum. More water converts it into a thin pulp, which

is easily washed through the sieve. Above the sieve only the cokes remain. They are, without any further manipulation, used over again.

Though I prefer the apparatus described above for the distillation process, because it allows a continuous working, submits the most exhausted mass to the hottest steam and the richest to the coldest, the purpose of my invention can also be achieved by using an iron cylinder instead of one made of brick, or by employing horizontal retorts instead of vertical ones. The retorts, horizontal or vertical, may also be heated from the outside and ordinary steam passed through. Thus the superheating of the steam takes place inside the retorts.

Having thus described my invention, I do not claim the process as described in the Eng-

lish patent of Bell and Schofield in 1854; neither do I claim as my invention the English patent issued to one Beatson in 1855, as their processes will not answer to accomplish the object designed to be effected by the use of my process; but

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

The separation of boracic acid from borate of lime by distillation with superheated steam, substantially as set forth and described.

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

FREDERICK GUTZKOW. [L. S.]

Witnesses:

C. W. M. SMITH,
PHILIP MAHLER.