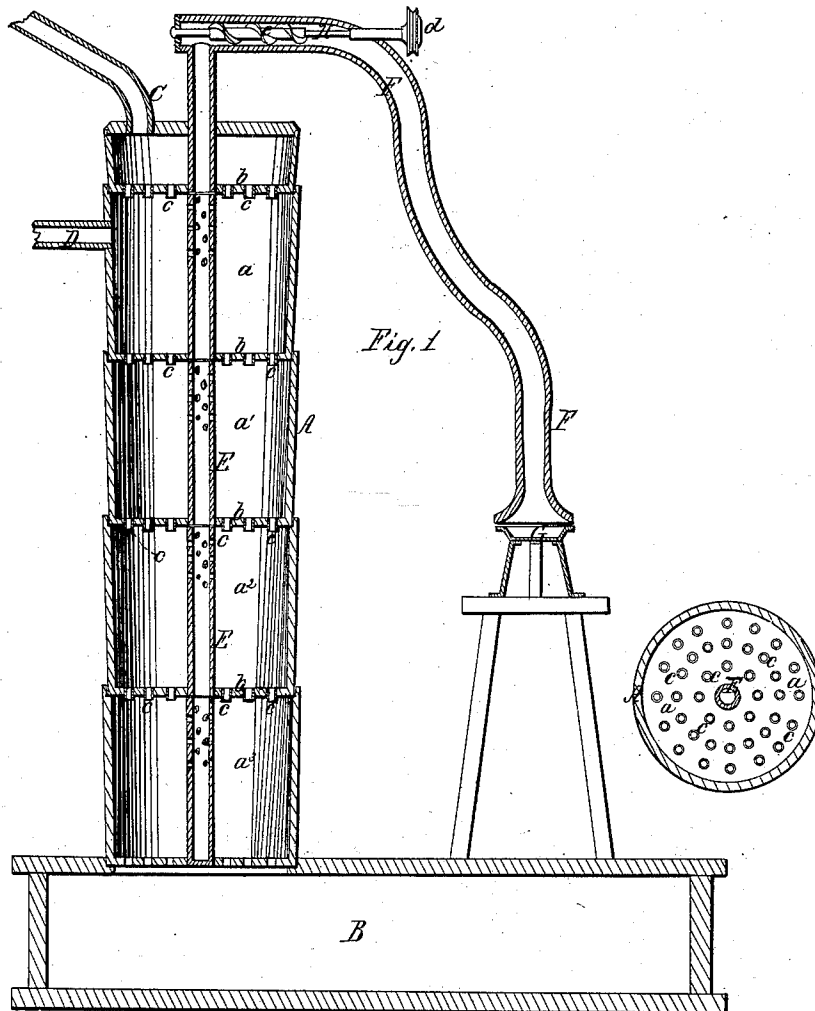


G. A. HUWALD.  
 APPARATUS FOR TREATING CANE JUICE WITH SULFUROUS ACID GAS.  
 No. 33,086.                      Patented Aug. 20, 1861.



*Witnesses*  
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# UNITED STATES PATENT OFFICE.

GUSTAVE A. HUWALD, OF KNOXVILLE, TENNESSEE.

IMPROVEMENT IN APPARATUS FOR TREATING CANE-JUICE WITH SULPHUROUS-ACID GAS.

Specification forming part of Letters Patent No. 33,086, dated August 20, 1861.

*To all whom it may concern:*

Be it known that I, GUSTAVE A. HUWALD, of Knoxville, in the county of Knox and State of Tennessee, have invented a new and useful Improvement in Apparatus for Defecating Sugar-Cane Juices with Sulphurous-Acid Gas; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a vertical central section of my invention. Fig. 2 is a horizontal section of the same.

Similar letters of reference in each of the two figures indicate corresponding parts.

To enable others to make and use my invention, I will proceed to describe its construction and operation.

A represents the juice-column, made in sections  $a\ a'\ a''\ a^3$  and with horizontal partitions  $b\ b'\ b''\ b^3$ , as shown. The sections are connected together in any suitable manner, so as to make close joints, and the partitions are perforated or have small tubes  $c\ c'\ c''\ c^3$  passed down through them, said tubes terminating sufficiently far below the under surface of the partitions to compel the juice to drop down in small streams, and thus more effectually expose the same to the sulphurous-acid gas. The top of the column is closed tight, but its bottom is reticulated, so as to allow the juice to run off into a reservoir, B, which forms a foundation for the column. The column is provided with a juice-supply pipe, C, and a sulphur-fume-escape pipe, D, near its upper end.

E is a vertical central pipe, extending up from the bottom of the column to the top thereof, and then passing out and connecting with a sulphur-fume-supply pipe, F, which leads from a sulphur-burning retort or pan, G, as represented. The central pipe, E, is reticulated so as to allow fumes of sulphur to pass into the juice-column. The reticulations in the pipe are so located above the top surface of the partitions of the juice-column that no chance is allowed the juice to flow into the pipe in case it should not flow off

freely, and in consequence thereof should rise several inches above the surface of the partitions.

In the upper horizontal part of the sulphur-fume pipe F a horizontal shaft, H, with a deep spiral flange,  $e$ , on it, is arranged, and on the end of said shaft a pulley or crank,  $d$ , is fastened. Instead of this device a piston or other suitable suction and forcing device may be used, as the function to be performed is that of drawing fumes of sulphur from the retort or pan G, and forcing the same into the pipe E and therefrom into the juice-column.

The operation is as follows: The sulphur is laid upon the pan G and ignited. The fumes are caused to rise through the pipe F by means of the device H  $e$ , and pass down the pipe E, and escape through the perforations of the same into the different sections of the juice-column, and, after having filled them, pass into the open air through the pipe D. At this stage, the burning of the sulphur still continuing and the screw still revolving and keeping up the supply of sulphurous-acid gas, the sugar-juices are introduced into the column through the pipe C from an elevated reservoir, and descend through the small pipes from one section to another, and in their descent mingle thoroughly with the sulphurous-acid gas. The juice having passed through all the sections, runs into the reservoir in a thoroughly bleached or defecated condition.

My arrangement is very simple, and yet insures a more thorough diffusion of the sulphurous fumes throughout the sugar-juices than any of the arrangements heretofore devised for the same purpose, and therefore a more perfect defecation can be effected.

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

1. In the treatment of sugar-juices with sulphurous fumes, the introduction of the gases to the sugar-juices through a sulphur-fume pipe, F, and a perforated vertical pipe, E, which is inclosed by a vertical juice-column, A, substantially in the manner and for the purposes set forth.

2. The combination, with the juice-column A and reticulated sulphur-fume pipe E, of a

suction and forcing device and sulphur-burning retort or pan G, substantially as and for the purposes set forth.

3. In apparatuses for treating sugar-juices with sulphurous fumes, making the column A in sections  $a$   $a'$   $a^2$   $a^3$  and with partitions  $b$   $b$   $b$ , which are perforated or have tubes  $c$   $c$   $c$  extending down through them and below their

surface, in combination with perforations in the pipe E, which are located some distance above the surface of the partitions, substantially as and for the purposes set forth.

GUSTAVE A. HUWALD.

Witnesses:

JOHN MILLER,  
D. KUHN.