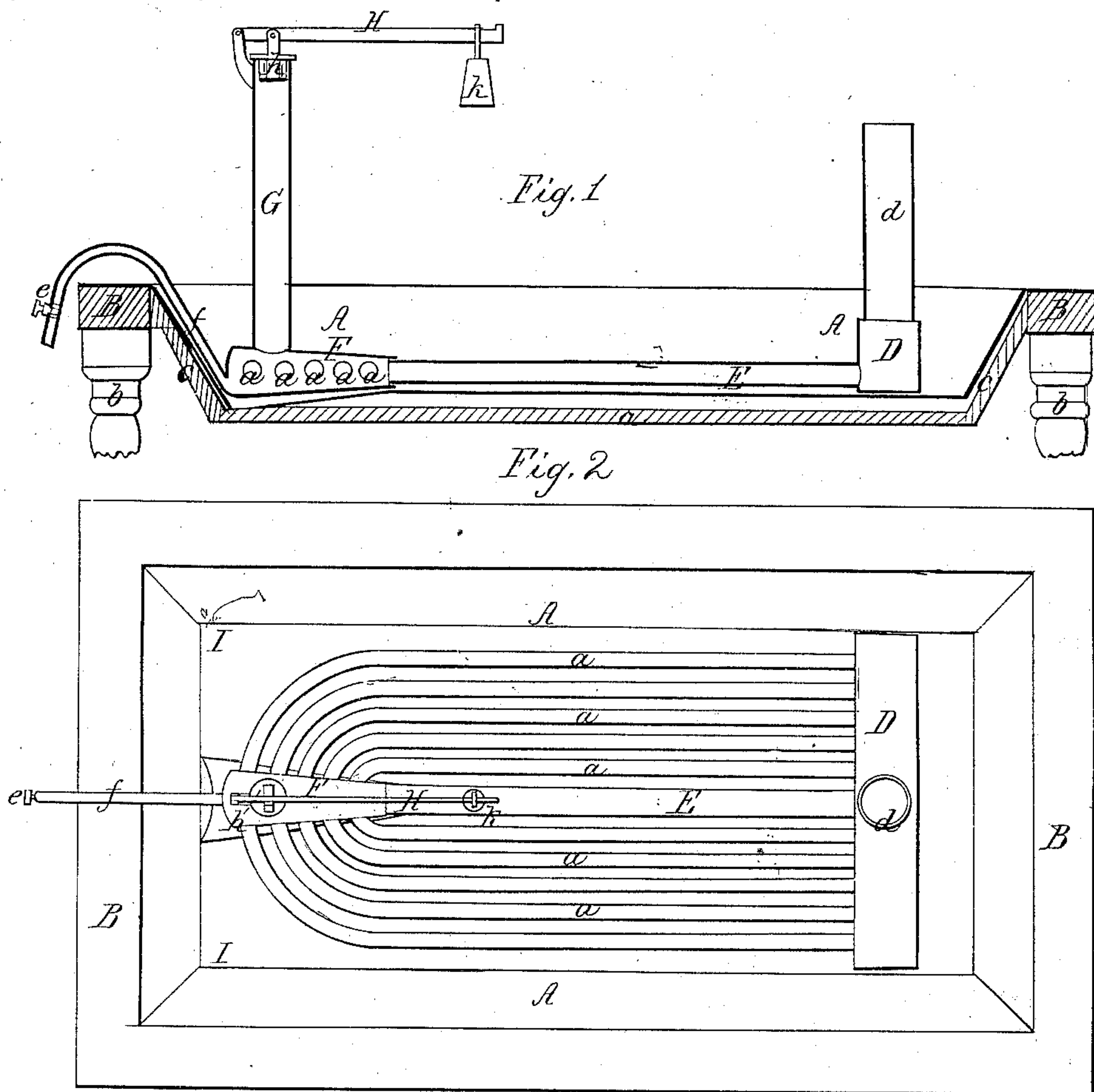


H. FOWLER.
 APPARATUS FOR EVAPORATING SORGHUM JUICE AND OTHER LIQUIDS.
 No. 66,480. Patented July 9, 1867.



Witnesses
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HENRY FOWLER, OF BRONSON, MICHIGAN.

Letters Patent No. 66,480, dated July 9, 1867.

IMPROVED APPARATUS FOR EVAPORATING SORGHUM JUICE AND OTHER LIQUIDS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, HENRY FOWLER, of Bronson, in the county of Branch, in the State of Michigan, have invented certain new and useful improvements in a Steam Apparatus or Boiling-Pan for Evaporating Sorghum Juice, Cider, or other Matter; and the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings making a part of this specification, in which—

Figure 1 represents a side longitudinal section through the pan, showing the steam-chest, heating pipes, induction pipe, safety-valve, and siphon for clearing the pipes of water from the condensed steam.

Figure 2 shows a plan or top view of the same.

The object of my invention is to evaporate the juice of sorghum, sugar cane, cider, or other liquids, and reduce them to sirups, without the possibility of burning, scorching, or discoloring the substance.

My invention consists in the construction and arrangement of a steam-chest, and a series of steam pipes converging into an enlarged central pipe or water-chamber, so that the water from condensed steam can be drawn off or forced out by the pressure of the steam, the arrangement of the pipes being such that the greatest heat is produced in the central portions of the pan, thus throwing the scum to the sides, and particularly to the left-hand corners of the evaporator, where it can be taken off.

To enable others to make and use my improved steam apparatus for boiling or evaporating sorghum, cider, maple sap, &c., for clarifying or reducing to sirup, I will describe it more fully, referring to the drawings and to the letters marked thereon.

The boiling-pan or evaporator A A may be made of tin, sheet copper, brass, or of any suitable material, and of any desired size and form. The pan A A being supported on a frame, B B, with legs b b so as to be at a convenient height. The sides and bottom of the evaporating-pan A A may be covered on the under side with a wood casing, C C, so as not to be cooled off by the circulation of the air from beneath. At or near the bottom of the pan A A, inside, is placed the heating apparatus, which consists of a steam-chamber, D, having a large vertical pipe, d, in its centre for the introduction of steam into the chamber D which is placed horizontally in the bottom near one end of the pan. From the centre of the chamber D extends the central or main steam pipe E, which lies horizontal in the centre of the pan A A, and terminates in an enlarged conical pipe, F, which forms a receiver or water-chamber for the condensed steam from all of the other pipes, whose ends terminate in it where the water can easily be forced off through the small siphon pipe f, placed in the lowest or sunken portion of the end of the conical pipe F for that purpose. The water-discharging pipe f is provided with a stop-cock, e, so as to be closed when it is not necessary to discharge the distilled water from the condensed steam. A series of steam pipes, a a a a, connects with the chamber D, and the conical pipe or water-chamber F. These pipes may be of any number sufficient to nearly cover the bottom of the pan A A, the steam being let in through the pipe d into the chamber D. The main central pipe E being the longest will necessarily be the hottest, as also the chamber D at the right-hand end, so that the ebullition commences there, and through the centre of the pan, and will continue to be so during the whole process of evaporation, thus driving all of the impurities and extraneous matter into a scum which flows off to both sides of the pan, and concentrates at the left-hand corners I I, where most of the ebullition ceases, and the scum can be taken off at any time while the process of reducing and clarifying is going on. The water-chamber or receiver of condensed steam F is provided with a vertical steam induction pipe, G, on the top of which is fitted a safety-valve, h, with an arm or lever, H, and a movable weight, k, so that any amount of pressure of steam may be used at any or all times, and regulated so as to produce much or little ebullition, which is important to be varied in the process of evaporating different substances, and also at different periods in the same substance.

In boiling sorghum, juice of sugar cane, and sweet cider, the first part of the process requires to be rapid, so as to separate and throw off the impurities; and also in reducing maple sap, the first part of the operation is greatly facilitated by a more intense heat. When the impurities are removed and the sirup begins to thicken, then the heat wants to be less intense, and continue to diminish until the process is completed. This has heretofore and the more generally been effected by changing the sirup into different pans or kettles to be slowly finished off, or by reducing the fire in the furnaces, and then with the utmost caution the sirup often gets discolored and burnt, so as to give it a disagreeable flavor, if not entirely ruin it for the market. This is the experience

of many with the most of the processes now in use. Thus it will be seen that a boiling-pan or evaporator, constructed as above described to operate by steam, the heating process may be regulated and varied at will, according to the conditions of the substance, or the time in the process of clarifying and reducing the liquid to the plastic or granular state, mainly by the amount of pressure of the steam in the chambers and tubes in the boiling-pan. This is controlled by the lever and weight on the safety-valve.

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

The arrangement of the steam-chamber D, pipes *a a a*, and E, connected with the water-chamber F and discharging pipe *f*, in combination with the eduction pipe G, safety-valve *h*, lever H, and weight *k*, operating substantially as and for the purposes herein set forth.

I also claim the arrangement of the horizontal steam pipes in such a manner that the greatest heat will be in the centre of the boiling-pan, thus throwing the impurities and scum to the sides and corners of the pan or evaporator, as and for the purposes herein described.

In testimony whereof I hereunto subscribe my name on this 26th day of March, 1867.

HENRY FOWLER.

Witnesses:

GEO. F. GILLAM,
HENRY POWERS.