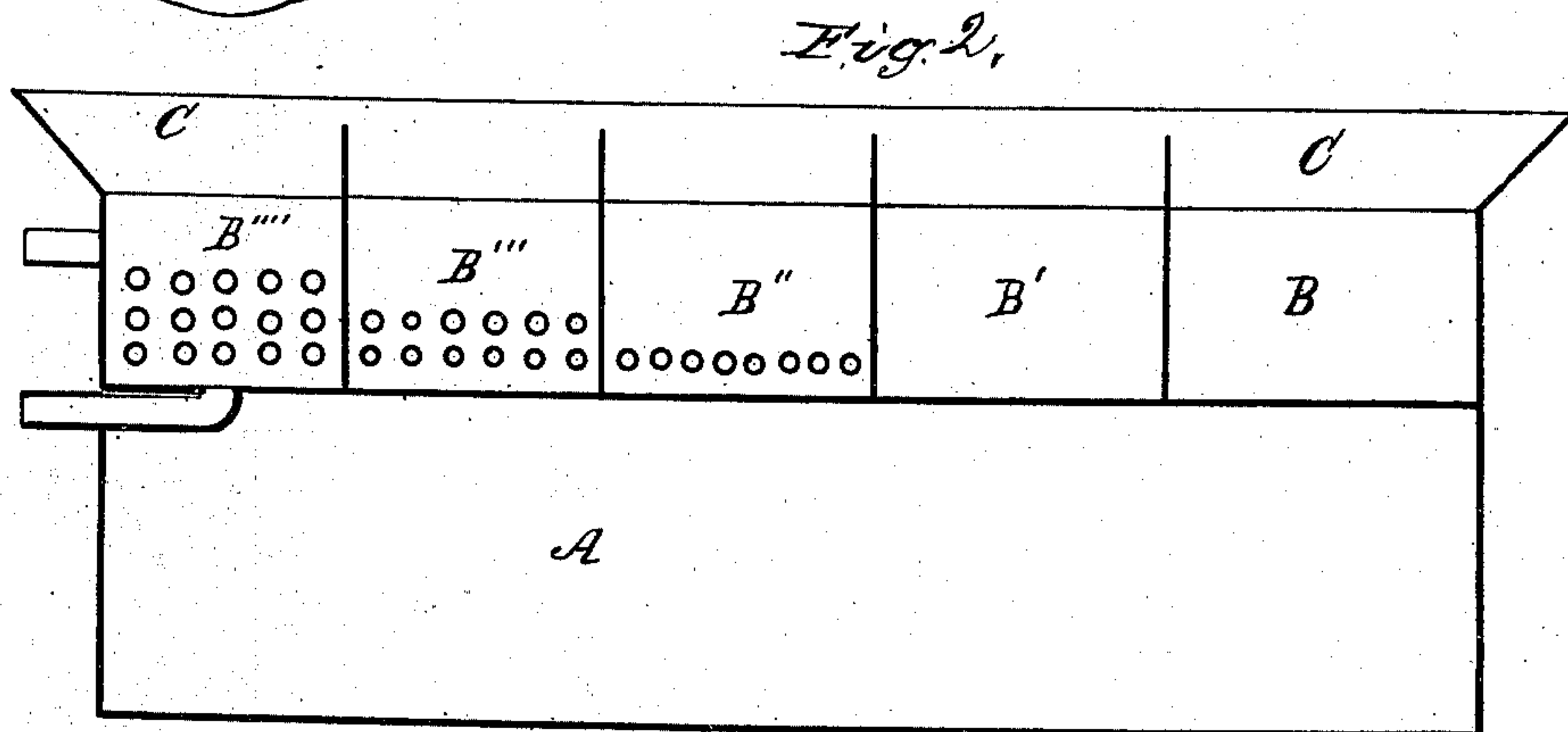
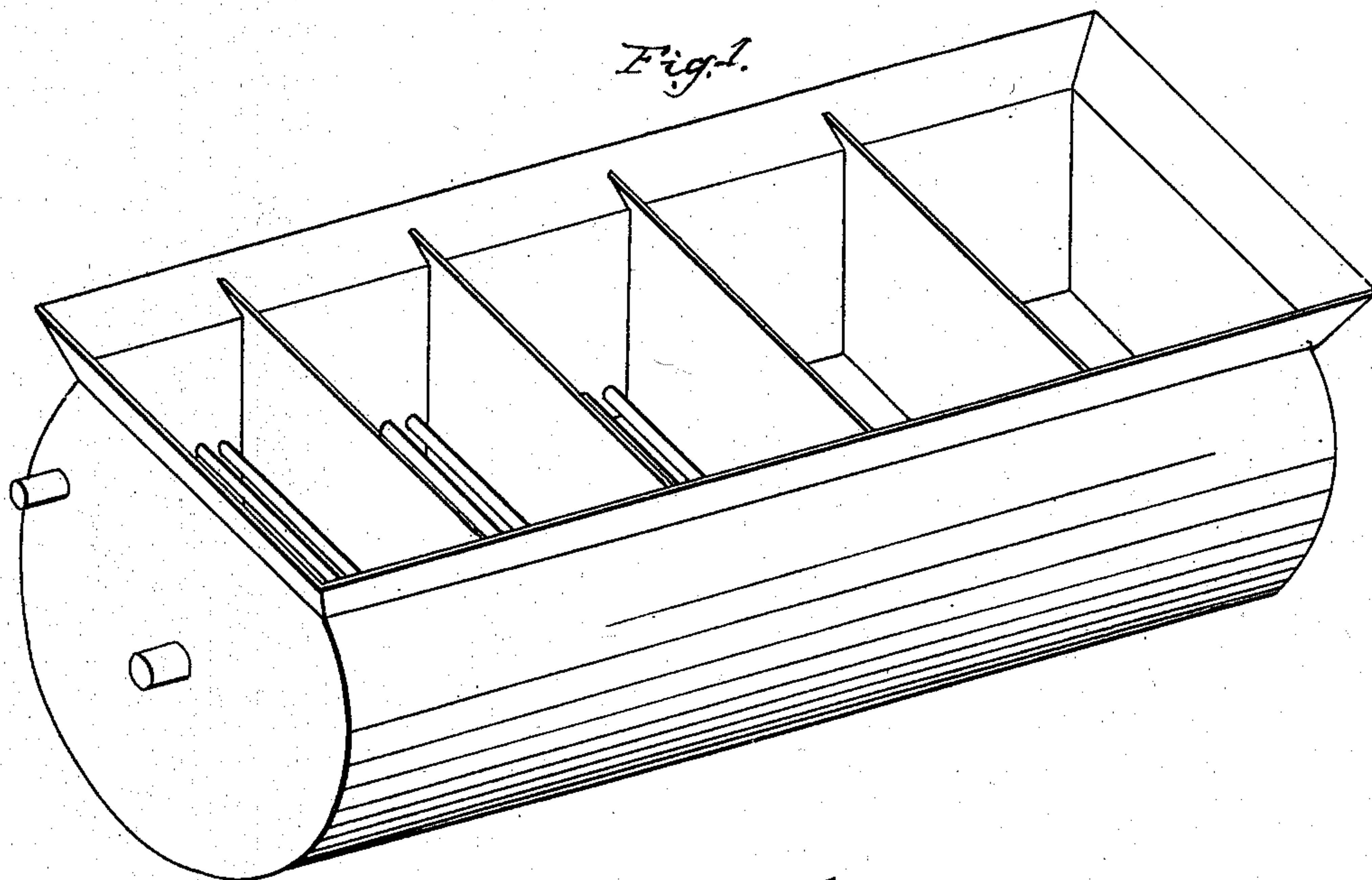


S. A. POCHÉ.
EVAPORATING CANE JUICE.

No. 104,491.

Patented June 21, 1870.



Witnesses;
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Letters Patent No. 104,491, dated June, 21, 1870.

IMPROVEMENT IN EVAPORATING CANE-JUICE.

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

I, SIMEON A. POCHÉ, of the parish of St. James, in the State of Louisiana, have invented a certain Improved Method of Evaporating Cane-Juice, with a view to its reduction to sugar, of which the following is a specification.

My invention relates to an apparatus or equipage, technically so called, as in the case of my improvement for which Letters Patent No. 84,134 were issued to me, on the 17th of November, A. D. 1868, in which the heat of steam that is generated in a boiler in which a set of evaporating kettles or pans are inserted is the only agent or means employed to effect the evaporation and reduction of the juice; but, unlike that invention, my present improvement does not contemplate the supplying of steam to the engine of the sugar-mill, nor the generation of more steam than is necessary to furnish the requisite measure of heat to effect the evaporation of the juice. In other words, my equipage is detached from all other parts of the mill, although, of course, placed within it, and subserves no purpose other than the evaporation and reduction of the juice to sugar, my object being to economize water by the evaporation and condensation of the same volume over and over again indefinitely in the boiler or generator in which it is confined, and of reducing the quantity of fuel required to reduce any given volume of juice, by diminishing the temperature and pressure of the steam to the minimum point at which evaporation and granulation can be effected, which may be stated approximately to be about thirty pounds to the square inch. And when it is remembered that, if cane-juice is perfectly defecated and neutralized, and its evaporation is effected rapidly at a low temperature, there is scarcely any molasses produced, but nearly all the saccharine is converted into sugar, and that the value of sugar is at least double that of molasses, another and very important economic advantage resulting from my invention is at once disclosed.

The boiler, as well as the kettle inserted therein and securely attached thereto by being riveted to proper flanches, may be of any form, but I prefer the forms for each which are shown on the drawing, which very clearly illustrate my invention in all its parts; that is to say, I make the boiler in the form of a longitudinal section of an ellipse, and insert a set of rectangular evaporating-kettles or pans that gradually diminish in size from the "grande" or clarifying-kettle to the "battery" or granulating-kettle, as in the case of ordinary sets of kettles, in the flat top thereof, substantially as shown, and surround the whole with a flaring rim, to prevent overflowing and waste from too rapid a boiling of the juice, as in my patented apparatus to which I have before referred.

Instead of steam-jackets underneath the "battery," "sirup," and "flambeau," for so the granulating and two next adjoining kettles are called in the order in which they are named, in the parlance of the sugar-mills, in which a progressive increase of heat from the flambeau to the battery is requisite to produce an effective reduction of the juice, I accomplish this object by means of transverse tubes, as shown, which, open at both their ends, communicate with the steam-space in the boiler, and hence extend the heating-surface that is brought into contact with the juice by an increasing multiplication from the flambeau, in which a very few are sufficient, to the battery, in which double or treble the number is necessary to effect the best results.

The boiler should be provided with steam and water-gauges, a mud-drum, with the view of withdrawing mechanical impurities from the water, and a safety-valve to prevent an accidental explosion from an undue accumulation of steam from carelessness or other cause.

The emptying and filling of the kettles is effected in the ordinary manner, by means of buckets, in connection with a small hand-pump, whenever it is wished to empty any kettle completely.

The scum and other impurities that rise to the top of the juice during the boiling are brushed off from one kettle to another in the usual manner until they reach the "grande," and are finally thrown out.

A reference to the drawing, which, at Figure 1, represents my invention in perspective in its complete form, and, at Figure 2, by a longitudinal sectional view through line *a b*, will at once make clear its nature and construction.

On the drawing—

A is the boiler, and B, B', B'', B''', and B''', the evaporating-kettles or pans, as they are indifferently called, B being the "grande," B' the "proper," B'' the "flambeau," B''' the "sirup," and B'''' the "battery" or granulating-kettle; the whole composing what is popularly known as a "set" of kettles.

C is a rim, which rises several inches above the top of the boiler, and inclines outwardly, as shown. The function fulfilled by this rim, as before stated, is to prevent the overflowing and waste of juice during the operation of boiling it.

To prevent the intrusion of juice from one kettle into another by an over-active boiling, I extend the dividing walls about half way up to the top of the rim C, as shown at D.

In order to increase the heating-surface and quicken the evaporation in the flambeau or kettle B'', which is necessary to produce the best results, I insert near its bottom a number of small pipes or tubes, substantially

as shown, which, communicating with the steam-chamber of the boiler, carry the steam, with its heat, through the juice, and thus effect the desired result.

In the next kettle to the flambeau, to wit, the "sirup," where an increased rapidity of evaporation is required, I double the number of tubes, and in the battery I treble the number, in order still further to increase the heat to produce granulation.

The "strike" or withdrawal of the cooked sugar is effected by any ordinary and suitable means.

The boiler being perfectly tight, and the steam within it, therefore, always confined, it will be perceived there can be no loss of water, and, consequently, no need for a pump to be kept constantly working during the process of evaporation, a pump, in fact, only being required to fill the boiler in the first instance, and afterward to make up any loss resulting from the waste of steam at the gauge-cocks, safety-valve, or elsewhere.

It will be seen, also, that, insomuch as the tubes running through the last three kettles of the series communicate with the steam-chamber of the boiler, and are always full of steam, in the practice of the invention, the heat, applied through their agency in the kettles in which they are placed, will always be increased or diminished in precise correspondence with the number of tubes employed, and that, consequently, that gradual increase of heat from the flambeau to the battery which is requisite to give the largest yield and best quality of sugar is with great ease managed.

Being completely confined, the steam, by contact with the upper portions of the boiler, the surfaces of the kettles, &c., condenses as fast as it is generated, and hence the water in the boiler is always maintained at or about the same level.

An equilibrium of pressure or density in the steam is maintained by a watch upon the gauges and proper management of the fire in the furnace in which the boiler is placed, and which may be of any proper construction.

The drawing shows only five kettles in the set, but it must be understood I may, if I consider it expedient, use a larger number.

I have demonstrated the practical value of my improvement by actual experiment, and it is beyond all question the simplest, most compact, and cheapest equipage ever yet devised.

What I claim as my invention, is—

The introduction of transverse tubes or pipes in cane-juice-evaporating kettles, in the manner and for the purpose herein described, whatever may be the shape or form of the kettles, when the same are inserted in and constitute a part of a steam-boiler, and the steam generated in the latter is the heating agent to produce the evaporation and reduction of the cane-juice to sugar.

S. A. POCHÉ.

Witnesses:

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