

G. A. JASPER.  
Process for Refining Raw Sugar.

No. 198,943.

Patented Jan. 8, 1878.

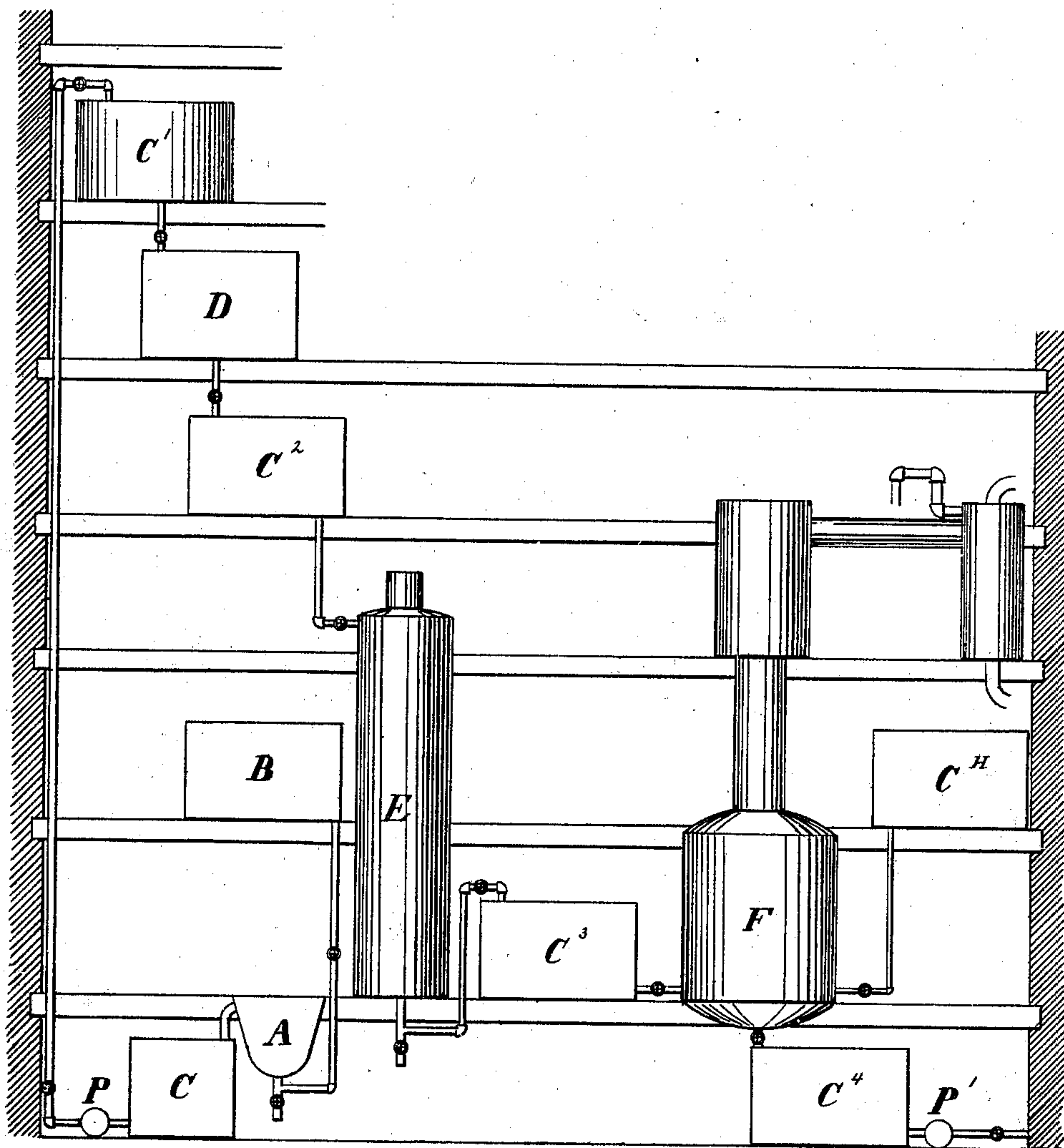


FIG. 1.

WITNESSES.

William W Swan  
W. B. Bynum

INVENTOR.

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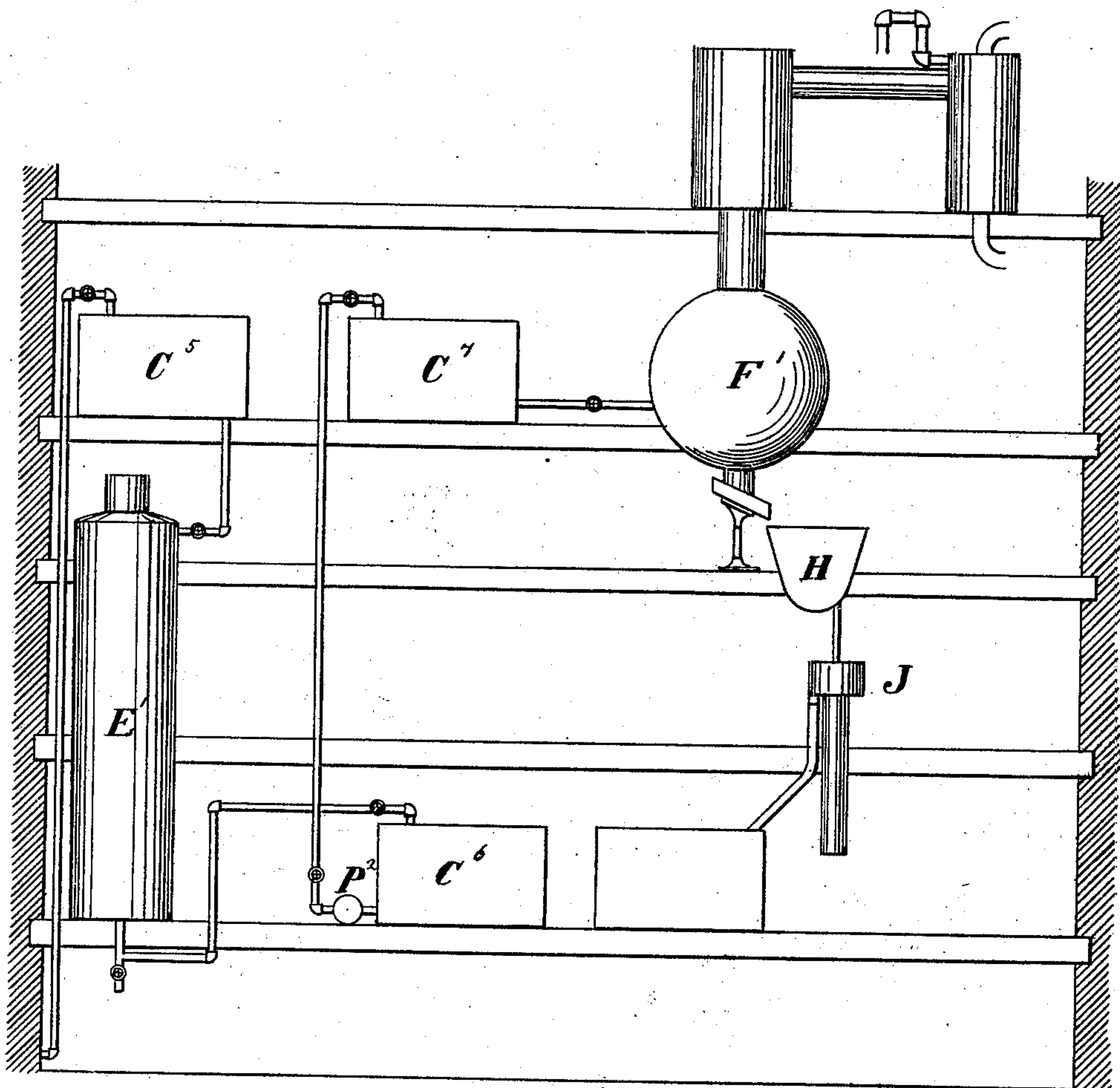


Fig. 2.

WITNESSES:

*W. M. Boynton*  
*William W. Swan*

INVENTOR.

*Gustavus A. Jasper*



# UNITED STATES PATENT OFFICE.

GUSTAVUS A. JASPER, OF BOSTON, MASSACHUSETTS.

## IMPROVEMENT IN PROCESSES FOR REFINING RAW SUGAR.

Specification forming part of Letters Patent No. **198,943**, dated January 8, 1878; application filed September 6, 1877.

*To all whom it may concern:*

Be it known that I, GUSTAVUS A. JASPER, of Boston, in the State of Massachusetts, have invented a new and useful Improvement in the Process of Refining Raw Sugar, of which the following is a specification:

The improvement consists in dissolving the raw sugar to the form of exceedingly thin liquor of low temperature, and in that condition subjecting it to rapid cleansing and evaporating processes, and then treating the thick liquor resulting from the evaporation in the manner ordinarily practiced in sugar-refineries.

In the ordinary process of refining raw sugars they are first dissolved to the form of thick liquor, having a density of from 25° to 28° Baumé. This thick liquor is then treated with lime, run through the bag and charcoal filters, and conducted to the vacuum-pan, where it is crystallized, the excess of lime being there, or having been elsewhere, removed, and the poorer grades having been clarified with blood at the beginning of the process; but thick liquor runs with difficulty through the bag and charcoal filters, and at the first working a considerable amount of the liquor remains in the filters. Moreover, this ordinary filtering process must be or is conducted at the comparatively high temperature of about 160° Fahrenheit, or over, and thereby a considerable amount of the crystallizable sugar in the liquor becomes carbonized, and much of the sugar in the liquor which remains in the bag-filters will be carbonized by the steaming process, by which the liquor is afterward removed. Very thin liquors at a low temperature pass through the filters much more satisfactorily, comparatively none of the sugar being left in the bags and charcoal, and none of it being carbonized. Thin liquors, however, are extremely liable to ferment, if allowed to accumulate and remain at rest, as they must while awaiting the ordinary slow operation of the vacuum-pan; and they cannot be boiled in the vacuum-pan to advantage, for new charges of thin liquor introduced into the vacuum-pan will dissolve or reduce the size of the crystals already formed there; and thin liquors boiled in the vacuum-pan produce a large percentage of sweat, which finally results in sirup instead of sugar.

It is well established that liquor, to be boiled to the best advantage, is introduced into the vacuum-pan at a density of from 25° to 28° Baumé.

By my improved process I combine the advantages resulting from boiling thick liquor with the advantages resulting from filtering and defecating the liquor in a thin condition at a low temperature.

I first dissolve the raw sugar by adding to it warm water till the liquor becomes so thin that it will run freely through the bag and charcoal filters, leaving no deposit of value, (of a density of from about 10° Baumé, or lower to about 15° Baumé,) without permitting the liquor to reach a temperature above about 120° Fahrenheit, at which sugar in the liquor will be carbonized. This thin liquor is next treated with lime or other chemicals, and run through bag and charcoal filters in the ordinary manner, although, to obvious advantage, I can use much finer coal than is used with thick liquor. It is then conducted to an evaporating-pan, such further chemicals being added as may be necessary to remove the excess of lime, or as may be otherwise useful, and there rapidly evaporated, but at a continued low temperature, to a density of from about 25° to 28° Baumé, and the resulting thick liquor is then refiltered in charcoal, and crystallized in the ordinary manner.

Although I prefer to apply to the liquor when it is in its thin condition such chemicals as may be of aid in clarifying the sugar, the time of so employing chemicals is not an essential element in my process, for if they are not made use of for the most part before the liquor reaches the vacuum-pan in its then thick condition, the benefit will still result which comes from filtering thin liquor and boiling thick.

In the drawings I have shown an apparatus by which, so far as I know, my improved process may be worked to the best advantage. The instrumentalities there shown, however, form no part of the invention which I wish to secure in this patent, they being the subject-matter of a separate and distinct patent of even date herewith, and my process being capable of being worked by other mechanisms and apparatus.



A is a mixer; B, a warm-water tank; C C<sup>1</sup> C<sup>2</sup>, &c., tanks for receiving and discharging melted sugar or liquor in various stages of the process; D, a chest containing bag-filters. E and E' are charcoal-filters; F, an evaporating-pan, having a condenser, and furnished with a tank, C<sup>3</sup>, for supplying such chemicals as may be required. F' is the ordinary vacuum-pan; H, a second mixer; J, a centrifugal; and P P<sup>1</sup> P<sup>2</sup> are the pumps.

It may be added that warm water flows constantly from the warm-water tank to the first-mentioned mixer, into which the raw sugar is dumped, and that warm thin liquor constantly overflows from that mixer to a tank, from which it is pumped to a tank at the top of the house, where, by heat or the addition of water, its density and temperature are regulated to uniform standards, and lime added, so far as may be necessary.

It may also be stated that the evaporating-

pan contains an excess of steam-pipes, in order that evaporation of the thin liquor may go on rapidly, while the vacuum-pan has few steam-pipes, in order that the boiling to form the crystals from the thick liquor may be done slowly.

I claim—

The process of refining raw sugar by first dissolving it in warm water to an exceedingly thin liquor, of low temperature, filtering the thin liquor, and evaporating it to the density of thick liquor, the low temperature being all the while maintained, and then filtering and crystallizing the thick liquor, chemicals being employed or not, as necessary, substantially as above set forth.

GUSTAVUS A. JASPER.

Witnesses:

G. W. BOYNTON,  
WILLIAM W. SWAN.