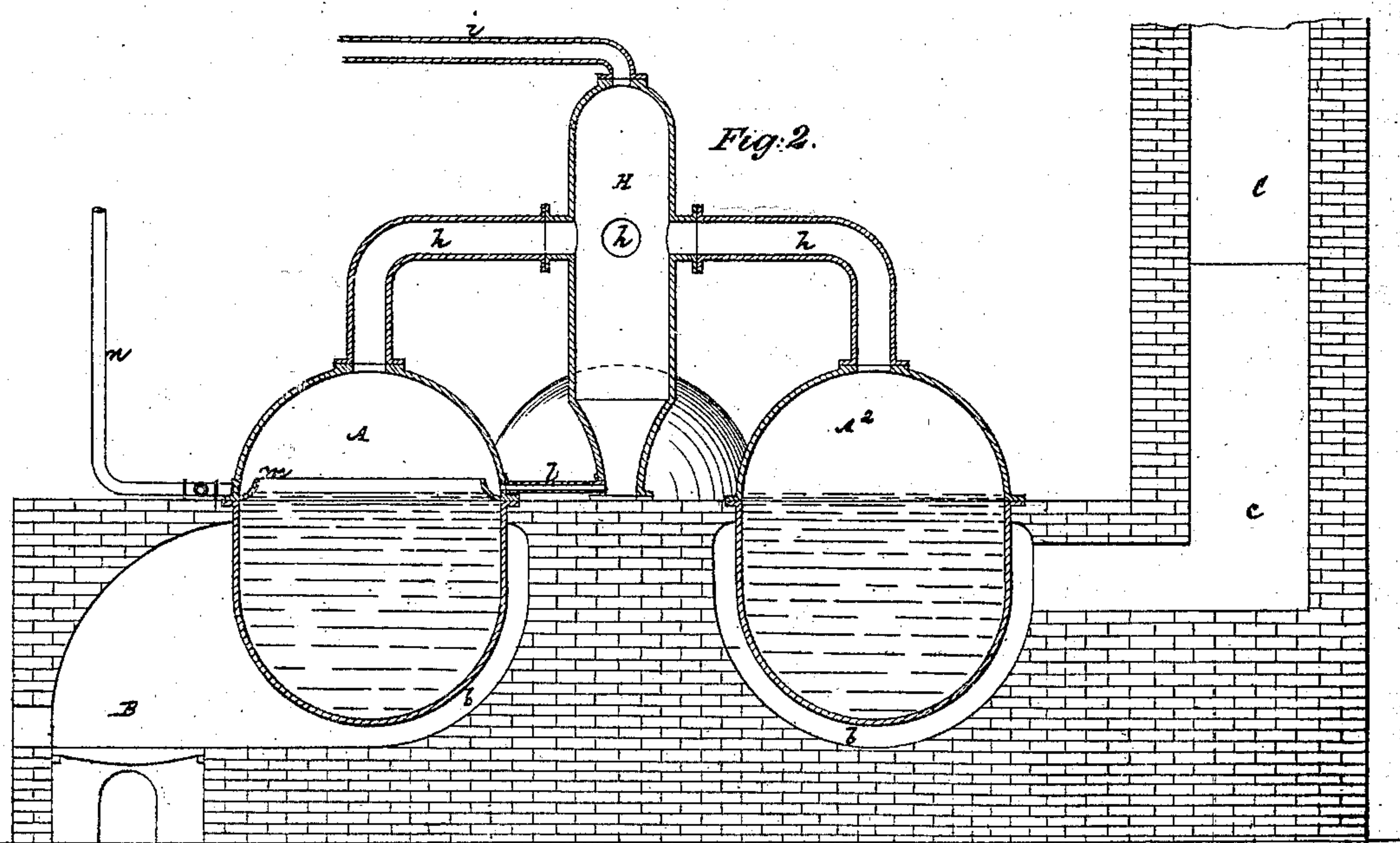
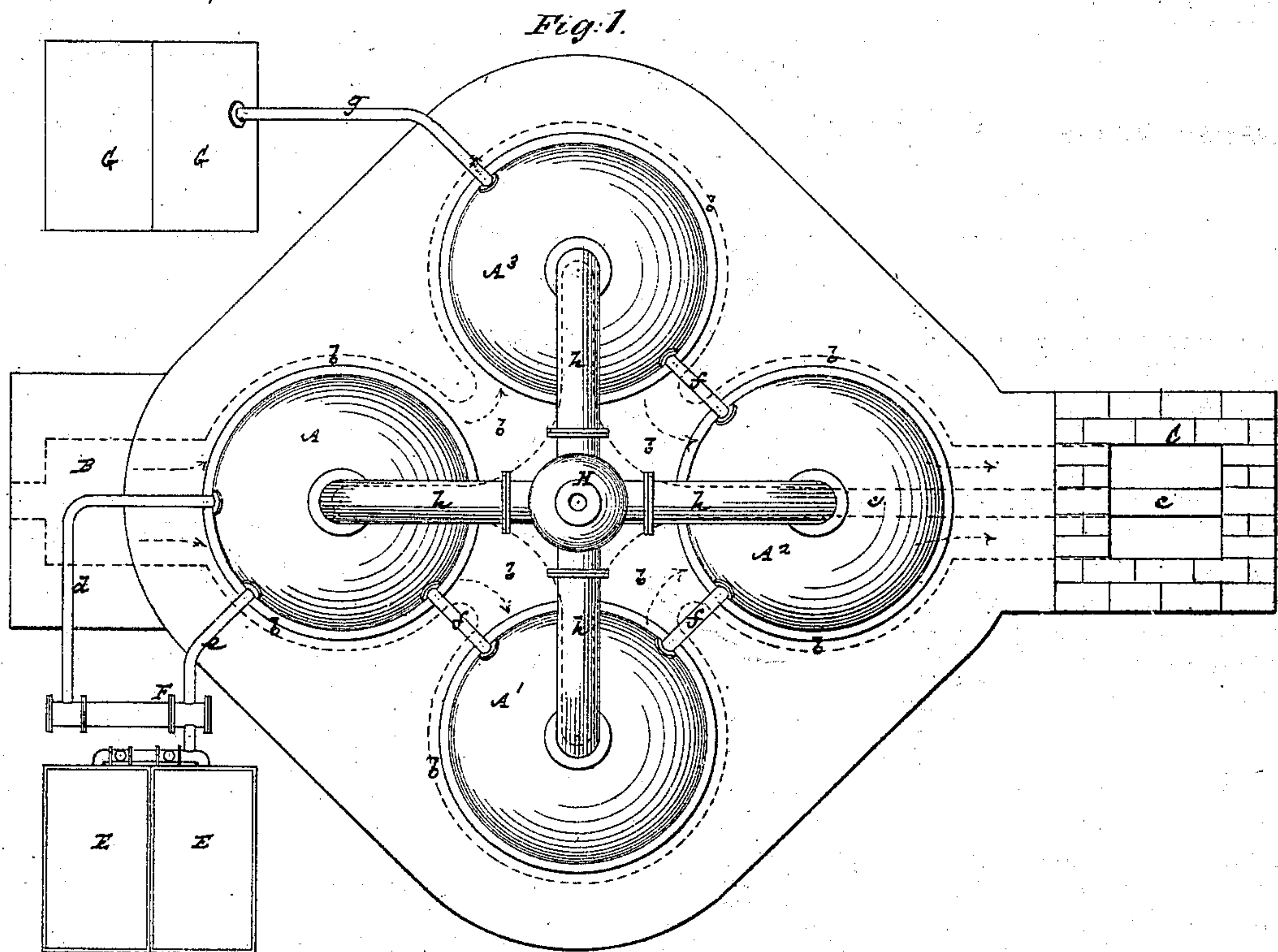


S. DOD.
Apparatus for the Manufacture of Sugar.
 No. 135,529. Patented Feb. 4, 1873.



Witnesses:

Fred. H. H. H. H.
R. H. H. H.

Charles H. H.

UNITED STATES PATENT OFFICE.

SANTIAGO DOD, OF HAVANA, CUBA.

IMPROVEMENT IN APPARATUS FOR THE MANUFACTURE OF SUGAR.

Specification forming part of Letters Patent No. 135,529, dated February 4, 1873.

To all whom it may concern:

Be it known that I, SANTIAGO DOD, a citizen of the United States, residing at Havana, in the Island of Cuba, have invented an Improvement in the Manufacture of Sugar, of which the following is a specification:

This invention relates to the manufacture of sugar either from the cane or beet-root by the vacuum-pan process. Its object is to subject the juice, preparatory to introducing it to the vacuum-pan and during the earlier stages of its concentration, to a boiling process under pressure in close vessels or boilers made to constitute a steam-generator, thus causing said juice to furnish steam to be used in the sugar-works for clarifying purposes or for driving the pump or pumps and engine employed in place of steam generated from water in the usual way, whereby fuel is largely economized, as also labor, and the removal of impurities from the juice cheapened by reason of the high degree of heat which is obtained to effect coagulation and remove impurities without resorting, or of necessity, to repeated successive stages of concentration or to bone-black or its equivalents. The improvement consists in a generator composed of a number of connected boilers in combination with a particular arrangement of flues, dividing-wall, and safety-column with its connections, whereby a most perfect distribution of the heat is obtained and the steam collected for use, as required, free from foam or scum, which is returned to the boilers. The improvement also consists in a scum-trough arranged within one or more of the boilers, and pipe connecting said trough with the clarifier, for collecting the scum from the surface of the juice in the boilers and conveying it to be recleaned.

In the accompanying drawing, which forms part of this specification, Figure 1 represents a plan of the furnace and generator. Fig. 2 is a vertical sectional elevation of the same.

Similar letters of reference indicate corresponding parts in both figures of the drawing.

A A¹ A² A³ are close boilers, connected to form a single generator for partly concentrating the juice under pressure by heat applied direct to said boilers, and for generating steam from the juice for use in the clarifiers or else-

where. B is the furnace, the products of combustion from which are caused to circulate under and around the boilers A A¹ A² A³ by means of flues *b b* formed in the setting or brick-work of the boilers, and through which the equal distribution of the heat is insured by a dividing-wall, *c*, arranged to extend some distance up the chimney C.

The juice is first clarified in the usual way, or in a close clarifier, blow-up, or defecator, by boiling under pressure. It is then conveyed to settling-tanks E E or direct to the boilers A A¹ A² A³ by a pump, F, which may be operated by the steam derived from the juice in said boilers, or from the first one, A, of such boilers, as by a steam-supply pipe, *d*. The pump F connects with the boiler A by a pipe, *e*, by which the juice is fed to said boiler, and from thence is passed successively by connecting-pipes *f* from boiler to boiler, and is ultimately discharged, through a cock or valve actuated by a float to maintain any required level, by a pipe, *g*, to receivers or sirup-tanks G G, from which the vacuum-pan, for further concentration of the juice, is supplied. The steam, or greater portion of it, thus produced from boiling the juice under pressure, after clarification, is conveyed by pipes *h h h h* to a column, H, from whence it is conveyed by a pipe, *i*, for use, as required, either in working the engine which drives the works and for supplying the clarifier for operating the air and other pumps, or for any other use for which it may be needed.

The column H is a safety one for collecting scum or foam rising from the boilers with the steam and for returning the same by a pipe, *l*, to the first boiler A, or to any of the other boilers, thereby tending to keep the remaining boilers clean.

The first boiler A, as also the other boilers if necessary, is or are provided with a trough, *m*, for collecting the scum from the surface of the juice and discharging it by a pipe, *n*, to the clarifier to be recleaned.

By boiling the juice under pressure, as described, not only is fuel economized and other economies obtained by generating steam direct from the juice for use, as specified, but the high degree of heat to which the juice is exposed in this its earlier stage of concentra-

tion enables coagulation to be effected and allows of impurities to be removed without necessarily resorting to repeated successive stages of concentration or to the use of bone-black or other purifying substances.

What is here claimed, and desired to be secured by Letters Patent, is—

1. The generator composed of a number of connected boilers, in combination with the flues *b*, and dividing-wall *c*, the steam pipes

h, and safety-column *H* with its pipe *l*, substantially as herein described.

2. The combination of the trough *m* and discharge-pipe *n* with either or all of the boilers, essentially as and for the purpose herein set forth.

SANTIAGO DOD.

Witnesses:

FRED. HAYNES,
R. E. RABEAU.