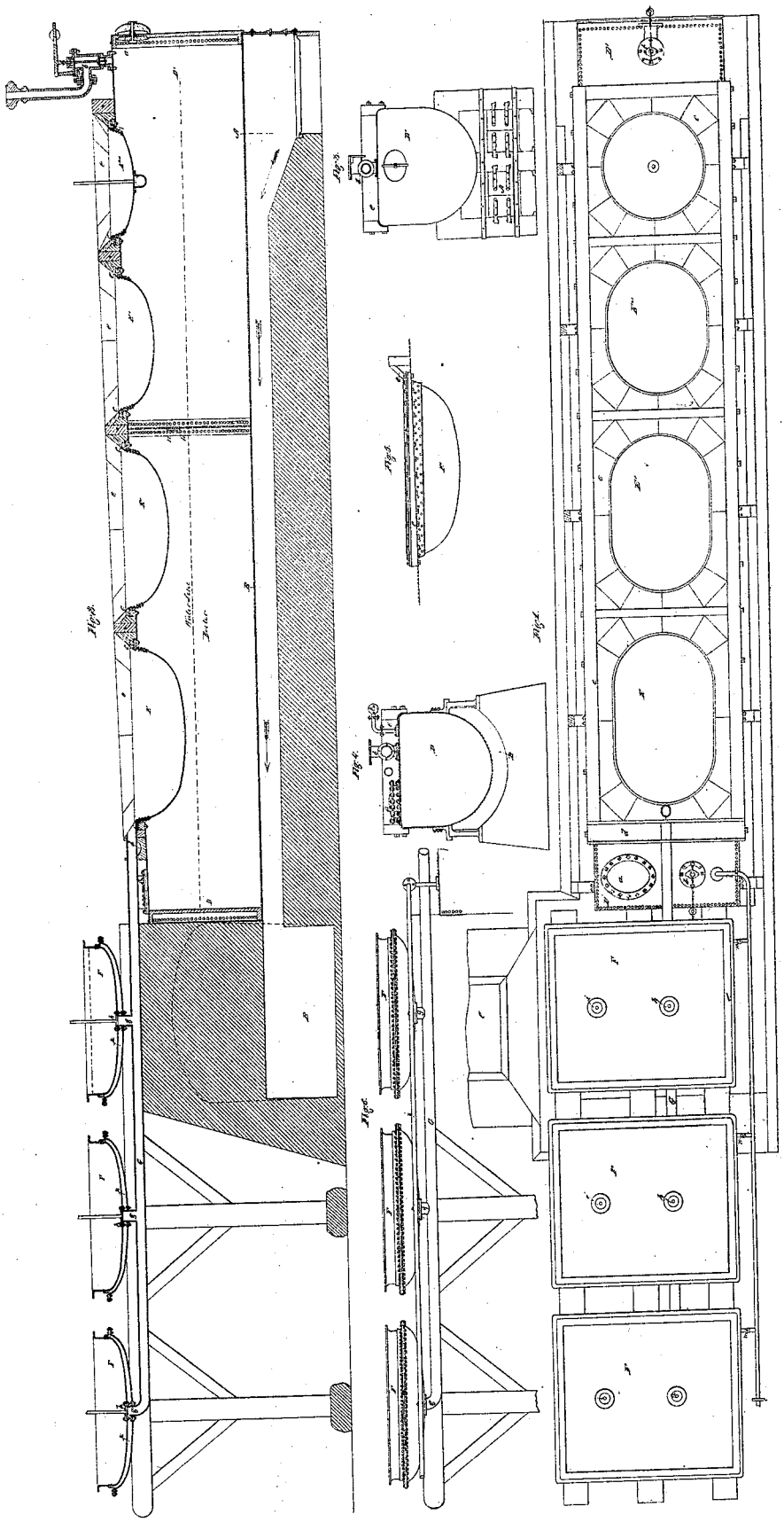
F. Duplessis.

Sugar Mach.

No 4,310. Patented Dec. 10, 1845.



UNITED STATES PATENT OFFICE.

FRANCIS DUPLESSIS, OF PLAQUEMINE, LOUISIANA.

IMPROVEMENT IN SUGAR-BOILERS.

Specification forming part of Letters Patent No. **4,310**, dated December 16, 1845.

To all whom it may concern:

Be it known that I, FRANCIS DUPLESSIS, of Plaquemines, in the parish of Iberville and State of Louisiana, have invented a new and useful Improvement in the Apparatus for Making Sugar by Steam; and I do hereby declare that the following is a full, clear, and exact description of the principle or character thereof which distinguishes it from all other things before known, and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a plan of the apparatus; Fig. 2, a longitudinal vertical section; Fig. 3, a front elevation; Fig. 4, a transverse section; Fig. 5, a separate view of one of the kettles, to show the manner of setting them; and Fig. 6, a side elevation of the clarifiers.

The same letters indicate like parts in all the figures.

The methods heretofore practiced for evaporating saccharine juice in the manufacture of sugar are setting the series of kettles in a furnace, the flues therefrom passing under them, or making the kettles with double bottoms, into and through which steam is caused to pass by means of pipes from a steam-generator. The former of these is very objectionable on account of the practical difficulty of regulating the temperature to avoid burning the sirup, which of course spoils the sugar, and the latter on account of the waste of heat and the original cost of construction, the steam being conducted from the generator to the double bottoms of the pans through long pipes, which, together with the outer casing of the kettles, are exposed to the condensing influence of the surrounding atmosphere.

To remedy these evils is the great object of my invention, which consists in arranging the whole series of kettles for evaporating the saccharine juice and sirup on the top of a steam-boiler, with their bottoms, or all that portion of their surface which is to be heated, within the boiler, to be exposed to the direct action of the steam within the boiler, instead of taking the steam from the generator and conducting it through pipes exposed to the atmosphere, whereby I effect a saving of fuel and room, and avoid the whole expense in the original structure of making the double bottoms of the kettles and the pipes, &c. But simply putting the bottoms of the kettles in the boiler will not suffice, as this arrangement will not enable the attendant to moderate the temperature of any of the kettles, as is frequently required, without affecting the whole series at the same time, and therefore to meet this end I have devised my second invention, which consists simply in providing the boiler with one or more partitions, with a valve in each, so that by the closing of the valve or valves steam may be blown off from that section which heats the kettle or kettles to be reduced in temperature, thus putting the apparatus wholly under the the control of the attendant.

In the accompanying drawings, A is the furnace, constructed in accordance with the most approved plans, and B the flue leading therefrom to the chimney C. The boiler D is made with the bottom semi-cylindrical, the sides vertical, and the top nearly flat, and deeper at the front end, D′, than at the rear, D. To make the top incline from front to rear it is provided with a man-hole, *a a*, and a safety-valve, *b b*, at each end, of the usual construction, and to these must be added supply-pumps in the usual manner.

The evaporating-kettles E E′ E″ E‴, constructed in the usual manner, are let into the top of the boiler, which is pierced with large holes for this purpose, the flanges *c* of the kettles being bolted steam-tight to the top plate of the boiler, which, being inclined from front to rear, gives to the tops of the range or series of kettles the same inclination, to facilitate the transfer of the scum from them to a delivery-spout, *d*, at the lower end. The kettles are further surrounded by wood-work *e e*, representing tiling, to form a sloped rim around the kettles to prevent the scum in the boiler from running over. The kettles in the series are of different sizes, the larger at the lower or back end, D, and the smaller at the upper or front end, D′, the size being gradually redueed from what is called the "grande" to the "battery" to correspond with the reduced bulk of the sirup as it evaporates from the saccharine juice to the concentrated sirup prepared for granulating.

The saccharine juice is heated preparatory to its introduction into the first of the series

of kettles E by means of pans F F F, arranged back of the boiler, and above the level of the kettles, so as to conduct the juice after it is heated by a pipe, G, which communicates with the bottoms of the pans F by small vertical pipes *g g g*, provided with valves *h h h*, the stems of which extend up above the top of the pans. Other valves, *i i i*, are adapted to their bottoms for the purpose of cleaning them. These pans are heated by steam conducted from the boiler A through the space *k k k*, between their double bottoms, by means of a steam-pipe, *l*, provided with branch pipes *m m m*, leading to each pan, and each having a cock to shut off or let on the steam. The boiler A is divided in its length into two compartments by a vertical partition, H, provided with a valve, *n*, which may be operated by a stem passing through a stuffing-box in the side of the boiler, so that by closing this valve steam can be blown off from either end to reduce the temperature under the kettles, when deemed essential by the attendant, and when sufficiently reduced the valve may be opened to restore an equilibrium of temperature. In this way the baking may be regulated with great facility and accuracy. Instead of one partition and valve for four kettles, the number may be increased so as to have one for each kettle; but I deem one for four kettles sufficient for all practical purposes.

I am aware that for cooking and other purposes kettles have been set directly into a steam-boiler, so as to have the steam in the boiler act directly against their bottoms, but this has always been limited to one kettle for each boiler, which if applied to the manufacture of sugar would require one boiler for each kettle in the series, presenting not only the objection of great cost in the original construction, but much labor in attendance, as well as the important difficulty in keeping up an equal temperature under all the kettles at the same time, which is frequently required; and therefore I do not wish to claim simply letting a single kettle into a steam-boiler to have the steam act directly on the bottom thereof; nor do I wish to claim simply the insertion of a series of kettles in one boiler for general uses; but

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

1. The arrangement of a series of kettles for evaporating saccharine juices and sirups in the manufacture of sugar on the top of and let into one steam-boiler when any method is employed of regulating the temperature of the kettles, that is, reducing or increasing the temperature of a portion of the series without affecting the rest, substantially as herein described.

2. Arranging the series of evaporating-kettles let into the top of one steam-boiler to have them exposed directly to the action of steam within the boiler, in combination with the arrangement for heating the pans, for preparing the saccharine juice by means of steam conducted from the boiler into the double bottoms of the pans, as herein described.

3. Dividing the boiler into two or more compartments by a partition or partitions provided with a valve, in combination with the arrangement of kettles let into the boiler, for the purpose of regulating the temperature, as herein described.

F. DUPLESSIS.

Witnesses:
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