

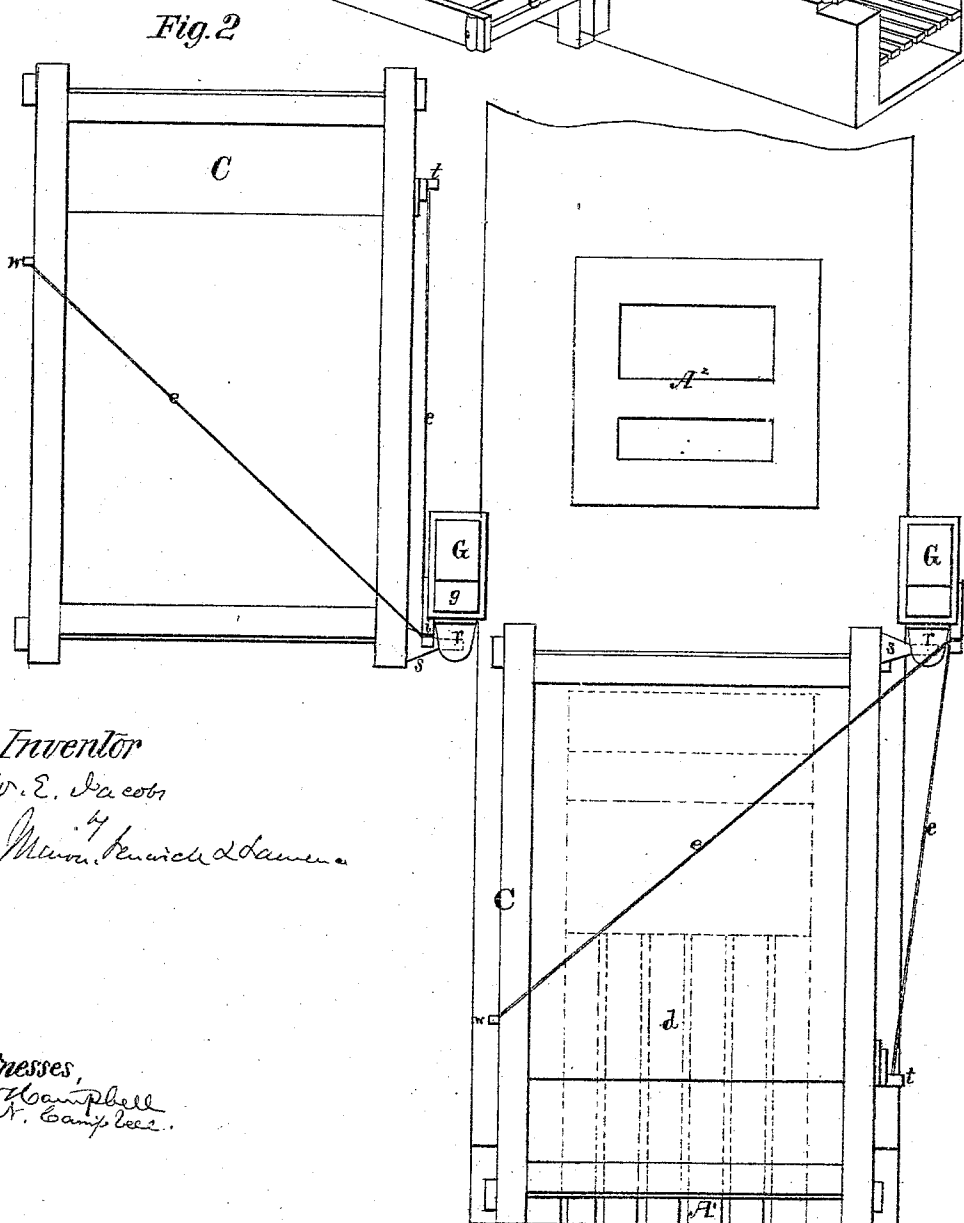
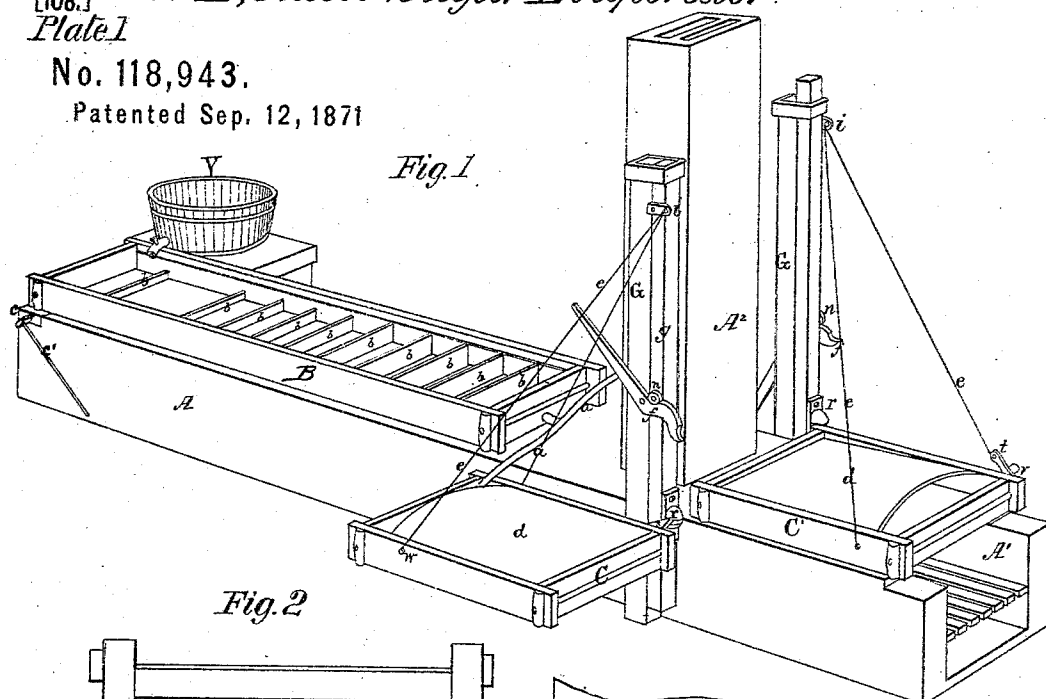
[108.]

[108.] *W. E. Jacobs' Sugar Evaporator.*
Plate 1

Plate I

No. 118,943.

Patented Sep. 12, 1871



Inventor

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Marion Fenwick & Lawrence

Witnesses

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Fig. 4

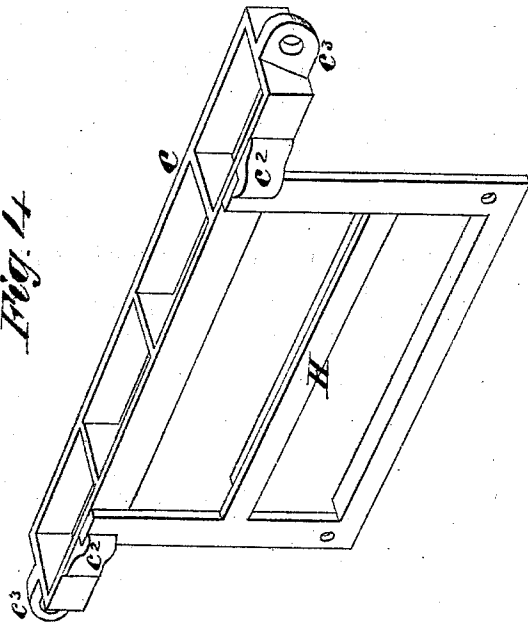
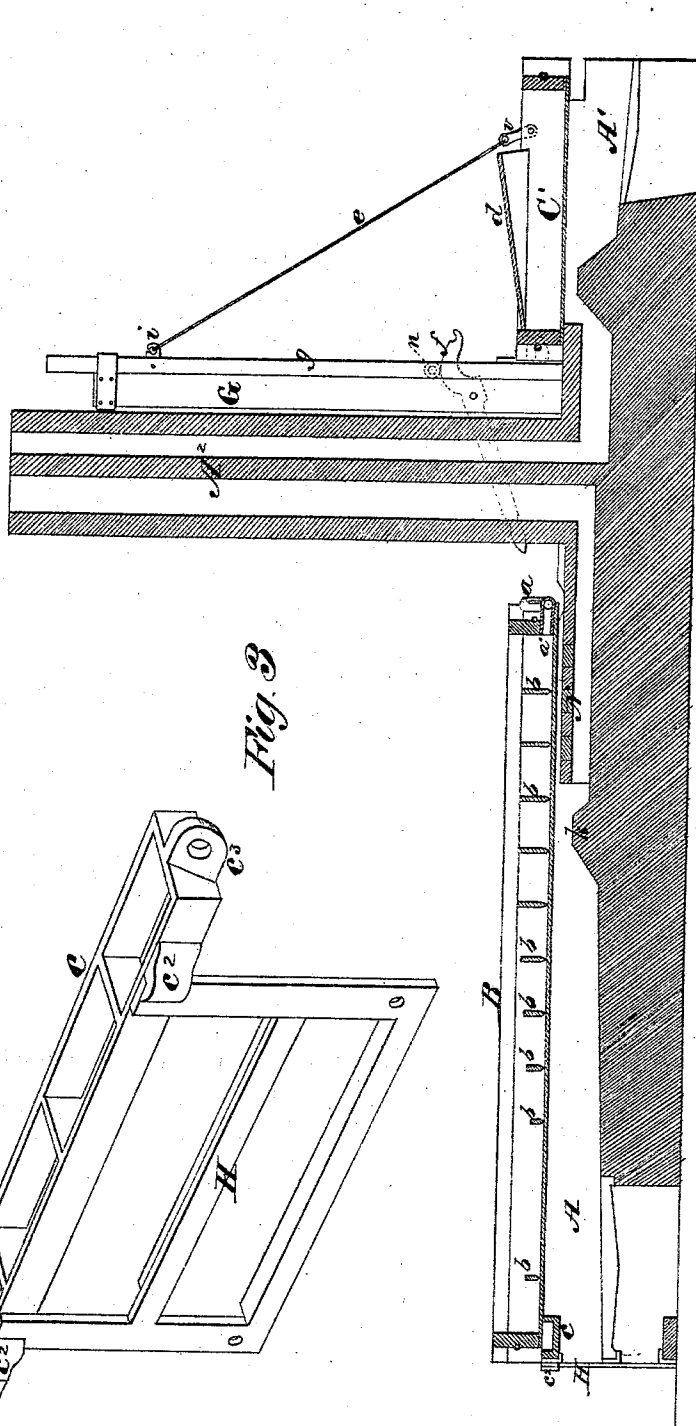


Fig. 3



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WILLIAM E. JACOBS, OF COLUMBUS, OHIO.

IMPROVEMENT IN SUGAR EVAPORATORS.

Specification forming part of Letters Patent No. 118,943, dated September 12, 1871.

To all whom it may concern:

Be it known that I, WILLIAM E. JACOBS, of Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Sugar-Evaporators; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing making part of this specification, in which—

Figure 1, Plate 1, is a perspective view of the apparatus complete. Fig. 2, Plate 1, is a top view of the finishing-pans, their hoisting apparatus, and furnace. Fig. 3, Plate 2, is a section taken longitudinally and vertically through the apparatus. Fig. 4, Plate 2, is a perspective view of the cellular arch iron and door-frame.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to certain novel improvements in the furnaces and in the handling of the finishing-pans of sugar evaporators, as will be hereinafter explained.

The following description of my improvements will enable others skilled in the art to carry them into effect.

In the accompanying drawing, A represents the main furnace, on which rests the pan B into which the juice is first received, and in which it is prepared for the finishing-pans. This furnace extends the whole length of the pan B, and communicates with a stack, A². Between the bridge-wall *k* and the rear end of the pan B a bridge, N, is constructed of bricks laid loosely together about an inch below said pan, for the purpose of equalizing the heat beneath that portion of the pan where it is desired to keep the surface of the juice quiet, or nearly so, and allow the cane-gum to be skimmed off. The heat beneath the last two or three compartments of the pan B may also be regulated by introducing currents of cool air between the bridge N and bottom of the pan. Across the front of the furnace A, and level with the top thereof, is a cast-iron cellular arch or door-head, *c*, having ears *c*³ *c*³ formed on its ends and lugs *c*² *c*² formed on its front side. This arch *c* is held down firmly in its place by means of inclined anchors *c*¹, which are attached above to the ears *c*³ and are fastened below to the furnace-wall. The lugs *c*² *c*² receive the door-frame H and hold it firmly in place. The arch *c* is adapted to receive sand to form a close joint beneath the front end of the pan B; and this arch, when

applied as above stated, will not strain the furnace-wall by expansion and contraction. The pan B is provided with a number of removable division-strips, *b b*, the lower edges of which are beveled and adjusted against the bottom of the pan, so that the juice, in passing under them, is distributed in a regular sheet over the whole bottom of the pan, as fully explained in the Letters Patent numbered 32,998, and reissue No. 1,418. At the rear end of the pan B is an oscillating outlet-pipe, *a*¹, to the outer end of which a double discharge-pipe, *a*, is attached, by means of which the juice can be drawn off from either side of the furnace into either one of the finishing-pans C C', as will be hereinafter explained. A¹ represents the finishing-furnace, which communicates with the chimney A², as shown in Fig. 3. This furnace is open on top to receive upon it the two finishing-pans C C', one at a time. The pans C C' are connected by hinges *r s*, to vertically-movable standards *g g*, which are guided and supported by means of upright posts G G arranged on opposite sides of the furnace A¹, and in such relation thereto that either one of the pans C or C' can be swung over it, or swung around beneath the discharge-pipe *a*. The hinge attachment of each finishing-pan will allow it to be swung horizontally and also allow it to be tilted. Each finishing-pan is provided with a cover, *d*, which only partially closes it from the rear end to near the front, leaving a space to allow the steam to escape. These partial covers are for the purpose of boiling and finishing the sirup at a lower temperature, which is an important point in sugar making. Each pan is suspended by means of two chains, *e e*, which are attached to a hook, *i*, near the upper end of a vertical slide, *g*. One of the chains is attached below to a link, *t*, which is pivoted to a crank-arm, *v*. When the crank-arm *v* is turned down against a shoulder on the side of the pan, the pan will be supported in a horizontal position; but when the crank-arm *v* is turned up one corner of the pan will be depressed, and the sirup will flow from it through a hole which is made through said depressed corner. To the outer side of each part G a lever, *f*, is pivoted, the shorter arm of which is hooked and curved, as shown in Fig. 3. On each slide *g* a stud, *n*, is applied, by means of which this slide is supported upon the shorter arm of the lever *f*, and by means of which this lever is employed to raise and depress the

slide *g* and the pan which is attached to it, and also to support the pan in an elevated position.

The pan B is adjusted upon the furnace A in a level position, and by means of sand on top of the furnace walls the escape of smoke is prevented. A brisk fire is then started, and the bottom of the pan covered with water. When the water boils in the front part of the pan a small stream of the sugar-juice is allowed to flow from the tank Y into the first compartment of the pan. The discharge-pipe *a* is then lowered so that the surplus water is allowed to flow into one or the other of the finishing-pans, which should be swung around to receive it. The discharge-pipe *a* should be adjusted by inclining it more or less, so as to have the juice in the pan B as shallow as practicable, which adjustment can be maintained by applying a rest beneath said pipe. There will be no danger of scorching so long as there is a stream running at both ends of the pan, or a current of the juice allowed to flow over the surface of the pan. The fire should be regulated by means of the lower door of the furnace A, so as to boil briskly in the compartment nearest the front part of the pan B, and gradually diminish the heat toward the rear end of this pan, so that, in the two or three compartments nearest the rear end of the pan where the gum is allowed to concrete, the juice will not be allowed to boil. To prevent the juice from boiling at and near the rear end of the pan B cool air may be admitted beneath the pan at this point in any suitable manner. The introduction of juice into the front end of the pan B should be regulated by means of a valve applied to the draw-off cock of the reservoir X, shown in Fig. 1, so that a continuous stream will flow over the pan, the supply being regulated throughout the whole operation, so as to supply for evaporation, skimming, and the discharge of the clarified juice from the oscillating pipe *a*. The scum which rises in the compartments of the pan nearest its rear end should be removed as quietly as possible and much stirring avoided. One of the finishing pans is swung around, as shown in Fig. 1, beneath one end of the discharge-pipe *a*, and when sufficient juice has been collected in the pan B the pipe *a* is inclined and the juice allowed to run into the finishing-pan to a depth of one or one and a half inches. This finishing-pan is then swung around over the furnace A¹, and at the same time the other finishing-pan is swung to the opposite side of the furnace beneath the opposite end of the

pipe *a*, which is tilted to allow the juice to flow into it. When the juice in the first pan is properly condensed this pan is raised by means of lever *f* and swung off the furnace; after which the sirup is discharged from it into coolers by tilting one corner, as above explained. During this operation of drawing off the sirup into coolers the second pan will have received a sufficient quantity of juice and is swung over the furnace A¹. Thus it will be seen that the pans C C' are alternately adjusted over their furnace A¹, and the juice in them is prepared for the coolers by a continuous process. By thus arranging two swinging pans to operate alternately there will be a continuous stream of juice flowing into the pan B at one end and out of this pan at the other end; consequently there will not be a superfluity of juice in said pan B. It will be seen that the partitions *b* are gradually shortened in depth from a point near the middle of the length of the pan B to its front end. This is for the purpose of causing the scum to flow toward the front part of the pan, over the partitions, while the juice when boiling flows backward beneath these partitions.

My invention is applicable to portable furnaces as well as to stationary furnaces made of masonry.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is—

1. The cellular arch *c*, constructed with lugs *c*² and ears *c*³ *c*³, and applied to the furnace A, substantially as described.
2. The double discharge oscillating tube *a* applied to the evaporating pan B, substantially as described.
3. The bridge N beneath the rear compartments of the pan B and between the fire-wall *k* and chimney A², substantially as described.
4. The swinging finishing-pans C C', in combination with the supplementary furnace A¹, and the double discharge-pipe *a* leading from the pan B, substantially as described.
5. The combination of the two independent furnaces A A¹, the clarifying-pan B, the two swinging pans C C', and a hoisting apparatus for the latter, substantially as described.
6. The partial cover *d* for the swinging finishing-pans C C', substantially as described.

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Witnesses:

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(108.)