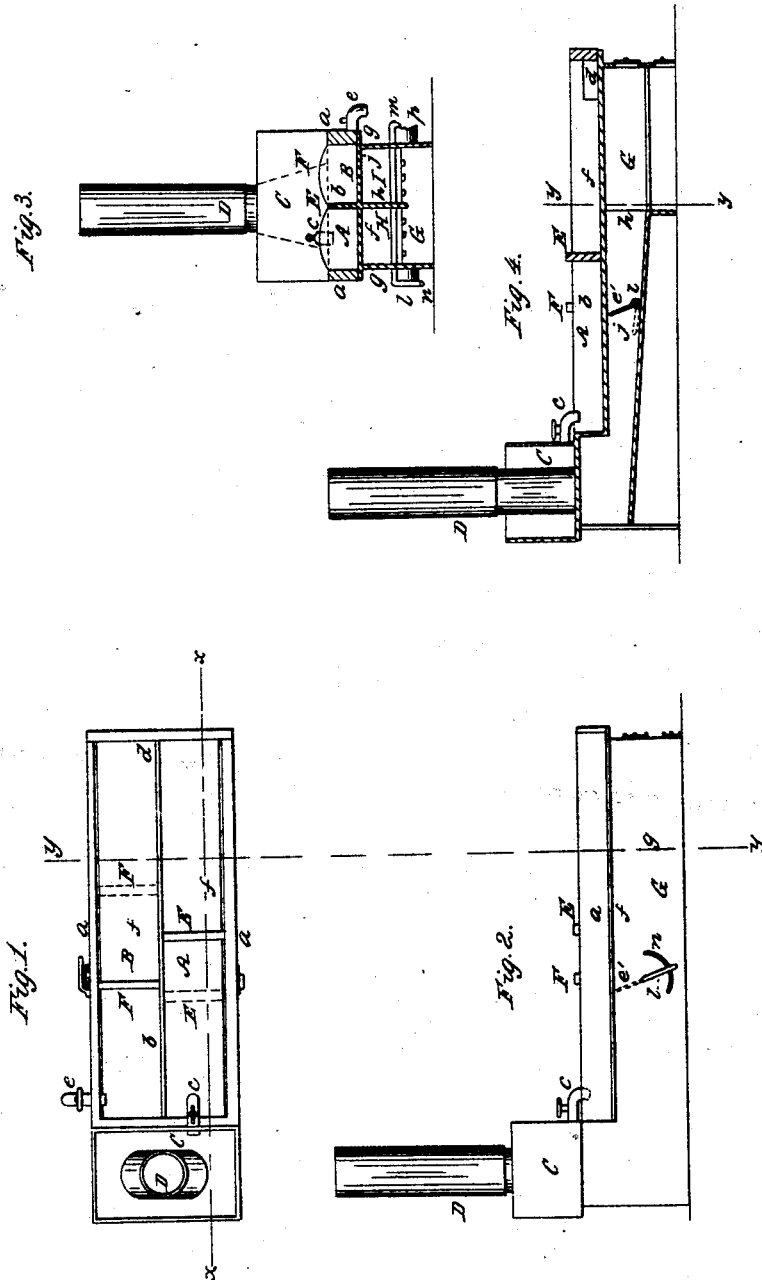


D. J. POWERS.  
Sorghum Juice Evaporator.

No. 45,433.

Patented Dec. 13, 1864.



Witnesses:  
E. P. Hudson  
J. F. Wood ad

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By his atty  
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# UNITED STATES PATENT OFFICE.

D. J. POWERS, OF MADISON, WISCONSIN.

## IMPROVED SORGHUM-JUICE EVAPORATOR.

Specification forming part of Letters Patent No. **45,433**, dated December 13, 1864; antedated November 30, 1864.

### *To all whom it may concern:*

Be it known that I, D. J. POWERS, of Madison, in the county of Dane and State of Wisconsin, have invented a new and Improved Evaporator for Sorghum and other Sirups; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification—

Figure 1 being a plan of my improved sorghum-sirup evaporator; Fig. 2, a side elevation thereof; Fig. 3, a transverse vertical section of the same in a plane indicated by the line *yy*, Figs. 1, 2, and 4; Fig. 4, a longitudinal vertical section in a plane indicated by the line *xx*, Fig. 1.

Like letters designate corresponding parts in all of the figures.

I employ two long shallow evaporating-pans, A B, or divisions of one pan separated by a longitudinal partition, *b*, through which pans the sirup passes successively, first, from the receiver C through a spigot, *c*, into and along the first pan, A, and from this through an opening, *d*, in the partition *b* at the front end of the pans into and along the second pan or division, B, from which it is finally discharged through a spigot, *e*, or its equivalent. These pans are situated over a suitable furnace or fire-box, G, the products of combustion passing back through two flues, H I, respectively, under the two pans A B, and separated by a partition, *h*, directly beneath the partition *b*.

The smoke-pipe D, through which the products of combustion are discharged, extends up through the receiving-vessel C, and thus is utilized a portion of heat which otherwise would be wasted in raising the raw sirup to a temperature sufficient for immediate evaporation before it enters the evaporating-pans.

I make the outer sides, *a a*, of the evaporating-pans of wood, the bottom of the pans being of metal, and projecting outward laterally beyond the sides of the furnace beneath, so that the wood will not be directly over the heating-surface. The object of the wooden sides is to keep the bottom of the pans from warping and bending by expanding more than the sides. The wood being free from the bottom, and still by its swelling keeping the

joints tight, obviates all the difficulties in the use of long pans.

I divide the pans A B into two or more compartments each by means of movable and removable cross-partitions E F, which fit tightly between the sides *a a* and partition *b*. They may be made of wood, and in order that they may be readily removed, though fitting closely, the sides *a a* may slope a little inward, as indicated in Figs. 1 and 3, so that the partitions will wedge in between them and the central partition, *b*, which may also slope in like manner, if desired. These partitions E F are not only removable and replaceable, but they may be shifted to different positions, as indicated by the black and red lines in Fig. 1. Their use is twofold:

First. They enable me to evaporate the sirup in successive batches and stages of progressive degrees of concentration from the first compartment, into which the raw sirup is received from the heating-receiver C, to the last compartment, from which the concentrated sirup is drawn off at the outlet *e*; and not only this, but I am thereby enabled to retain the sirup successively in the different compartments just as long as required to advance the evaporation as far as proper in each successive compartment. The compartments may be varied in length, as occasion may require, by shifting the positions of the partitions E F, as shown by red lines in Fig. 1.

Second. Not only do these partitions E F serve as partitions, but when they are moved or removed to pass the sirup on they serve as scrapers to force the sirup forward by turning them a little obliquely to a right-angled position till they are free to move along, and then pushing them forward with the sirup before them. They thus serve the purpose of scrapers better than separate scrapers can, since, being always in position, they do not allow the sirup of adjacent compartments to become mingled together.

In connection with the above-described manipulation of the sirup by means of the movable partitions E F, I arrange the flues H I and the dampers *i j*, by which the passage of the products of combustion through them is controlled so as to produce just the degree of heat under the successive compartments of the

evaporating-pans A B most suitable for the progressive evaporation therein. The dampers *i j* are not only arranged so as to wholly open or wholly close the flues, but so that they will afford any intermediate degree of opening and closing required, and thus regulate the degree of heat to a nicety. I keep these dampers in any position, and indicate the same to the outward view by having the handles *l m* of their shafts spring into different notches of circular notched plates *n p*, respectively, so as to be retained thereby in that position wherein they may be placed at any time, substantially as shown in the drawings. Any equivalent of this arrangement may be used.

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

1. The arrangement of a series of movable close partitions, E F, in an elongated pan or divisions, A B, thereof, acting also as scrapers

to move the sirup forward, whereby the evaporation is conducted to any desired extent and with any degree of rapidity, the process being under perfect control, substantially as herein specified.

2. In combination with the movable close partitions E F, arranged in double pans or divisions A B, the arrangement of the dampers *i j*, minutely adjustable to different positions to regulate the flues respectively under said pans or divisions, so as to hasten or retard the evaporation at the earlier or advanced stages with the utmost exactness, substantially as herein specified.

The above specification of my improved sorghum-juice evaporator signed by me this 22d day of March, 1864.

D. J. POWERS.

Witnesses:

THOMAS H. GODDING,  
CHARLES W. ASKEW.