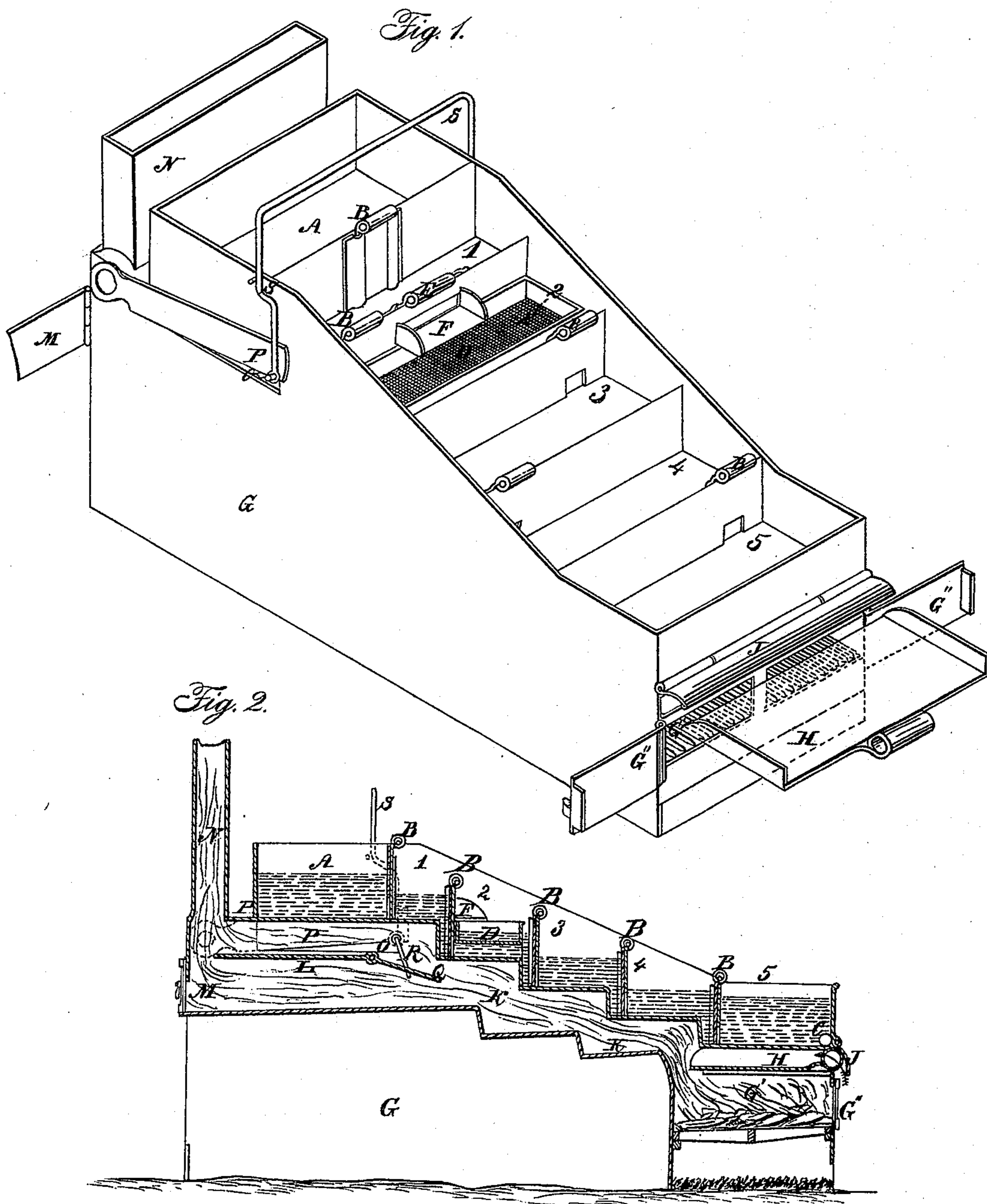


D. I. DURFEY.

Evaporating Pan.

No. 24,016.

Patented May 17, 1859.



Witnesses:

*Elihu M. Dowell*  
*A. P. Council*

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# UNITED STATES PATENT OFFICE.

DANIEL INGHAM DURFEY, OF CROTON, OHIO.

IMPROVEMENT IN APPARATUS FOR EVAPORATING SACCHARINE JUICES.

Specification forming part of Letters Patent No. 24,016, dated May 17, 1859.

*To all whom it may concern:*

Be it known that I, DANIEL INGHAM DURFEY, of Croton, Licking county, Ohio, have invented new and useful Improvements in Saccharine-Evaporators, of which the following is a full and exact description, reference being had to the accompanying drawings, making part of this specification.

My invention relates to a construction and arrangement of evaporating apparatus, whereby the speedy concentration of the sirup is effected without liability of burning.

Figure 1 is a perspective view of a series of pans and their appurtenances embodying my improvements. Fig. 2 is a longitudinal section thereof.

The pans A 1 2 3 4 5 are rectangular in form, and are so set in the masonry of the furnace G as to form an inclined range, commencing with the final concentrator or "teache" 5, and thence rising, step by step, to the clarifier A, which receives the crude juice from the mill. Sluices B, placed alternately on the right and left, down the range, enable the concentrated sirup to be drawn off from the bottom of each pan to that of its immediate successor in the range, their alternate arrangement preventing a too direct discharge of sirup in case several sluices should be open at once. A small portion of the bottom of each pan on its discharging side is made of equal depth with its immediate successor in the range, so as to create a circulation in which the more concentrated juice, as fast as formed, flows into the well thus provided, and, having only a very small portion or surface of its volume presented to the action of the fire, is thereby saved from being burned or caramelized, while at the same time the less concentrated juice may be exposed in a thin or shallow sheet or film to the action of the flame in often or constantly renewed installments, which is, under the conditions or circumstances, found most effective for uniform evaporation. The juice, in passing from the clarifier A to the pan 1, is caught in a strainer, D, which, arresting the grosser portions of the scum and feculent matters, enables them to be ladled back again into the clarifier.

G' is the fire-place; G'', its doors.

H is a damper adapted to be slid beneath the bottom of the teache 5. This damper is used in several different ways, according to

the changing requirements of the sirup. When an excessive heat is required to the bottom of the teache, as at the first commencement, the damper H is withdrawn entirely and its place of insertion in the fire-front closed by a door, J. When the damper is inserted inversely to the position represented in the drawings, it modifies the heat and presents it to the bottom of the pan at a uniform temperature throughout the entire surface. When it is necessary for the juice or sirup in the teache to be protected wholly from the action of the fire—as for cooling down before drawing off—the damper is inserted in the position shown in the sectional view, so as, while excluding the fire, to admit a stream of cold air between the damper and the teache bottom, as indicated by arrow. The damper H can also be used to contract the mouth of the flue K, so as to damp the fire and to reduce the temperature of the flue beneath the upper pans. The top of the flue K is formed by the gradually-ascending surfaces of the bottoms of the upper pans, and the bottom of the flue K, being parallel thereto, has a corresponding shape. This form and arrangement of the flue facilitates the draft and holds the heated products of combustion well up to the pans. The upper part of the flue, immediately beneath the clarifier, has a transverse partition, L. It has also on each side a rectangular opening or passage, O, to the external air. Each opening O is guarded by a valve, P, which may be hinged to the outside of the flue, as shown.

Hinged to the partition L is a damper, Q, corresponding to the whole area of the flue at this place. The air-valves P and damper Q are connected together by links R, so that an opening of the air-passage O is, by means of the rods S, accompanied by a corresponding closure or partial closure of the damper Q, and vice versa. These simultaneous movements of the damper Q and air-valves P act very effectually to cool down the contents of the clarifier, so as, as much as possible, to discharge only clear liquor into the pan 2.

M is a flue-door.

N is the smoke-stack.

This apparatus under careful management produces sirup free from all taint of scorching, being of a pale amber or golden hue, comparable to new honey.

I claim herein as new and of my invention—

1. A descending series of evaporating-pans, each having a well or depression on the side next its immediate successor in the range, closable by sluices, substantially as set forth.

2. The arrangement of the sluices B alternately on the right and left of the range, when used in the described combination with the wells or depressions above referred to, for the purpose set forth.

3. The strainer D in the described combination with the clarifier A, operating in the manner and for the purpose set forth.

In testimony of which invention I hereunto set my hand.

DANIEL I. DURFEY.

Witnesses:

WM. F. SCOVEL,  
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