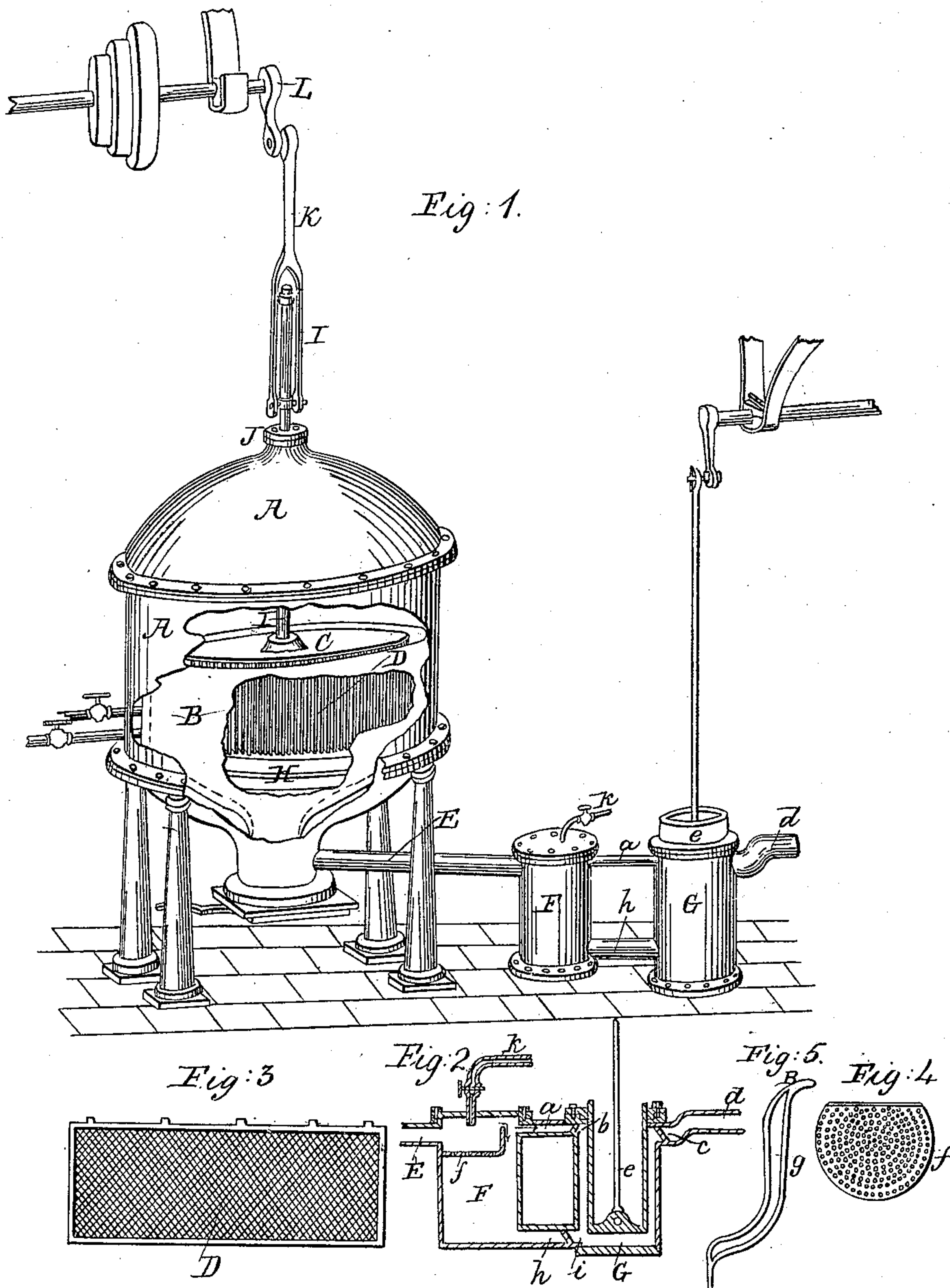


J. A. SOUTHMAYD.
Vacuum Pan for Evaporating.

No. 34,651.

Patented March 11, 1862.



Witnesses.
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Daniel Cronin

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JOHN A. SOUTHMAYD, OF JERSEY CITY, NEW JERSEY.

IMPROVEMENT IN VACUUM-PANS FOR EVAPORATING.

Specification forming part of Letters Patent No. 34,651, dated March 11, 1862.

To all whom it may concern:

Be known that I, JOHN A. SOUTHMAYD, of Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Evaporators; and I do hereby declare the following to be a full and exact description of the same, reference being had therein to the drawings which accompany this specification and make part of the same.

The nature of my invention consists, first, in constructing and arranging tight evaporating-pans so as to carry off all the condensed vapor, effectually preventing the return thereof to the body of the liquor from which it has exuded; secondly, in a means of an increase of surface for evaporating and of regulating the same; thirdly, in such a construction as will admit of the employment of a high or low temperature, as may be desired, and, lastly, in an improved condenser and exhaust-pump, which assists in removing the carbonic and other gases and the air that tend to neutralize a vacuum.

In the drawings, Figure 1 represents a vacuum-pan adapted to the evaporating required in the process of refining sugar; Fig. 2, the condenser and exhaust-pump shown in section; Fig. 3, one of the leaves of the plunger used to increase the evaporating-surface; Fig. 4, the perforated plate of the condenser, and Fig. 5 is part of a double-jacket pan in section.

The same letters designate the same parts in each figure.

An air-tight outer case, in which a vacuum can be formed, is shown at A, with a hole broken through it to show the separate pan B in its inside, and through a rent in the side of the pan B can be seen the plunger C with its leaves D. The exhaust from the inside of the case A is at the bottom, through the pipe E to the condenser F and the pump G.

In all evaporating-pans in a vacuum which have a connection with the outer case the condensed vapor which accumulates in the inside of necessity drops back into the liquor in the pan, and has to be vaporized again and again. By an entire disconnection of the inner and the outer pans, A and B, except at the bottom, through which the charge is withdrawn, and necessary supports to keep the inner pan equidistant from the outer, the vapor which

condenses in the arched top and on the sides of the case A runs down outside of the pan B, and flows freely through the pipe E to the condenser F and into the pump G, and thus of course effects a saving of both the time and fuel needed to create vapor from the same liquor repeatedly. The inner pan, B, is constructed in the manner termed technically "double-jacketed"—that is, a space, *g*, between the outer and inner surface of the pan is provided for admitting steam or water, as required, or both together when operating at low temperatures as desired. (See Fig. 5.) By the detachment of the inner pan, B, from the outer case, A, the temperature outside the pan is higher than that of the liquor in the pan, and therefore there must be less loss of heat by radiation than when the inner pan, B, has its outer surface in contact with the air in the ordinary manner.

It will be seen that the two advantages—first, that of preventing repeated evaporations of a portion of the liquid, and, secondly, that of decreasing loss of heat by outer radiation—will be obtained whether single or double inner pans be used.

For the presentation of an increased amount of surface to facilitate evaporation, the plunger C is introduced into the vacuum-pan A. This plunger consists of a plate or a grating, if so chosen, corresponding in form with the circular, oblong, or square form of the pan B, to which is attached a series of plates or leaves, D, and Fig. 3, with a space between each. This plunger is secured to the rod I. The rod working in the packing or stuffing box J is connected to the rod K and crank L, by which a perpendicular motion is communicated to the plunger, alternately dipping and withdrawing the leaves or plates D, exposing that which adheres to their surfaces to the action of the vacuum-pump G.

By making the crank L adjustable the depth of dip can be regulated, and by use of a cone of pulleys the speed can be regulated, and the motion of the plunger can be suspended when necessary so to do. The leaves may be either plates or wire-netting, as deemed best.

By the detachment of the outer pan, A, and inner pan, B, the vacuum-pump has the advantage of drawing from below, so that all inner condensation is with ease extracted, and, as the water never fills the exhaust-pipe E,

steam, gases, and air are also drawn through it by the action of the vacuum-pump G.

To insure the evacuation of the carbonic and other gases and the expulsion thereof, with the air that always accumulates more or less in vacuum-pans, and which materially decreases the vacuum when suffered to remain, an additional pipe, *a*, with an easy operating valve, *b*, is provided, so that the air and gases may pass into the pump above the water and be ejected before or with the water through the valve *c* and pipe *d* of the pump G by the downstroke of the piston *e*. The exhaust-pipe *d* of the pump G is bent upward, so that backwater insures the valve *c* being air-tight. The condenser F, interposed between the pan and the pump, receives the condensed vapors on the perforated plate *f*, (or Fig. 4.) This plate, not covering the entire area of the condenser, thereby affords a free passage of the steam or vapor to the pipe *h* and valve *i* and the pump G. The condensed

steam, with the addition of a jet of water from the pipe *k* falling in a shower, condenses the most of the remaining vapor in its passage to the pump.

Aware that plungers or lifters have been used for absorbing purposes, I do not broadly claim them.

What I claim, and desire to secure, is—

1. The plunger or lifter, when constructed and operated in combination with evaporating-pans, as hereinabove specified.

2. Evaporating-pans constructed and arranged in the manner and for the purpose hereinabove set forth.

3. The condenser and pump, constructed in the manner described, in combination with pans used for evaporating purposes.

JOHN A. SOUTHMAYD.

Witnesses:

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