J. SUTTON.

Evaporating Apparatus.

No. 26,717. Patented Jan'y 3, 1860.

Fig. 1.

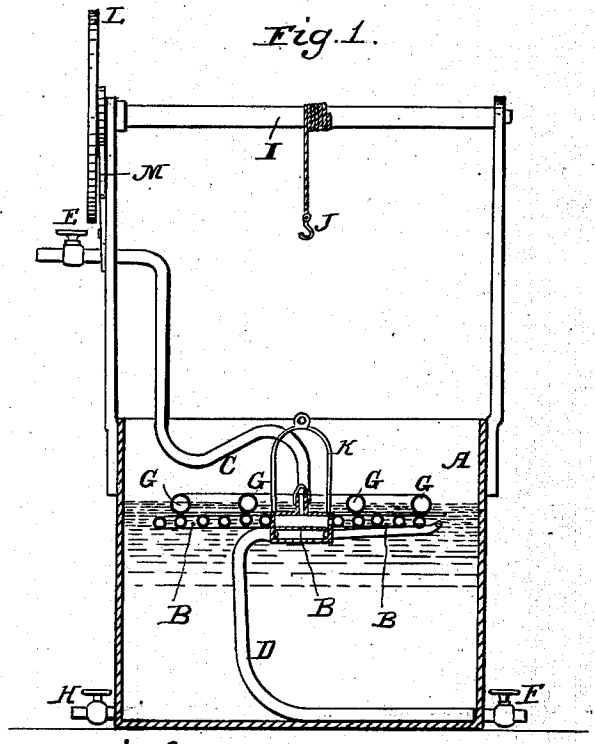
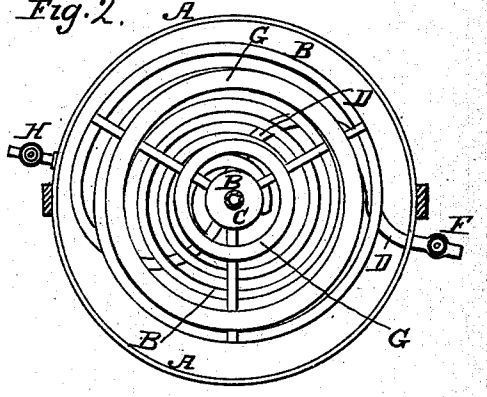


Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

JOHN SUTTON, OF NEW YORK, N. Y.

IMPROVEMENT IN APPARATUS FOR EVAPORATING.

Specification forming part of Letters Patent No. **26,717**, dated January 3, 1860.

To all whom it may concern:

Be it known that I, JOHN SUTTON, of the city, county, and State of New York, have invented certain new and useful Improvements in Apparatus for Evaporating Juices and Solutions; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical section of an evaporating apparatus with my invention applied. Fig. 2 is a plan of the same with the portion above the pan removed.

Similar letters of reference indicate corresponding parts in both figures.

My invention consists in so applying a steam-coil or other heater, in combination with an evaporating pan or vessel, that it shall be capable of floating upon or in and at or as near as may be desired to the surface of the liquid, and hence of causing the evaporation to take place constantly at the surface or at the same distance therefrom, whatever may be the depth or quantity of the liquid in the vessel, by which means some important advantages are obtained over the usual mode of applying steam coils or heaters for evaporating purposes.

My invention further consists in the employment, in combination with a steam-coil or other heater that is capable of floating upon or in the liquid in an evaporating-vessel, of means of elevating the same above the surface of the contents of the vessel, or of sustaining the same at various distances below the surface of the contents of the vessel, to permit such manipulations or produce such effects as may be desirable.

To enable others skilled in the art to which my invention is applicable to apply and use my invention, I will proceed to describe its construction and operation.

In the apparatus represented, the evaporating-vessel A consists of an open pan, and the heater B consists of a steam-coil. C is the steam-pipe, and D the pipe for letting off the water of condensation from the heater, both made of flexible material, to permit the rising and falling of the heater, the pipe C entering the vessel at the top, and being furnished with a cock, E, to regulate the supply of steam, and the pipe D connecting with an outlet-cock, F, close to the bottom of the vessel, for regulating the escape of the water of condensation. The heater is represented as being furnished with hollow metal floats G G, of circular form, which keep it floating just below the surface of the liquid; but instead of being thus furnished with floats, it may be made of itself buoyant enough to float or be suspended and balanced by weights or any suitable means to keep it at the surface of the liquid, or at a desirable distance above or below the said surface. H is a cock near the bottom of the pan, for drawing off its contents.

The heater may be heated by steam, hot air, or hot water, according to the nature of the liquid substance to be evaporated. It may be of other forms besides that of the coil—as, for instance, a gridiron series of pipes or a hollow circular disk.

In applying the floating heater to a close evaporating-vessel—a vacuum pan or still, for instance—the portion of the steam-pipe C immediately connected with the heater may be straight, and pass vertically through a stuffing-box in the center of the head of the pan, and the portion of the water-pipe D immediately connected with it may pass vertically through a stuffing-box in the bottom of the pan. Instead of the pipes of flexible material, metal pipes with working elbow-joints may be used.

Among the advantages of making the heater float near the surface of the liquor the following may be enumerated: First, the evaporation may be commenced almost immediately when the steam or other heating medium is let into the heater, thus economizing time; second, less fuel is required to evaporate a given quantity of liquid than by a heater that is stationary near the bottom of the vessel, as the liquid is boiling only near the surface, while the lower strata are comparatively cool, and thus comparatively little heat is lost by radiation from the sides and bottom of the vessel; third, in the manufacture of sugar and some other products a better quality of product is obtained, as the heat, being at the surface, is surrounded only by the thin watery portion of the juice or liquid, which alone is evaporating while the crystallizable or denser particles fall from the heat to the bottom, where the vessel is comparatively cool and where they consequently

cannot be affected by a too great heat, or be reboiled.

I, Fig. 1, is a windlass arranged over the pan, with a rope or chain, J, to connect the heater, which is represented as being made with a bow, K, to attach the said cord or chain. This windlass is furnished with a ratchet-wheel, L, to be engaged by a properly-applied pawl, M. This windlass serves to withdraw the heater out of the liquid, or to raise it entirely above the pan, if necessary for the purpose of facilitating the discharge of the contents of the pan, or the cleaning out of the pan or of the heater, or of permitting the repair of the pan or heater or their connections. It may also serve, if the heater be properly loaded, to prevent it floating, to suspend the heater at any desired distance below the surface of the liquid or above the bottom of the pan, as may be desirable in certain processes or at a certain stage of any process.

Instead of the windlass I and rope J, an endless chain or band may be arranged to run over a pulley above the vessel, and a pulley within and near the bottom thereof, and the heater, so connected with the said band or chain that by working the upper pulley it (the heater) may be elevated above or depressed as far as desirable below the surface of the liquid, and so secured by a properly-applied ratchet and pawl. This chain or band, when the pawl is disengaged from its pulley, need not interfere with the floating of the heater when it is desired to float. Other arrangements of hoisting apparatus may be employed in connection with the heater.

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

1. So applying a steam-coil or other heater, in combination with an evaporating-vessel, that it may be independent of the vessel in its action, and may float in and rise and fall with the surface of the liquid in the vessel, substantially as and for the purpose herein described.

2. The employment, in combination with a so-applied heater, of means of elevating it wholly above and depressing it wholly below the surface of the liquid, as may be desired, substantially as and for the purposes herein specified.

JOHN SUTTON.

Witnessses:
R. S. SPENCER,
WM. TUSCH.