GEORGE CLARK.

Improvement in Processes and Apparatus for Purifying Brine and other Liquids.

No. 115,573. Patented June 6, 1871.

Fig. II.

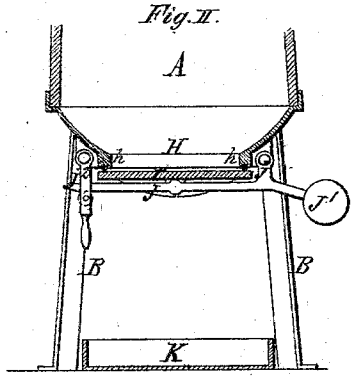
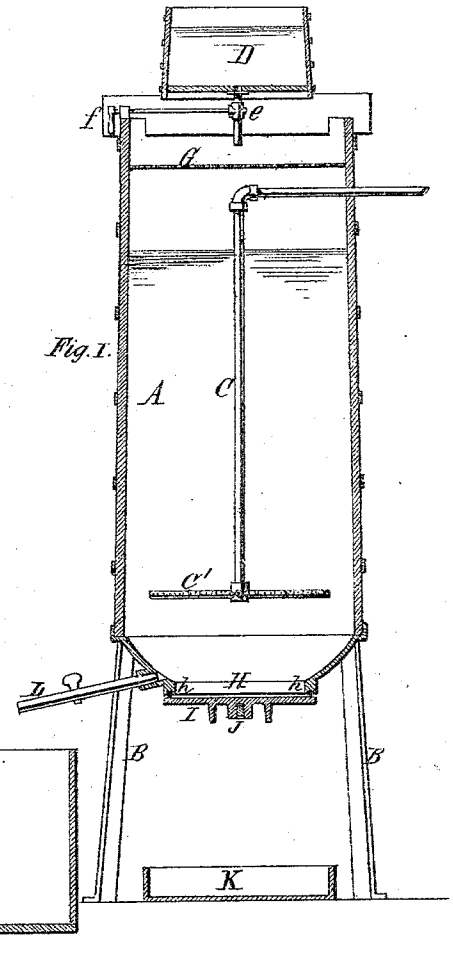
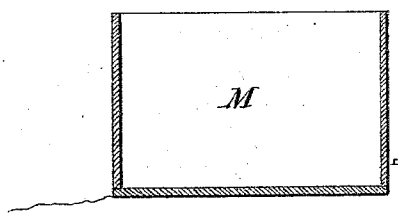


Fig. I.





Witnesses

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UNITED STATES PATENT OFFICE.

GEORGE CLARK, OF BUFFALO, NEW YORK.

IMPROVEMENT IN PROCESSES AND APPARATUS FOR PURIFYING BRINE AND OTHER LIQUIDS.

Specification forming part of Letters Patent No. 115,573, dated June 6, 1871.

I, GEORGE CLARK, of the city of Buffalo, in the county of Erie and State of New York, have invented certain Improvements in Process and Apparatus for Purifying Brine or other Liquids, of which the following is a specification:

My invention relates to the separating of those impurities in liquids, and especially in brine, which have a greater specific gravity than the liquid itself, by precipitating them to the bottom of the vessel. The invention consists, first, in the process of heating the brine or other liquid in a vessel to a temperature a little below the boiling-point, so as to lessen the density of the same, and then, by applying a shower of cold liquid to the surface of the heated liquid, suddenly reduce the temperature thereof, which thereby increases the density and gravity of the liquid at the surface, and thus induces a descending current that carries with it the heavier impurities, which, being once set in motion, continue to settle, by reason of their greater gravity, to the bottom of the vessel; second, in the arrangement, at the top of a vessel provided with suitable means for heating the liquid contained therein, of a suitable apparatus for applying a shower of cold liquid to the surface of the heated liquid in the vessel below.

In the accompanying drawing, Figure I represents a sectional elevation of my improved apparatus; Fig. II, a vertical section of the lower portion of the vessel in which the separation is to take place, made at right angles to that of Fig. I.

Like letters designate like parts in each of the figures.

A is the vessel containing the brine or other liquid to be heated, and in which the precipitating of the impurities is to take place. To insure the best results this vessel should be of considerable height, and is represented as supported on legs B, so as to afford access to the under side of the bottom for removing the deposited impurities, as will be presently explained. This vessel may be heated by the injection of naked steam into it, or by means of a steam-jacket or other suitable means, a steam-pipe, C, with perforated coil C′, being the means shown in the drawing. D represents a tub or reservoir arranged over the top of the vessel A, for holding the cold liquid. It is provided at its bottom with a stop-cock, *e*, operated by a lever, *f*. G is a perforated diaphragm arranged in the vessel A near the top, onto which the liquid from the tub D is discharged and diffused so as to pass through the same in a shower upon the surface of the heated liquid below when required. Instead of this perforated diaphragm a rose-jet may be attached to the cock *e*, although I prefer the diaphragm, as shown. The cold-liquid reservoir may also be arranged above and at one side of the top of the vessel A, and have a pipe connect therewith, instead of being arranged directly over the top, as represented. The bottom of vessel A is provided with a valve-opening, H, surrounded by a downwardly-projecting flange, *h*, in which a packing-ring, of rubber or other suitable material, is inserted. This opening is closed by a disk or plate, I, pivoted at the center to a lever, J, which is hinged at *j* and provided with a counterpoise, J′. This disk I is pressed upward against the packing by the lever J, which is secured in place by a hinged arm, j^2, the end of which is slotted so as to pass over the end of the lever, as shown in Fig. II. Any other suitable means for securing the valve may be employed. K is a pan arranged beneath the opening H to receive the impurities which settle in the bottom of the vessel A on the valve I. L is a pipe provided with a stop-cock, and piercing the vessel A at a point a little above the bottom, through which the purified brine or other liquid above the impurities is drawn off into a reservoir, M, arranged below and at one side, as shown.

The operation of my invention is as follows: The brine or other liquid containing, in suspension, the impurities to be precipitated, is heated in the vessel A, which rarefies the liquid and predisposes the heavier impurities to gravitate toward the bottom. The stop-cock in the bottom of the reservoir D is now opened and a quantity of the cold liquid let fall upon the perforated diaphragm, through which it is showered upon the surface of the heated liquid below, suddenly cooling and condensing the same, which causes it to descend toward the bottom, setting in motion the suspended impurities, which are thereby, owing to their greater specific gravity, readily precipitated to the bottom. The purified liquor above is

then drawn off through the pipe L, and the precipitated impurities discharged through the opening H into the pan beneath, as hereinbefore described.

What I claim is—

1. The process of precipitating the heavier impurities held in suspension in liquids by first heating the liquid in a suitable vessel to rarefy the same, and then applying a shower of cold liquid to the surface thereof, as hereinbefore set forth.

2. The combination, with the vessel A, provided with steam-pipe and coil C C′, or equivalent means for heating the liquid therein, of the cold-liquid reservoir D and perforated diaphragm G, or equivalent means, arranged so as to enable a cold liquid to be showered upon the surface of the heated liquid in A, substantially as and for the purpose hereinbefore set forth.

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Witnesses:
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