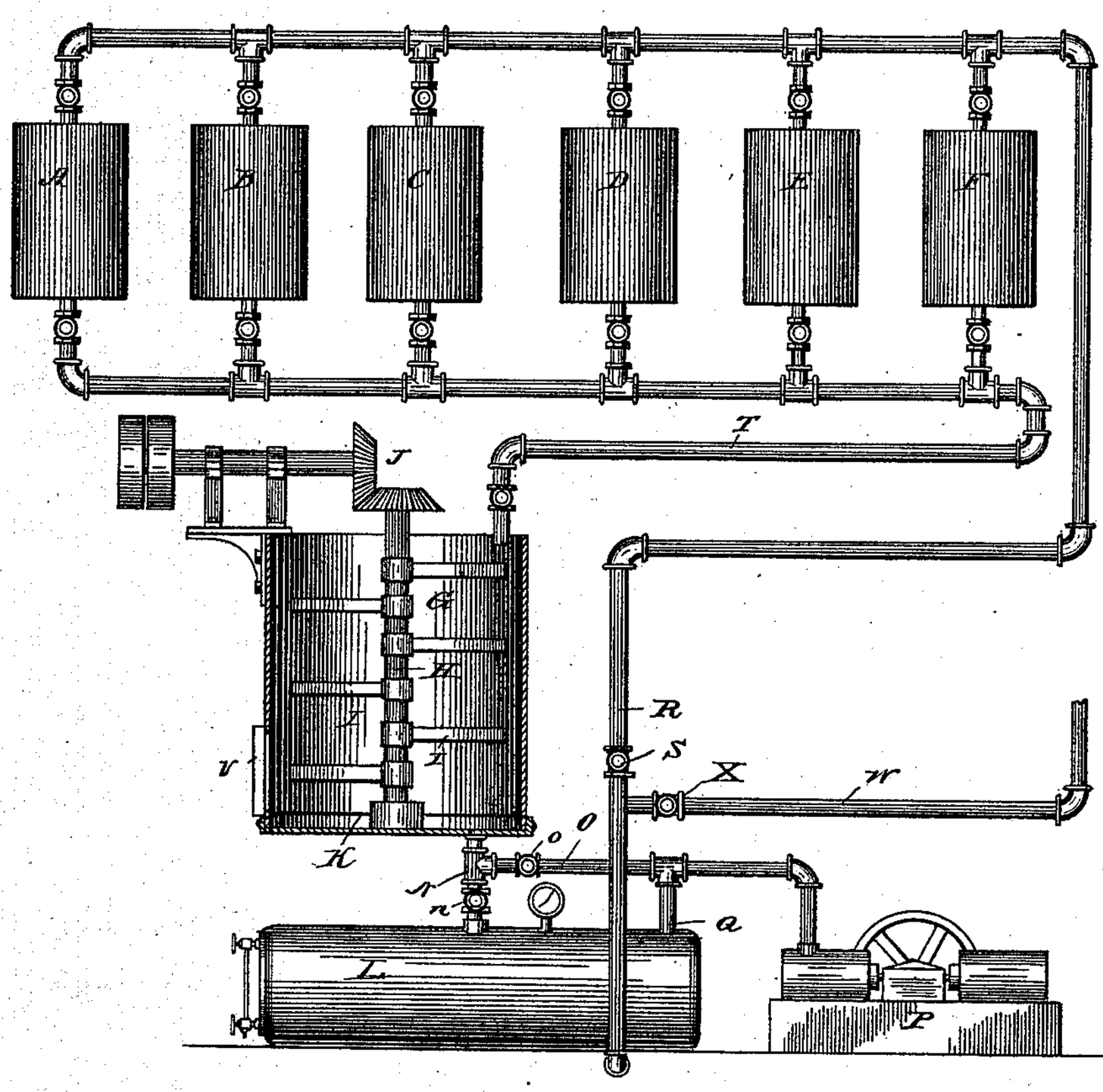
(No Model.)

A. DOMEIER & O. C. HAGEMANN.

PROCESS OF PURIFYING SALT RECOVERED FROM SPENT SOAP LYES.

No. 413,616. Patented Oct. 22, 1889.



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UNITED STATES PATENT OFFICE.

ALBERT DOMEIER AND OTTO CHRISTIAN HAGEMANN, OF LONDON, ENGLAND, ASSIGNORS TO JAMES S. KIRK & CO., OF CHICAGO, ILLINOIS.

PROCESS OF PURIFYING SALT RECOVERED FROM SPENT SOAP-LYES.

SPECIFICATION forming part of Letters Patent No. 413,616, dated October 22, 1889.

Application filed December 21, 1888. Serial No. 294,307. (No specimens.)

To all whom it may concern:

Be it known that we, ALBERT DOMEIER, merchant, and OTTO CHRISTIAN HAGEMANN, mechanical engineer, both of London, England, have invented a new and useful Process of Washing or Purifying the Salt Recovered from Spent Soap-Lye During the Manufacture of Crude Glycerine therefrom, of which the following is a specification.

The salt which is thrown out of solution during the concentration of soap-lye for the manufacture of crude glycerine and in the distillation of such crude glycerine is contaminated with the lye or crude glycerine as an impurity; and the object of this invention is to recover such lye or glycerine from said salt and at the same time free the salt from these impurities and render it clean and merchantable and fit for use again in the manufacture of soap.

In carrying out our process we may make use of the improved apparatus shown in the accompanying drawings, which process we will describe in connection with the description of said apparatus; but said apparatus will form the subject-matter of another application for Letters Patent.

A B C D E F are small tanks or tubs placed at a higher elevation than cylinder G, within which latter is journaled a vertical rotatable shaft H, having blades or mixers I I. The shaft H is revolved by means of gearing J in order to mix the contents of cylinder G.

K is a false bottom of the nature of a sieve, composed of a perforated metal plate covered with wire-gauze or canvas, or both. A second perforated plate may be placed on top of the gauze or cloth for protection of same from abrasion. Below the level of the sieve is placed a closed cylinder or vessel L, which communicates with cylinder G by a pipe N, fitted with a valve *n*, and a branch pipe O therefrom, also fitted with a valve *o*, leads to an air-pump P, capable of producing air pressure or vacuum in cylinder L. Another branch pipe Q communicates also with cylinder L. A pipe R, fitted with valve S, leads from the bottom of cylinder L to top of tanks A F, with a valve over each tank, as shown. Cylinders A F communicate with the main pipe T, leading to top of cylinder G.

V is a door to cylinder G for the purpose of taking out the purified salt.

A branch pipe W, fitted with a valve X, as shown, leads to a store-tank, referred to hereinafter.

We operate this apparatus to perform our processes as follows: The mixture of salt and lye or glycerine is placed in the cylinder G and the mixer revolved to mix the mass thoroughly, and this may be assisted by forcing in air by means of pump P through the pipe O. The cylinder L is then exhausted by the air-pump P, and at the same time valve N is opened (the other valves being closed) and the glycerine or lye adhering to the salt for the most part drawn through pipe M into cylinder L. Valve N is then closed and valve X opened, and the glycerine or lye forced to store-tank through pipe W by means of air-pressure from pump P. The vessels A F are charged with a saturated aqueous solution of common salt. The lower valve of tank A is opened and the solution allowed to flow into the salt in cylinder G. The whole is then mixed together by mixers I. Valve N is then opened and the liquor drawn into cylinder L by means of the air-pump P. Valve N is then closed and valve X opened, and the liquor forced by means of the pump P through pipe W to the store-tank. The liquor from B is now allowed to flow down to the salt in cylinder G and mixed with the salt therein, the valve N again opened, and the liquor drawn into cylinder L by the pump. The valve S is then opened and the liquor in L forced up into cylinder or vessel A. The liquor from C is now allowed to flow down into the salt in cylinder G, the shaft again revolved to mix the mass, the valve N again opened, and the liquor drawn into cylinder L by the pump. The valve S is then opened and the liquor forced up into cylinder B. The same operation is repeated with the liquor in each of the cylinders D, E, and F, finally leaving cylinder F empty. This is recharged with more of the solution of salt, which is allowed to flow down into the salt in cylinder G, mixed therewith, drawn into cylinder L, and forced therefrom into cylinder F. Air is now drawn through the salt in cylinder G until it is dry, or nearly so, when

door V is opened and the purified salt removed.

The foregoing describes the operation on the first batch of salt worked or purified in the apparatus. In the case of succeeding batches the operations are the same, the liquor from A, after being used to purify the salt, being forced direct into store-tank through pipe W, the liquor from B being (after use on the salt in the same way) forced into A, C into B, D into C, E into D, and F into E, leaving F empty to receive the last or finishing charge of solution of salt. It will thus be seen that the salt receives six successive purifications by solutions of salt, finishing always with a fresh charge of such solution, but only using one fresh charge for every batch of salt, resulting in economy of labor, as each charge of the aqueous solution is used a number of times (being entirely effective in repeated use) and requiring less evaporation in the final process than does the method where each charge of the solution is used only once.

We do not confine ourselves to the number of such purifications, as in some instances two or three are sufficient; but we have found six to be sufficient in all cases. We also employ for the purpose of salt-washing spent lyes treated and concentrated to salting-point, which means to the point where the treated lye just begins to be fully saturated with salt. In such case we apply a number of successive washings with such salting-point liquor, and, finally, one with pure brine. The lye or glycerine adhering to the salt when first placed in cylinder G is taken up or dissolved therefrom by the saturated solution of salt, (which will dissolve lye or glycerine, but, being already saturated with salt, is incapable of dissolving any more salt,) which becomes richer in lye or glycerine at each successive time of using, and eventually finds its way into the store-tank so described. At the same time the salt is thoroughly cleansed from adherent impurities by the successive treatments with solution of salt, being finally dried by the passage of air through it, as described, and rendered merchantable and fit for nearly every purpose for which salt is used.

We claim—

The herein-described process of purifying salt recovered from spent soap-lye during concentration or the manufacture of crude glycerine therefrom, which consists in subjecting a convenient quantity of the salt to a series of washings with separate charges of a saturated aqueous solution of salt, said charges containing decreasing quantities of glycerine in solution, the first of said charges being drawn off with its dissolved glycerine and a fresh charge of a saturated solution of salt free of glycerine added to the series in lieu thereof for each quantity of salt treated, said fresh charge being used for final treatment, whereby each quantity of salt is subjected to repeated washings and the separate charges of the solution are utilized repeatedly.

ALBERT DOMEIER.
OTTO CHRISTIAN HAGEMANN.

Witnesses:
MARTIN B. WALLER,
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A. G. MOSSARD.

Correction in Letters Patent No. 413,616.

It is hereby certified that Letters Patent No. 413,616, granted October 22, 1889, upon the application of Albert Domeier and Otto Christian Hagemann, of London, England, for an improvement in the "Process of Purifying Salt Recovered from Spent Soap-Lyes," was erroneously issued to James S. Kirk & Co. as sole owners of the said invention; that said Letters Patent should have been issued to said *Albert Domeier and James S. Kirk & Co. jointly*, each being owner of one-half interest, as shown by the record of assignments in this Office; and that said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 5th day of November, A. D. 1889.

CYRUS BUSSEY,
Assistant Secretary of the Interior.

[SEAL.]

Countersigned:

C. E. MITCHELL,
Commissioner of Patents.