

# UNITED STATES PATENT OFFICE.

EBENEZER KENNARD MITTING, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO ALBERT DOMEIER, OF LONDON, ENGLAND.

## PROCESS OF RECOVERING GLYCERIN AND SALT FROM SPENT SOAP-LYE.

SPECIFICATION forming part of Letters Patent No. 522,998, dated July 17, 1894.

Application filed August 3, 1891. Serial No. 401,489. (No specimens.)

### *To all whom it may concern:*

Be it known that I, EBENEZER KENNARD MITTING, a subject of the Queen of Great Britain and Ireland, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Processes of Recovering Glycerin and Salt from Spent Soap-Lye, of which the following is a specification.

10 The object of this invention is to provide an improved process for recovering glycerine and salt from spent soap lye.

I take the spent soap lye as it comes from the soap kettles and in case it contains an appreciable quantity of free alkali worth recovering in the form of soap, or is very dark colored owing to the presence of dissolved impurities, or if it contains much suspended impurity, I first treat it with a small percentage of caustic lime or its equivalent earthy or metallic oxide, or hydrated oxide. The effect of this treatment with lime is to clarify the liquor from impurities in suspension and from some impurities in solution and also to causticize the carbonated alkali present. In case the lye is of such quality that I employ the lime for the purpose of clarifying and purifying the lye only, I find the quantity of lime required is usually from one fifth to one third of one percent. by weight of the lye, while if the treatment with lime is intended to causticize the carbonated alkali present I usually find it necessary to employ from one half of one percent. to one percent. of lime and some times a little more, according to the amount of carbonated alkali present, and preferably heat the lye, (if it is not already sufficiently heated,) to or near its boiling point in order to facilitate the causticization. I allow the mixture to settle and remove the clear liquor from the precipitate by decantation or filtration. I next concentrate this clear liquor by evaporation to a more convenient bulk, for instance about two volumes into one, or otherwise, until it becomes nearly saturated with salts, and then (in case the lime treatment has been directed to the causticization of the carbonated alkali) boil it with fat or a fatty acid or rosin. The concentration and boiling with fat, fatty acid or rosin may be effected at one and the same time if preferred. By

this means the free alkali present in the lye is removed, or very nearly so, and the lye becomes nearly neutral. In cases where the lime treatment has been directed merely to the clarification and purification of the lye I omit the boiling with fat, fatty acid or rosin, and the concentration of the lye in such case is effected merely for convenience of handling.

In case the lye does not contain sufficient dissolved or suspended impurities or free alkali to render it desirable to employ the above named steps, or in case it is not convenient to adopt this preliminary treatment, I omit the same and proceed at once with the following treatment: I add to the lye bi-sulphate of soda (hydric-sodaic-sulphate) until no further turbidity or precipitate is produced. To determine when this point is reached I take a small sample of the liquor and filter it into a test tube and add to it a few drops of a clear solution of the bi-sulphate of soda. If the liquor remains perfectly bright sufficient bi-sulphate has been used, while on the other hand if any opalescence or turbidity appears, more is required. This treatment invariably requires sufficient of the bi-sulphate of soda to render the lye acid in reaction. During the operation I prefer to agitate the mixture thoroughly by the injection of air or equivalent means. This procedure effects thorough admixture and facilitates the formation and separation of the precipitate. I next remove the clear liquor from the precipitate by decantation or filtration heat it to about 80° centigrade and bring it to neutral point by adding an alkali (*e. g.* caustic soda or carbonate of soda) or an alkaline earth such as lime, (preferably in the form of milk of lime.) I filter or decant the clear liquor from the precipitate thus formed and concentrate it by evaporation until it boils at about 300° Fahrenheit, and thus produce crude glycerine fit for distillation. As the concentration progresses salts are deposited. During the earlier part of this operation such salt consists almost entirely of sulphate of soda (Glauber's salt), while as the liquor becomes more concentrated the deposited salt consists, mainly, of chloride of sodium. These salts I remove and wash from adhering glycerine liquor and render them available for use in the arts.



The above process has special advantages for use in localities where the bi-sulphate of soda can be procured cheaply as the by-product of acid factories, (in the form of "niter-cake," "salt cake") and no other active ingredient for treatment being required except lime which is almost everywhere available, or alkali, which is employed by every soap maker, while as is well known, sulphate of soda (Glauber's salt), a by-product of this process, has marketable value and is used by many soap makers for the purpose of hardening the cheaper kinds of soap, and the salt (chloride of sodium) recovered may be used over again indefinitely in the manufacture of soap.

I claim—

1. The improvement in the art of recovering glycerine and salt from spent soap lye which consists in adding to the lye bi-sulphate of soda, substantially as described.

2. The improvement in the art of recovering glycerine and salt from spent soap lye which

consists in adding to the lye bi-sulphate of soda, removing the precipitate thus formed, and then adding alkali, or an alkaline earth, substantially as specified.

3. The improvement in the art of recovering glycerine and salt from spent soap lye which consists in first adding to the lye bi-sulphate of soda, removing the precipitate thus formed, next adding alkali or an alkaline earth, and separating the clear liquor from the precipitate, substantially as specified.

4. The improvement in the art of recovering glycerine and salt from spent soap lye which consists in adding to the lye bi-sulphate of soda, removing the precipitate thus formed, then adding alkali or an alkaline earth and removing the precipitate and concentrating the clear liquor, substantially as specified.

EBENEZER KENNARD MITTING.

Witnesses:

FREDERICK C. GOODWIN,  
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