UNITED STATES PATENT OFFICE.

FRANCIS J. O'FARRELL, OF DUBLIN, IRELAND.

METHOD OF SEPARATING GLYCERINE FROM SPENT SOAP-LYES, SALINE, AND OTHER SUBSTANCES.

SPECIFICATION forming part of Letters Patent No. 266,504, dated October 24, 1882.

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To all whom it may concern:

Be it known that I, FRANCIS JOSEPH O'FARRELL, of Dublin, Ireland, Fellow of the Chemical Society of London, a subject of the United Kingdom of Great Britain and Ireland, have invented a new and useful Method of Separating Glycerine from Spent Soap-Lyes, Saline, and other Substances; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

The object of my invention is to effect the separation of glycerine from the salt, caustic, and carbonated alkalies with which it is mixed in the spent lyes of soap-works, and also the recovery and utilization of the salt, caustic, and carbonated alkalies, with a view to lessening the cost of the production of the glycerine.

The method by which I carry out my invention is as follows: The tallow, palm-oil, or other neutral fats which are generally used in the manufacture of soap are saponified in the ordinary manner by means of soluble caustic alkalies of the required density. When saponification is complete the glycerine is separated from the stearate and oleate of soda, (or soap,) together with the excess of water, caustic and carbonated alkalies, by means of common salt. Now, I propose to evaporate the spent lye thus obtained immediately it is drawn off from under the soap by means of fire heat or dry steam applied in any suitable and convenient manner till a saturated aqueous solution of common salt is obtained, (which can readily be ascertained by determining its specific gravity by means of a hydrometer,) and this saturated solution I proceed to use for the purpose of separating the glycerine from a fresh portion or second charge of soap, when I again evaporate the spent lye obtained from this fresh portion or second charge of soap in the manner applied to the lye obtained from the first charge of soap, and I again return the aqueous solution thus obtained to the soap-pan for the purpose of separating the glycerine from a third charge of soap, when I again evaporate the lye obtained therefrom and proceed as before, thus repeating the process in this manner until the quantity of glycerine present in the solution is sufficiently concentrated to be economically separated. Having by this means obtained the maximum amount of glycerine in the minimum volume of spent lyes, I proceed to evaporate the solution till as much salt as possible crystallizes out, when there remains only glycerine containing a small portion of water, which I eliminate by distilling the glycerine *in vacuo*, during which operation I introduce a jet of steam at about 200° centigrade, or as nearly as practicable of the same temperature as the liquid under treatment, by which means I secure a perfectly uniform ebullition during the distillation.

In carrying out my said invention the following advantages are obvious:

First. The aqueous solution of salt obtained by the evaporation of the spent lye may be used over and over with fresh charges of soap *ad libitum*, thus enabling the treatment of the lye to be carried on in a continuous manner.

Secondly. By this treatment the excess of caustic soda as usually used in present methods of separating lye is saved.

Thirdly. One supply of common salt is rendered sufficient for an indefinite period, while by the present method a supply is necessary with each charge of soap.

Fourthly. The small portions of soap held in suspension in the lye are recovered by my process.

Having thus described the nature of my said invention and the manner of applying the same in practice, I would have it understood that what I desire to claim, and secure by Letters Patent, is—

The herein-described method of treating soap-lye immediately as it is drawn off from the copper by fire heat or dry steam until an aqueous solution of common salt is obtained, and using this solution for separating the glycerine from a fresh charge of soap, thus enabling the process to be repeated until a maximum amount of glycerine is obtained from the minimum volume of spent lye, then evaporating the solution thus obtained to crystallize out the salt, and finally eliminating the water from the glycerine by distillation *in vacuo* and the injection of a jet of steam, as specified.

Dublin, December 24, 1881.

FRANCIS JOSEPH O'FARRELL.

In presence of—
J. ANGELO FAHIE, C. E.,
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Both of 2 Nassau Street, Dublin.