

UNITED STATES PATENT OFFICE.

EUGEN LANGEN, OF COLOGNE, GERMANY.

REFINING SUGAR.

SPECIFICATION forming part of Letters Patent No. 576,861, dated February 9, 1897.

Application filed May 28, 1894. Serial No. 512,798. (No specimens.) Patented in England February 21, 1894, No. 3,782; France February 21, 1894, No. 236,464; in Belgium February 22, 1894, No. 108,698; in Austria March 14, 1894, No. 44/473; in Hungary May 17, 1894, No. 449, and in Italy August 1, 1894, LXXII, 138.

To all whom it may concern:

Be it known that I, EUGEN LANGEN, a citizen of Prussia, Germany, residing at 14 Werthstrasse, Cologne, in the Empire of Germany, have invented new and useful Improvements in Refining Sugar, (for which Letters Patent have been granted in Great Britain, dated February 21, 1894, No. 3,782; in Austria, dated March 14, 1894, No. 44/473; in Italy, dated August 1, 1894, No. 136, LXXII; in Hungary, dated May 17, 1894, No. 449; in France, dated February 21, 1894, No. 236,464, and in Belgium, dated February 22, 1894, No. 108,698,) of which the following is a specification.

The refining of raw sugar for the production of a pure article of consumption has heretofore always been carried out in such manner that the raw sugar was first subjected to affinage, that is to say, it was purified by washing with water or sugar solutions in a centrifugal machine or other apparatus. The sugar thus obtained was then dissolved and the solution filtered through animal charcoal or otherwise treated for bringing it to the requisite degree of purity for the refining process. Lastly, the filling mass obtained by boiling from the purified solution was, after solidification in moulds, washed with pure sugar solutions for freeing it from adhering impure syrup. With this threefold purification there were obtained three different kinds of saccharine liquors as by-products, and on extracting the sugar from these liquors there were again obtained a number of different products of varying purity, the treatment of which occupied a great deal of time, was very tedious and expensive, and caused considerable losses in sugar.

My present invention has for its object to simplify these complicated processes; and it consists in a new treatment of the raw sugar, whereby in place of subjecting it in the first instance to the process of affinage and dissolution it is at once mixed with the discharge syrups of any degree of purity resulting from the subsequent affinage and refinery, these syrups being either first concentrated or left in their dilute condition, as will be herein-

after explained. This mixture, if the syrups have been concentrated, is then subjected to the well-known process of crystallization in motion, and after cooling, whereby a further crystallization is effected, the mass is then subjected to affinage. The discharge of the latter process, after separation of the molasses-like portion, is then carried back to the first part of the process to be mixed with another quantity of raw sugar.

It would at first sight seem to be illogical to mix the inferior syrups derived from the refinery with the best raw materials, but with this mode of operating the twofold object is gained of withdrawing the sugar from the said inferior syrups and of improving the condition of the raw sugar for the affinage, inasmuch as the sugar extracted from the syrups will on crystallizing assume the form and purity of the raw-sugar crystals, namely, the sugar crystallizing out of the syrup does not form independent small crystals, as would be the case if the syrups were subject to crystallization by themselves, but it crystallizes onto the added raw-sugar crystals, causing these to increase in size, and consequently to improve in quality. The larger are the crystals the smaller is the surface thereof in proportion to their weight, and, as the impurities only exist in the syrup adhering to their surface, it follows that the larger are the crystals the smaller is the quantity of impurities combined with a certain weight thereof, and in addition to this advantage the enlarged size of the raw-sugar crystals also facilitates their subsequent affinage by washing. In view of this latter consideration it follows that when raw-sugar crystals are dealt with that have a quantity of small crystals mixed with the larger ones it is of advantage, instead of first concentrating or thickening the discharge liquors before mixing with the raw sugar and then subjecting it to crystallization in motion, to mix the dilute liquors at once with the raw-sugar crystals, and then to heat the mixture in a vacuum-pan. By such moderate heating the small raw-sugar crystals become dissolved in the liquor, and when this is concentrated and subject to crystallization in motion the dis-

solved sugar, together with that originally in the liquor, will crystallize onto the undissolved large crystals.

On subjecting the sugar produced by either of the above methods to affinage there will first result from the washing a molasses-like product, which, as before stated, is separated from the next following saccharine liquor, and the latter is then led back to be mixed with a fresh charge of raw sugar.

The molasses-like product last referred to does not contain any appreciable quantity of crystallizable sugar. Consequently it would be useless to mix the same with the raw sugar, the only object of mixing the saccharine liquors with the raw sugar being to cause the crystallizable sugar contained therein to crystallize onto the raw-sugar crystals, as heretofore set forth. Under these circumstances the separation of these washings into numerous fractions, such as is carried out by the "Steffen" process, is rendered unnecessary, and the process is consequently greatly simplified.

The washed crystals may either be sold directly as granulated sugar or be led into the refinery as charging material.

What I claim is—

In the process of refining sugar, the method of improving the quality of the raw sugar before it is subjected to affinage by mixing it with the syrups or saccharine liquors derived from the refinery, heating these liquors for their concentration either before or after such admixture and subjecting the mixture to crystallization in motion, whereby the said syrups are at the same time deprived of their sugar, and numerous fractionated washings are dispensed with, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 26th day of May, A. D. 1894.

EUGEN LANGEN.

Witnesses:

JAMES L. NORRIS,
GEO. W. REA.