UNITED STATES PATENT OFFICE.

AUGUST WERNICKE, OF HALLE-ON-THE-SAALE, AND WILHELM PFITZINGER OF STANCH, PRUSSIA, GERMANY.

METHOD OF EXTRACTING CRYSTALLIZABLE SUGAR FROM MOLASSES, &c.

SPECIFICATION forming part of Letters Patent No. 260,340, dated June 27, 1882.

Application filed May 23, 1882. (No specimens.)

To all whom it may concern:

Be it known that we, AUGUST WERNICKE, of Halle-on-the-Saale, Prussia, Germany, engineer, and WILHELM PFITZINGER, of Stanch, Prussia, Germany, temporarily residing at Prague, Austria, chemist, have invented an Improved Method of Obtaining Crystallizable Sugar from Raw Sugar, Saccharine Juices, Sirup, and Molasses, of which the following is a specification.

The method of obtaining crystallizable sugar which forms the subject-matter of the present invention is based on the property of acetic acid of being a solvent of all foreign matter contained in raw sugar, in saccharine juices, in sirup, and in molasses, while crystallizable sugar is absolutely insoluble therein.

In order to obtain crystallizable sugar from raw sugar, it is advantageous, first of all, to free the latter from the greater part of the water which it contains by a drying process carried out with application of heat. After having been cooled to below 70° centigrade the sugar is intimately mixed with from fifty to seventy per cent., or thereabout, of its weight of concentrated acetic acid, the mixing being carried out in a closed receptacle having by preference the form of a horizontal cylinder, and provided with a stirring apparatus. The mixture is thereupon drawn off and allowed to remain at rest and to cool in other vessels fitted with covers, and which may have a capacity of eight cubic feet. After a certain time—say from thirty-six to forty-eight hours—nearly all sugar has separated or crystallized out in pure state, while the mother-lye consists in the acetic acid containing, in solution, all the foreign substances with but traces of sugar. The bulk of this liquid having been drained off from the sugar, the rest is extracted on a centrifugal drying-machine or in any other known manner. If it should be required, the sugar is comminuted before it is brought into the said machine. In order to complete its purification of adhering lye, the sugar is washed on the machine with some pure acetic acid, whereupon it is dried in a closed iron cylinder provided with a stirring apparatus, and heated by steam to a temperature of about 106° to 110° centigrade. For the purpose of recovering the acetic acid which is evaporated from the sugar, the vapors are conducted into a condensing-worm. Instead of washing out the sugar on the centrifugal machine by means of acetic acid, it may also be freed from the residue of mother-lye by means of a solution of sugar.

When the sugar contained in saccharine juices, molasses, or sirup is to be extracted the liquid is concentrated as much as possible —*i. e.*, to from 45° to 50° Baumé—by evaporation in vacuum. After having been cooled to below 70° centigrade the concentrated acetic acid is added, of which in this case from seventy-five to ninety per cent. of the weight of the saccharine liquor is required, according as it is more or less concentrated. The mixing with the acid, which requires but a few minutes of time, is again carried out in a closed vessel with stirring apparatus; also, the further treatment of the liquor and of the sugar separating or crystallizing out therefrom is substantially the same as hereinbefore described.

In case the raw sugar, the molasses, &c., are not mechanically mixed with impurities, the sugar obtained by this process is generally sufficiently white. In the contrary case it must be subjected to a further purification by dissolving, filtering, and reconcentrating it.

The acetic acid to be employed must be of a high degree of concentration, especially when saccharine liquors, sirup, or molasses are to be treated. In this case it is preferable to use an acid containing from ninety-eight to one hundred per cent. of pure acid. For sirups and other saccharine liquors which are evaporated to a density of from 50° to 52° Baumé, an acid of a strength of ninety per cent. would, however, be sufficient, and for raw sugar an acid still somewhat less concentrated might be used.

In order to recover the acetic acid from the mother-lye, the latter is distilled preferably in a still made of cast-iron and provided with a cover and a condensing-worm of earthenware. The acid thus obtained is subsequently to be freed from the water which it has taken up from the sugar, molasses, &c. This may be done by means of bisulphate of soda or of chloride of calcium, either of which has to be employed

in anhydrous state. If the latter salt is used, it is necessary to cause the muriatic acid evolved during the process of distillation to be absorbed by the medium of dry acetate of soda, which is put into a vessel inserted between the head of the still and the condenser. If the degree of concentration attained by the aforesaid salts should not be sufficient, the acid has to be converted by addition of lime into acetate of lime, which, after having been completely desiccated, is decomposed again by sulphuric acid for the purpose of liberating the acetic acid, which is then completely concentrated.

The residue from the distillation of the acetic acid may be utilized as manure or for producing ammonia, methyl, potash, &c.

We claim as our invention—

The method of obtaining crystallizable or crystallized sugar from raw sugar, saccharine juices, sirup, and molasses by adding concentrated acetic acid to the raw sugar or the saccharine liquor, allowing the sugar to separate or crystallize out, liberating the sugar from the mother-lye by mechanical means, and finally evaporating the residue of acetic acid or water or of acid and water, substantially as hereinbefore described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

AUGUST WERNICKE.
WILHELM PFITZINGER.

Witnesses for A. Wernicke:
CARL PIEPER,
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CARL RUPPERT,
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