UNITED STATES PATENT OFFICE.

THOMAS NORTON, OF DETROIT, MICHIGAN, ASSIGNOR TO THOMAS A. JEBB, OF BUFFALO, NEW YORK.

PROCESS OF MANUFACTURING CRYSTALLIZED GRAPE-SUGAR.

SPECIFICATION forming part of Letters Patent No. 285,654, dated September 25, 1883.

Application filed April 6, 1883. (No specimens.)

To all whom it may concern:

Be it known that I, THOMAS NORTON, of the city of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement in Processes of Manufacturing Crystallized Grape-Sugar, of which the following is a specification.

The object of this invention is to produce in a simple and economical manner crystallized grape-sugar which has a pure flavor, and from which the unconverted starch, dextrine, and other impurities have been thoroughly removed.

In practicing my invention a concentrated watery solution of grape-sugar is produced in any suitable or well-known manner, care being taken that the starch and dextrine are as completely or highly converted as practicable. The watery solution of grape-sugar is drawn from the vacuum-pan or other vessel in which it may be contained into an agitating or mixing vessel, which is provided with a jacket or coil, by means of which a cooling or heating agent can be supplied to said vessel at desire.

The ordinary cooling apparatus which is employed in grape-sugar factories for cooling the sugar or glucose after it leaves the vacuum-pan to prepare it for the barrels, and which is provided with an interior coil and surrounding-jacket through which water can be circulated, is well adapted to be used in this step of my process. The hot watery solution of grape-sugar is drawn from the vacuum-pan or other vessel in which it is contained—preferably at a gravity of 41° to 42° Baumé—into this mixing or agitating vessel, and cooled therein under constant agitation to a temperature of about 75° Fahrenheit, or until the mass assumes the thick consistency with which it is ordinarily delivered into the barrels, or until it is almost ready to solidify. During this cooling of the watery solution of grape-sugar a small quantity of crystallized grape-sugar—preferably from one to one and a half per cent.—is added to the charge in the mixing-vessel, and thoroughly incorporated with the solution in the same by an agitating or stirring device with which the mixing-vessel is provided. When the mass has reached the above-described consistency and temperature, it is, under continued agitation, heated to a temperature of about 150° Fahrenheit, whereby the almost solidified grape-sugar is melted, and a large amount of the water contained in the same is driven off, and the dextrine prepared to be separated from the grape-sugar. The hot sugar is now drawn from the agitating-vessel into pans, in which it is permitted to cool and crystallize. The pans are provided with perforated bottoms, in which the perforations can be opened and closed at will, either by wooden plugs inserted in the perforations, or by a slotted plate arranged on the under side of the perforated bottom, and made adjustable, so that the tight portions of the slotted plate can be made to register with the perforations in the bottom, and thereby close the same, or be removed from the perforations and open the same, as desired. When the hot sugar is drawn into the pans, the perforations in the same are closed. These pans are placed in a room in which the temperature is maintained at about 75° to 80° Fahrenheit. After three or four days a large portion of the mass in each pan will be crystallized. The perforations in the bottoms of the pans are now opened, whereby the liquid contained in the pans is permitted to drain off. This liquid consists of a watery solution of dextrine, uncrystallizable grape-sugar, and other soluble or liquid matters or substances. The crystallized mass formed in the pans consists of hydrate of grape-sugar of considerable purity, with a slight admixture of the liquid which adheres to the crystals. The crystals collect in spherical aggregations of greater or less size, which can be regulated by tilting or shaking the pans either by hand or machinery, the crystals being larger when the pans are not agitated and smaller when the crystallization proceeds under agitation. After ten days the crystallization of the entire mass in the pans is completed and the uncrystallizable liquid has drained off, so far as this is possible. The liquid which escapes from the pans is returned to the converter and again subjected, either separately or with new material, to the usual processes of conversion, bleaching, and concentration, and the material resulting therefrom

is treated in the above-described manner for the production of crystallized grape-sugar, whereby the amount of uncrystallizable matter is reduced to a minimum. Each block of crystallized grape-sugar formed in the pans as above described contains in its outer layers or coating a certain amount of liquid or uncrystallizable matter, which should be removed therefrom. This is best accomplished by placing each block of sugar upon a slab of plaster-of-paris or other absorbent material, whereby the liquid or uncrystallizable matter is extracted from the adjacent portion of the block. By turning the latter on the slab from time to time, all of its outer portions are successively subjected to the action of the absorbent material and freed from their uncrystallizable matter. The liquid which has been absorbed by the slabs can be recovered by steaming or soaking the slabs. When all liquid or uncrystallizable matter has been extracted from the blocks of sugar, the latter may be crushed, cut, or otherwise comminuted by means of a suitable machine. The reduced material may then be washed with cold water of a temperature as near to the freezing-point as possible, whereby the crystals are freed from the adhering impurities without becoming dissolved. The washed crystals may then be dried in a vacuum-drier, centrifugal machine, or other suitable apparatus, and may be separated according to different degrees of fineness by a revolving reel covered with wire-gauze, or any other suitable separator.

The yield of crystallized grape-sugar produced by the above-described process from the starchy matter of Indian corn or other grains, potatoes, roots, &c., is quite large, and the quality of the sugar, as to flavor and appearance, is very fine. The sugar so produced is quite dry, and does not become moist or adhesive upon exposure to the atmosphere. This sugar is therefore especially adapted to be mixed with cane-sugar for table use and other purposes.

Grape-sugar as heretofore commonly produced, whether crystallized or close-grained, absorbs moisture either from the atmosphere or from the cane-sugar with which it is mixed, whereby the grape-sugar becomes adhesive and causes the entire mass to cohere, thereby rendering it unsalable.

The hydrate of grape-sugar is produced by my improved process in well-defined crystals, which closely approach the granular character of the cane-sugar, and which, when mixed with cane-sugar, form therewith a homogeneous compound, which will not change its original character under ordinary conditions of heat and moisture, and which can therefore be shipped over long distances and be stored for a long time without deteriorating.

I claim as my invention—

1. The herein-described method of manufacturing crystalline hydrate of grape-sugar, which consists in preparing a solution of grape-sugar at a low temperature, then increasing the temperature of the solution until the grape-sugar is melted, and then permitting the heated solution to cool and crystallize, substantially as set forth.

2. The herein-described process of manufacturing hydrate of grape-sugar, which consists in forming a concentrated solution of grape-sugar, then cooling said solution almost to solidification, then melting said solution by heating, and then permitting the heated solution to cool and crystallize, substantially as set forth.

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Witnesses:
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