UNITED STATES PATENT OFFICE.

CARL STEFFEN, OF VIENNA, AUSTRIA-HUNGARY.

REFINING RAW COLORED SUGARS.

SPECIFICATION forming part of Letters Patent No. 353,092, dated November 23, 1886.

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To all whom it may concern:

Be it known that I, CARL STEFFEN, a subject of the Emperor of Austria-Hungary, and a resident of Vienna, Austria-Hungary, have invented an Improved Method of Refining Raw Colored Sugars, of which the following is a specification.

The object of my invention is to refine the raw colored crystalline sugar of commerce, and thus convert it into white crystalline sugar. This I effect by what I denominate a "systematic process of lixiviation" in a battery composed of two or more elements or vessels, by the aid of an aqueous saturated solution of pure sugar, and without the aid of steam.

The raw sugar, freed from lumps, is placed in suitable vessels, arranged in battery for convenience, and the saturated solution of pure sugar is forced through the mass of colored sugar in the vessels successively until the sirupy liquid drawn off has removed all the coloring-matter and assumes the character of molasses, and the sugar treated has become white and pure. Thus the entire mass of colored raw sugar treated is converted into white crystalline sugar and a sirup or molasses of inferior quality, and without loss of the pure sugar solution employed, as the sugar in this solution is taken up by the mass of sugar treated and forms a part of the same.

In carrying out my invention in practice the following process may be adopted with excellent results: The raw sugar to be treated should be passed through a sieve to remove all lumps, and it is preferably introduced into the vessels of the battery in a sifted dry form. The vessels should be arranged in battery so as to be treated successively, and for this purpose the ordinary diffusion-battery used in the manufacture of beet-sugar may be employed. The solution of pure sugar is forced through each vessel in succession, either by direct pressure or suction, and it may pass down through the mass or up through it, as preferred. If suction or atmospheric pressure is employed, I prefer to admit the pure sugar solution at the top and employ a pump for each vessel to draw the solution from one vessel and force it into the next of the series. In this case the vessels should have false bottoms of foraminous material. This material may be such as is employed in centrifugal machines. Care must be taken to place about the same quantity of sugar in each vessel.

The number of vessels employed in the battery will depend upon the quality of the sugar treated; but in order to obtain pure white sugar in this way not less than four vessels per battery should be employed.

The ordinary temperatures are best suited to the operation; but higher temperatures may be employed.

As a general rule, the mode of passing the aqueous solution through the several vessels is the same as that employed in the well-known diffusion process—that is, the pure solution is always introduced into the vessel that has been submitted longest to the operation, or in which the raw sugar has been subjected to the treatment for the longest period, and the least pure solution is introduced into the freshest charge of raw sugar. The sirup is allowed to flow off when it has become sufficiently charged or sufficiently inferior in quality. Ordinarily raw sugar of about ninety-five per cent. polarizing capacity yields an inferior molasses after the fourteenth vessel is passed.

When the sugar in the first vessel of the series, or that longest treated, has become pure and white, it is saturated with a solution of pure sugar, and before this vessel is emptied this solution is drawn off until about six to ten per cent. of water remains in the mass. This mass of white crystalline sugar may now be melted and worked up into prime refined sugar, or be dried and sold as crystalline sugar, or be ground and sold as ground or pulverized sugar; or, if the mass of refined sugar containing about ten per cent. of water be heated in a vessel up to 190° Fahrenheit, or more, it will become fluid, and can be poured into suitable forms and allowed to crystallize.

If any residue of sirup should remain in the sugar after the above treatment, it can be removed with a centrifugal machine, or in any other well-known way.

I am aware that it is not new to wash raw sugar in a centrifugal machine, either with water or with an aqueous solution of sugar, and this I do not claim.

Having thus described my invention, I claim—

The herein-described process of refining raw colored sugar, which consists in the systematic

lixiviation of the raw sugar in a battery or series of connected vessels by means of an aqueous solution of pure sugar, which is made to pass through the said vessels and the sugar contained therein in succession, substantially as described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

CARL STEFFEN.

Witnesses:
EDWARD BRYDGES,
B. ROI.