

UNITED STATES PATENT OFFICE.

CARL STEFFEN, OF VIENNA, AUSTRIA-HUNGARY.

PROCESS OF DEFECATING SACCHARINE JUICES.

SPECIFICATION forming part of Letters Patent No. 600,899, dated March 22, 1898.

Application filed October 17, 1893. Serial No. 488,427. (No specimens.) Patented in Germany September 19, 1893, No. 78,142, and in England September 19, 1893, No. 17,632.

To all whom it may concern:

Be it known that I, CARL STEFFEN, a subject of the Emperor of Austria-Hungary, residing at Vienna, in the Province of Lower Austria, in the Empire of Austria-Hungary, have invented certain new and useful Improvements in the Process of Purifying and Decolorizing Saccharine Juices and Sugar Solutions Generally, (for which I have obtained patents in England, dated September 19, 1893, No. 17,632, and in Germany, dated September 19, 1893, No. 78,142;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has relation to the manufacture of sugar, and particularly to the decoloration and defecation of saccharine solutions, juices, or syrups already more or less purified by defecation or saturation with carbonic acid and freed from the scum of defecation or the saturation sediment.

Before my invention it has been deemed impossible to decolorize and defecate saccharine solutions, juices, or syrups, such as above referred to, by means of sulfurous acid in large proportion, because of the great loss of sugar by inversion, for the reason that the decoloration and defecation has always been carried out at high temperatures.

I have discovered that the decoloration and defecation by means of large quantities of sulfurous acid can be effected without loss of sugar if carried out at a low temperature, not above 60° centigrade and preferably at from 30° to 40° centigrade, or even at a lower temperature at which the sulfurous acid is readily and more completely taken up and so complete a decoloration and defecation obtained that the resulting product may be worked up into fine white sugar for consumption without further treatment, while another very important advantage is obtained in that the filtration may be effected by means of exceedingly small quantities of animal charcoal as compared with the quantity required before my invention.

I have found that saccharine solutions, juices, or syrups of whatever degree of density may be treated with large quantities of

sulfurous acid at the temperature stated and left standing for days without showing a trace of inversion, provided, of course, that they are kept at said temperatures; but that my invention may be fully understood I will describe the same more in detail.

Generally speaking, the process consists in the following steps: The more or less purified saccharine solution, juice, or syrup of a temperature not exceeding 60° centigrade is first treated with sulfurous acid until it shows a strong acid reaction, or until further decoloration ceases and until substantially the whole of the non-saccharine constituents have been converted into sulfite or acid-sulfite combinations which remain in solution. The acid saccharine solution, juice, or syrup is next filtered through a small quantity of animal charcoal while at the temperature stated, whereby the whole of the coloring-matter is taken up, together with considerable quantities of non-saccharine constituents, the filtrate being almost completely decolorized and purified, in fact, to a degree not attainable by the large quantities of animal charcoal required before my invention. The filtrate is then alkalized until it becomes neutral or, as may be necessary in some cases, until it is slightly alkaline, from 0.001 to 0.002 alkalinity per one hundred liters being sufficient, whereby the free sulfurous acid is converted into insoluble alkaline salt, which is then separated by filtration. This filtrate is substantially colorless and pure and is then worked up into masse-cuite in the usual manner. The masse-cuite thus obtained is of such purity as to yield the finest refined sugars of all kinds for consumption, while the syrups from these masses-cuites are also of such purity and degree of decoloration that the masses-cuites obtained therefrom also yield refined sugars for consumption.

In the neutralization of the acid in saccharine solutions, juices, or syrups from beet-root sugar a sufficient quantity of the reagent—as lime, baryta, strontia, or the like—should be added to produce slight alkalinity, while the acid in saccharine solutions, juices, or syrups from cane-sugar is simply neutralized.

The proportion of sulfurous acid required

varies according to the nature or degree of purity of the saccharine solution, juice, or syrup from one hundred to two hundred and fifty grams of acid per one hundred liters, while a remarkably small quantity of animal charcoal is required in the filtration of the acid solutions, juices, or syrups--namely, from about one to two kilograms per one hundred liters.

10 I have hereinbefore referred to the application of my process to the refining of saccharine solutions, juices, and syrups that have undergone a certain degree of purification. These may be of any density and include, therefore, solutions of raw sugar from the cane, of which I preferably form a solution of a density approximating that of the clearing liquor used in the refining of sugar and proceed as above described. It will also

20 be understood that saccharine solutions, juices, or syrups obtained at any stage in the manufacture of sugar after having under-

gone a partial purification may be treated as described or treated repeatedly as described, if necessary.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

The process, which consists in reacting upon a defecated saccharine solution with a sufficiency of sulfurous acid to produce an acid reaction, filtering the solution through bone-black, reacting upon the filtrate with a neutralizing agent, as lime, removing the insoluble products of the reaction, and carrying out said operations at a temperature below 60° centigrade, substantially as and for the purposes set forth.

In testimony whereof I affix my signature in presence of two witnesses.

CARL STEFFEN.

Witnesses:

DEAN B. MASON,
F. BELMONT.