

UNITED STATES PATENT OFFICE

ORAZIO LUGO, OF NEW YORK, N. Y., ASSIGNOR TO CALEB H. JACKSON, OF
SAME PLACE.

PROCESS OF MANUFACTURING SUGAR.

SPECIFICATION forming part of Letters Patent No. 512,200, dated January 2, 1894.

Application filed November 10, 1893. Serial No. 490,565. (No specimens.)

To all whom it may concern:

Be it known that I, ORAZIO LUGO, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Improvement in the Manufacture of Sugar; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

In a pending application for Letters Patent of the United States filed by P. H. Vander Weyde and myself on July 24, 1893, Serial No. 481,273, there is disclosed a novel method of defecation of impure sugar solutions by treating the same with nascent oxyhydrate of aluminum, generated by the action of an electric current passing through the solution. My present invention is an improvement on that process, and its object is the production of white sugars without necessarily filtering the sugar solution through bone-black.

I have discovered that the soluble aluminum compounds resulting from the electrolytic treatment of the sugar solution can be rendered insoluble as formed during the treatment by means of the salts of phosphorus, and can be separated from the solution by the use of filtering bags. This obviates the necessity for using bone-black, and consequently effects a large saving in the expense and time of making white sugars.

In putting my invention into practice I make use of a shallow tank or vat provided with plates or electrodes of aluminum metal, or with anodes of aluminum metal and cathodes of carbon or other material which will not react by secondary action. Each pair of electrodes is connected to the poles of an electric generator, one to each pole, preferably a constant current dynamo machine, capable of generating the required current. The sugar water or solution (preferably heated) is run into the tank in which also is placed or added a small quantity of soluble phosphate. When the electric current passes through the solution the positive electrodes or anodes of aluminum metal will be attacked actively by the oxygen liberated on their surface, producing nascent oxyhydrates of aluminum,

while at the surface of the negative electrodes hydrogen gas will be evolved, and any positive metal, such as iron contained in the sugar water or solution will be deposited on the negative electrodes.

The oxyhydrates of aluminum are insoluble in the sugar solution and act mechanically upon certain of the impurities present and remain insoluble with them, but a part of the oxyhydrates of aluminum combine with other impurities in the sugar solution forming soluble compounds. The phosphate in the bath combines with the soluble aluminum compounds and forms a double salt which is insoluble. The heat of the bath facilitates the aggregation and coagulation of the insoluble compounds and brings them together, leaving the liquor clear and decolorized and capable of being easily filtered off, and the resulting liquor, free from such insoluble substances, can be made into white sugar by evaporation, without the necessity of treatment with bone-black.

The plates or electrodes should be placed near to each other in order to diminish as much as possible the resistance of the electric circuit. The electro-motive force of the electric current need not be higher than from four to six volts, but the quantity of current required will depend on the extent of surface of electrodes exposed to the solution. In the ordinary practice of my invention a constant stream of sugar solution will be flowing into and out of the tank, and a constant addition of the phosphate will also be made.

I can use any of the salts of phosphorus, and especially those of the alkaline earths. The particular form I prefer to use is the acid phosphate of lime produced by treating bone-ash, bone-black or spent bone-black with sulphuric acid. The phosphate may be added to the bath of sugar solution in either a liquid or solid condition, but I prefer the former as more convenient and effective.

The time required to effect the decoloration of the sugar solution by my process will depend upon the quality of the juice and purity of the sugar desired to be obtained. Generally from five to ten minutes will be sufficient when a current of one ampère per square foot of anode surface is used with about one

part of the phosphate to one thousand parts of the sugar juice.

My invention is applicable to the treatment of sugar water and sugar solutions of all kinds, such as the expressed juice of sugar cane and beet-root, glucose, sweet water, molasses sirup and solutions made by remelting sugar or made from refuse. It can be used in the refinery or at the plantation.

10 What I claim as my invention is—

The improvement in the manufacture of sugar which consists in producing oxyhydrates

of aluminum in a bath of sugar solution by the action of an electric current, rendering the soluble oxyhydrates insoluble by a salt of phosphorus, and separating the said insoluble compounds from the sugar solution; substantially as and for the purpose described. 15

In testimony whereof I have hereunto set my hand this 9th day of November, 1893.

ORAZIO LUGO.

Witnesses:

HARRIETTE M. JOHNSTON,
THOMAS B. KERR.