

# UNITED STATES PATENT OFFICE

WILLIAM GARTON, OF SOUTHAMPTON, ENGLAND.

## IMPROVEMENT IN THE MANUFACTURE OF GLUCOSE.

Specification forming part of Letters Patent No. **166,090**, dated July 27, 1875; application filed June 30, 1875.

*To all whom it may concern:*

Be it known that I, WILLIAM GARTON, of Southampton, England, brewer, have invented or discovered certain new and useful Improvements in the Manufacture of Sugar for Brewing and other purposes; and I do hereby declare that the following is a full, clear, and exact description thereof—that is to say:

My invention has reference to the manufacture of sugar composed partly of dextro-glucose, obtained from rice or other amylaceous substances, and partly of lævo-glucose, obtained from cane, beet, or other like sugar-producing substances or their products.

Dextro-glucose and lævo-glucose are two separate and distinct manufactures; but for the purposes of brewing it has been found beneficial to mix some of the dextro-glucose, obtained as aforesaid from amylaceous substances, with lævo-glucose obtained from cane or beet.

In converting amylaceous substances into dextro-glucose by means of an acid and heat in the ordinary way, such conversion ceases as soon as the solution has attained a specific gravity of from 1.070 to 1.080, any further quantity of the amylaceous substance which is added after this limit has been reached simply remaining in the form of starch. It has, therefore, been usual to neutralize the solution with chalk or other suitable material as soon as the conversion can be no longer carried on, and in consequence of the very low specific gravity great expense in fuel has been necessary for evaporating the water in the subsequent process of concentration. On the other hand, in treating cane, beet, or such like crystallized sugar, so as to obtain lævo-glucose, an inversion may be effected in solutions of specific gravities of even 1.200 to 1.275.

Now, the object of my invention is to effect economy in the manufacture of this combined article, by the processes as hereinafter described, whereby the acid usually employed in converting the amylaceous substances is saved, as well as a considerable amount of the fuel required for heating the solutions to the necessary temperatures, and for their concentration; and I am also able to effect

the admixture of the dextro-glucose and the lævo-glucose in the process of conversion, and to neutralize the acid employed for both at one operation.

For this purpose I place the rice or amylaceous substance in a suitable vessel, previously charged with boiling acid-water, and keep adding more rice and more acid until the mixture has reached the point of about 1.075, and I maintain the heat so long as any traces of starch can be detected—*i. e.*, until the conversion of the solution is complete; then, instead of neutralizing the mixture in the usual way at this stage, I take advantage of the fact which I have ascertained by experiment, *viz.*, that the acid employed in converting is further capable of inverting large proportions of crystallized sugar, while the glucose obtained from the rice still remains in the solution. I therefore add sufficient cane or beet sugar to increase the gravity of the solution to about 1.275, and when the inversion is complete I neutralize by the usual means, and at one and the same time, the acid solution containing both the dextro-glucose from the rice and the lævo-glucose from the sugar.

I thus utilize the acid which has been employed in the conversion of the rice for the inversion of the sugar; and as the sugar is placed in a solution which has been maintained at a sufficient heat for the conversion of the rice, I save the fuel which is necessary for heating when the sugar is treated separately. I also dispense with the chalk or lime usually required for neutralizing the dextro-glucose, and further save the large quantity of fuel that would have been necessary for concentrating the solution of dextro-glucose from 1.075 to 1.275 had it been manufactured separately.

By the means hereinbefore described I obtain an article composed of about twenty per cent. of dextro and eighty per cent. of lævo-sugar, (which proportions may, however, be varied according to requirement,) specially adapted for brewing, and which may also be employed for wine and vinegar making, and for other purposes.

What I claim, and desire to secure by Letters Patent, is—

The process of manufacturing glucose from starch and cane-sugar by heating amylaceous or starchy substances with acid in the ordinary manner, and adding to the mixture cane or beet sugar before neutralizing the acid, substantially as described.

In witness whereof I, the said WILLIAM

GARTON, have hereunto set my hand this eleventh day of June, one thousand eight hundred and seventy-five.

WILLIAM GARTON.

Witnesses:

F. C. HILL,

JNO. L. BARON.