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PROCESS AND APPARATUS FOR THE MANUFACTURE OF GRAPE SUGAR.

Probably the most important feature of the process by which the conversion of amylaceous and ligneous substances into grape sugar is effected is the employment, in a gaseous or nascent condition, of a reagent having for its basis either chloric or hypochloric acid. This is obtained by combining an alkaline chlorate or perchlorate with an organic or inorganic acid. For this purpose chlorate or perchlorate of potash and oxalic acid have the preference.

The chief feature of the apparatus shown in our engraving is the arrangement by which the gaseous oxygenating agent employed may be forced from one converting vessel into another, so as to avoid waste.

Twin converters, constructed of wood or metal, are hermetically closed. From the upper conical extremity of each converter, a tapered tube extends horizontally to the adjacent converter, passes down through the top of the latter nearly to its perforated false bottom, and is provided with a stop cock. The lower portions of these tubes are perforated to allow free escape of the oxygenating gases that are forced through them from one converter into the

other. Beneath each false bottom are two pipe coils or worms, one of which is connected with the gas and air pump at one end, and with a steam generator at the other end, and is also provided with stop cocks, so that either gas or steam may be admitted into the converter. In practice they are admitted alternately. The other coil is closed and connects with the steam generator. It is provided with a stop cock, so that steam may be admitted when required for raising the temperature of the contents of the converter.

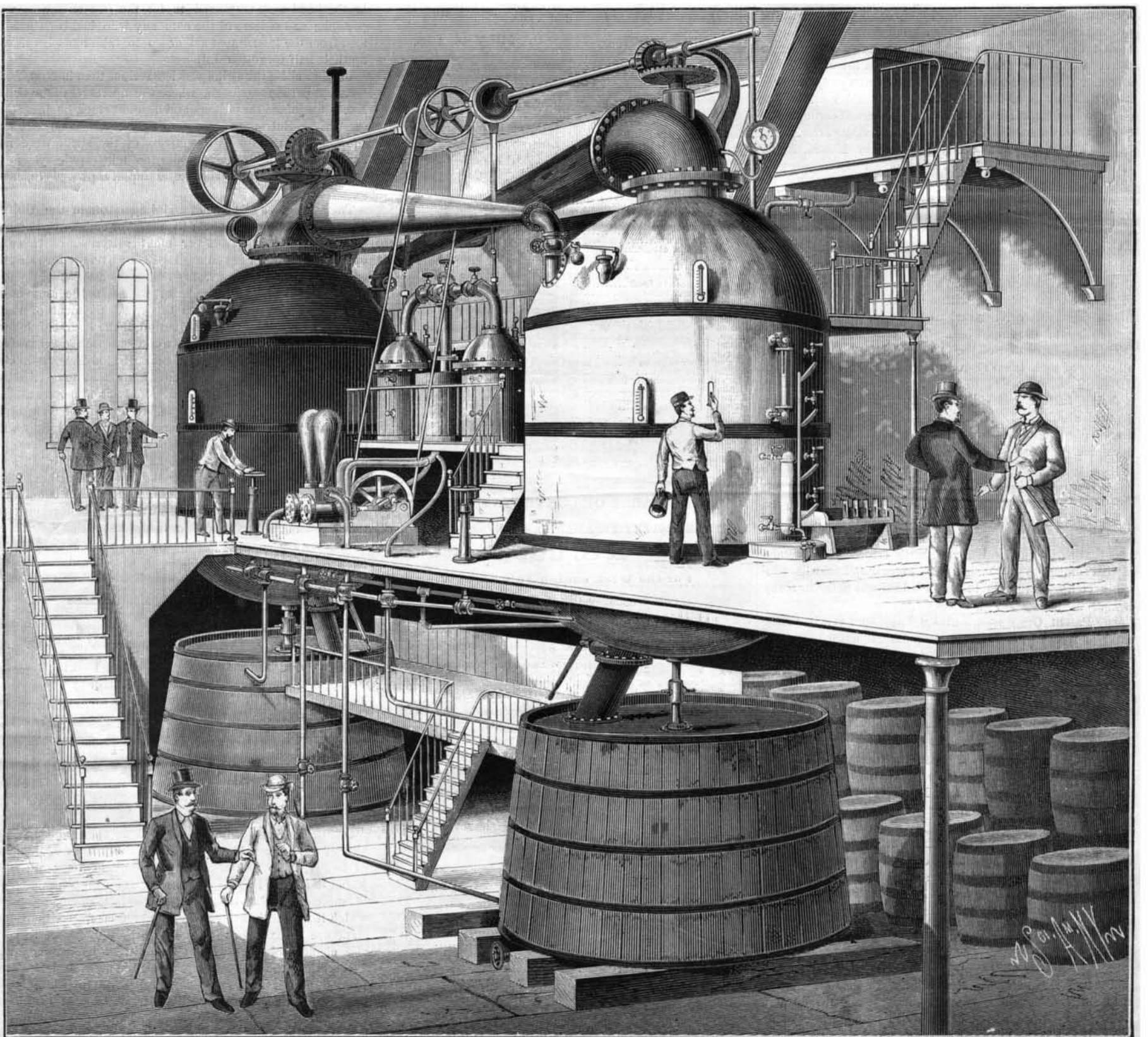
Each converter is provided with a liquid gauge, a try cock, a safety valve, and thermometer. Near the bottom of each converter is a sampling tube, having a cock at its lower end to allow samples to be taken when desired, and another cock is provided in connection with the sampler to permit introduction of steam for the purpose of cleaning it.

Above is placed a water tank, from which pipes extend down into the converters. A shaft extends vertically through each converter, and is prolonged into a tank below. Between the converters and tanks the vertical shafts are divided and coupled, so that the lower portion may be easily detached from the upper when required. The shafts are provided

with radial arms within the converters, and within the hermetically closed tanks a skeleton frame is attached to them, so that when the shafts are revolved the contents of both converters and tanks are agitated and thoroughly commingled.

The substance to be treated is conveyed into the converters by means of the spouts, and the converted or saccharified matter is discharged into tanks below through a pipe having a sliding valve operated by a lever. After delivery into the tanks, the converted mass is cooled to any desired degree by means of a coil or worm arranged in the tanks, and through which a current of cold water may be conducted from any suitable source of supply. When cooled the contents are allowed to discharge by opening the sliding valves at the bottom of the tanks. The vessels employed for generating the gas used in the converters for effecting the desired saccharification of the grain or other amylaceous body placed therein are placed between the converters, the gas being forced in by a pump.

The operation of the apparatus and the process of treatment of the bodies to be converted into glucose are as follows: The cornmeal or other substance to be converted is



LANDRY & LAUGA'S APPARATUS FOR THE MANUFACTURE OF GRAPE SUGAR.

introduced into the first vessel through the opening. At the same time a quantity of weak glucose liquor obtained in the final washing of the solid residuum in the filter press is inducted through a pipe at the top of the converter. Water is also admitted from the tank. The proportions of the glucose liquor and water may be equal, and the aggregate quantity required is about ten or twelve gallons for each bushel of grain. The agitator is then set in motion for the purpose of thoroughly commingling the contents of the converter. Steam is also simultaneously let into the perforate pipes, for the purpose of raising the temperature of the mass to 190° Fahr., and when this has been done steam is shut off, all openings are closed, the gas cocks opened, and the commingled gases and atmospheric air passing from the receiver to the pump are forced into the converter through the perforated pipe or worm.

The agitator being kept in motion, these gases readily permeate the mass and come in contact with every particle, so that a very perfect conversion is effected. When the usual tests and reagents—iodine, alcohol, cupric liquors, and the saccharometer—indicate the desired conversion has taken place, the admission of gases is cut off by turning a cock, and a cock on the other side of the converter is then opened to allow discharge of steam from the perforated pipe into the now transformed mass. The action of the steam liberates the gases that are not assimilated, and rapidly forces them out of this converter into the other converter, wherein a charge of meal, weak glucose liquor, and water has been admitted, mixed, and heated to the proper degree (190° Fahr.), while the conversion has been thus going on in the first converter. Thus the gases, which are still chemically active after the conversion of the first charge, are utilized in the treatment of the next, thereby avoiding loss and effecting a considerable economy in the converting process. After the first charge has been converted, the auxiliary gas generators are therefore only required to furnish such additional quantity of gas as is necessary to supply the deficit resulting from the loss of gas which inevitably attends the operation on each charge. While conversion is going on in the second vessel, the first one is being discharged and recharged, and at the proper time the free gases in the second converter are forced back into the first converter, where they effect such further conversion as they are capable of, and thus the operation of alternate charging and forcing of gases from one converter into the other is continued. The converted mass is discharged into tanks and cooled by water passed through the coil pipe while being agitated by the revolving stirrer.

This invention was recently patented by Messrs. A. C. Landry and C. Lauga, of New Orleans, La.

A New Mode of Burial.

At the recent general assembly of cement manufacturers at Berlin, Dr. Fruhling described a new application of cement. He explained that it would be easy to transform corpses into stone mummies by the use of Portland cement, that substance when hardened not in any way indicating the organic changes going on within it. He further illustrated the subject by describing various industrial uses of lime as a preventive of decomposition. The cement in hardening takes an accurate cast of the features which it incloses, thus allowing of their exact reproduction after the lapse of centuries. It is suggested to use coffins of rectangular shape, it being further considered by Dr. Fruhling that underground sepulture is needless, as the coffins soon become practically masses of stone, and can therefore be built into pyramids.

Crippling the Patent Office.

In accordance with legislation by the last Congress, the force of the Patent Office was reduced, July 1, by the discharge of twenty-five clerks. Commissioner Marble says that this reduction will necessarily cripple the efficiency of his office to a considerable extent, and it will probably compel inventors to suffer additional delay in many cases.

The Patent Office contributes a large sum yearly to the national treasury, and is therefore much more than self-sustaining. Justice to the inventors of the country would seem to demand that their business should not be injured and their progress delayed by the mistaken economy of reducing the already inadequate force of the Patent Office.

A Single Coal of Fire.

Property to the value of nearly a quarter of a million dollars was destroyed, one life lost, and twelve persons injured by a fire at a wharf in Brooklyn, N. Y., July 19, caused by a coal of fire being blown from the furnace door of the boiler of a hoisting engine, while the fire was being raked. A cargo of jute was being discharged, and the live coal blown among loose particles of the fiber scattered on the wharf set the material and the adjoining property on fire so quickly that the laborers had to flee for their lives, a number on the vessels alongside the wharf jumping into the water, one of them being drowned.

Large Dynamos and Slow Speed.

Mr. J. E. H. Gordon, the eminent English electrician, has been a strong advocate of small dynamos driven at a high speed. Now, after a costly series of experiments, he finds that a large machine driven at a comparatively slow rate gives incomparably the best result and does not endanger life by flying to pieces.

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NEW YORK, SATURDAY, JULY 28, 1883.

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THE SCIENTIFIC AMERICAN SUPPLEMENT

No. 395,

For the Week ending July 28, 1883.

Price 10 cents For sale by all newsdealers.

Table listing contents of the supplement by category: I. ENGINEERING AND MECHANICS, II. TECHNOLOGY, III. DECORATIVE ART, etc., with page numbers.

LOCK-OUT OF CIGAR MAKERS.

July 19, 1883, will be remembered for two quite important events affecting the relations of employer and employed—the strike of about 7,000 telegraphers all over the country, and the lock-out of 10,000 cigar makers by cigar manufacturers of New York city. The inciting cause of the lock-out was the strike of 250 "Progressive Union" men in a manufactory because the proprietor employed also 26 "International Union" men, who refused to strike to change the end of pay week from Friday night to Thursday night. The employers belonging to the Manufacturers' Union thereupon shut up their manufactories. This closed fifteen concerns and left the employes without work.

This trouble appears to have arisen between the members of two rival workingmen's unions, rather than directly between workmen and employers, and the manufacturers say that if the 26 International Union men had been discharged at the demand of the Progressive Union men, the result would be that in shops where the International Union predominated a similar command would be made to discharge the Progressive Union men, and thus there would be no end of the trouble.

THE TELEGRAPHERS' STRIKE.

July 19, at noon, from the Atlantic to the Pacific, the members of the telegraphic brotherhood, to the estimated number of 7,000, struck work because of a neglect on the part of the principal telegraphic company, the Western Union, to notice their demands for an increase of pay, a reduction of hours of labor to eight hours for day and seven for night, an increased rate for over-work, and an equalization of compensation for employes of both sexes. The sight in New York city at the principal office, when the strike occurred, was remarkable. Several hundred operators, male and female, marched quietly out of the building when the signal was given, and took cars uptown to attend a secret meeting. Other operators not connected with the brotherhood were employed to fill the gap as far as was possible; and officers of the company who had been graduated from the instrument sat down to tables and furbished up their half forgotten skill.

In other cities the strike was less serious than in New York—except perhaps Chicago, where the operators of the Grain Exchange joined the strikers and brought stock business to a standstill. But reports from many cities and large towns showed that the immediate effects of the strike were not sufficient to bring business under the telegraphic system to an end; recruits and volunteers rapidly poured in, and served at least as makeshifts.

The average pay for commercial operators in the United States is \$54.43 per month; average for commercial operators in Canada is \$37.49 per month; average of railroad operators in the United States is \$39.50; average for railroad operators in Canada is \$29.12.

The demand for an increase of wages to the amount of 15 per cent, if conceded, with the equal payment of male and female operatives, the reduction of the hours of labor, and extra payment for Sunday work, has been estimated to compel an extra cost to the Western Union Telegraph Co. of at least \$1,500,000, and to amount virtually to an increase of compensation to the operatives of about 40 per cent.

It is alleged on behalf of the Western Union Telegraph Company that these demands are excessive; and they will not accede thereto.

It would be difficult to find a more able, intelligent, and industrious body of people in the world than these telegraphers. The quietude with which they have conducted their strike, and the unanimity of their ideas in respect to their demands, afford ground for the inference that they know what they are about. The public will rejoice to see their wages increased and their hours of labor reduced, even if the prices for sending telegraph messages are slightly increased.

THE EXAMINATION OF BRIDGES.

The examination of bridges, relative to their safety, is a matter of vital importance to those passing over them, and is a duty that can only be reliably performed by one having long experience in bridge construction and a thorough knowledge of the mathematical questions involved. The mere running over of a locomotive, or an excessive load, is no guarantee of permanent safety. It is better to know how long a structure will carry an oft repeated light load in safety than how great a single load it will stand. The two seem to bear, for practical purposes, but little relation to one another.

One of the first points to be settled by the engineer is the plan of the bridge: if not in accordance with good practice of to-day, if so proportioned that some members are subjected to strains leaving too small a factor of safety, if not of sufficient strength to carry loads in excess of those for which it was designed, caused by increased traffic, then the structure is condemned without further consideration, or else changes obviating these difficulties are recommended. To ascertain this the parts are measured and the strains calculated, and if found to be safely within the limit of the strength of the iron, all is well so far. The operation also requires the examination of the effects produced by different loads, moving and at rest, and wind pressure.

The care and skill with which the parts were put together, the state of the rivets, bolts, and pins, and the deterioration