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NEW PROCESS OF UTILIZING SAW MILL REFUSE.

There is a new thing under the sun. It is the making of alcohol from wood.

We fancy that many of our readers will protest and say that there are scores of plants in America making alcohol from wood. But they would be mistaken. The plant to which they refer are making wood alcohol, which is not alcohol at all. It simply resembles alcohol in color, slightly in odor, and in the fact that it will burn, though with no such heat as results from the combustion of genuine alcohol. A better and more descriptive name is "wood spirits," which is used in France. Scientifically it is known as methyl alcohol, while real alcohol made by the fermentation of sugar is ethyl alcohol. Without attempting to be too technical, the chemical formulae of these two commercial products may be of value.

Ethyl or "grain" alcohol is C_2H_5O . This means that a molecule of alcohol is made up of two atoms of carbon, six of hydrogen and one of oxygen.

The formula for methyl or wood alcohol is CH_3O . That is, it has one less atom of carbon and two less of hydrogen.

Grain alcohol is comparatively innocuous, while wood alcohol is a virulent poison. Cases are numerous where people have drunk wood alcohol because they supposed it to be alcohol, and have promptly died. Wood alcohol has a large place in the arts, but grain alcohol has all the virtues of wood alcohol and many other besides.

To make real alcohol out of wood is from a practical standpoint a new thing. It has long been a fact well known to chemists that theoretically it should be possible to make alcohol from wood, for wood contains cellulose, and cellulose can be converted into sugar, and from sugar by fermentation is made alcohol. For thirty or forty years chemists have been at work on this problem, but they have always failed to make alcohol except at a cost greater than the value of the product, even if the laboratory experiments were enlarged to a factory scale.

Various methods have been used to convert the cellulose of wood into sugar. The most successful employed sulphuric acid, but sulphuric acid is a liquid, and to remove it from or neutralize it in the sugar solution resulting from the treatment of cellulose would cost more than the sugar or alcohol that can be deduced from it is worth. Chemists have not despaired, however, and have kept steadily at their work of investigation and experimentation, but it remained for Alexander Classen,

of Aachen, Germany, who is Professor of Chemistry of the Aachen Polytechnic School, a leading chemist of Europe and prize state councillor of the German Empire, to devise a means by which the cellulose of wood could be converted into sugar without leaving associated with it substances which make it nugatory in its value. What this discovery was will be told in brief further on.

UTILIZATION OF SAW MILL REFUSE.

The manufacturing lumberman is interested in this discovery because it presents to him a method for utilizing the refuse of his lumber manufacturing operations—a method which does not lie under the suspicion of being liable to over-production, as is the case with a good many of the other by-products of wood.

Most saw mills are located where the refuse has no

possibility of saving something from this waste is attractive.

Here comes in "grain" alcohol as a by-product of wood. There is no danger of over-doing the grain alcohol business provided only that a slight saving can be made in the cost of production.

WOOD VS. CORN.

The Classen process, it is claimed, makes at least fifty gallons proof alcohol from a long ton of dry sawdust. About four and a half gallons can be made from a bushel of corn. Reduced to gallons of alcohol, one proof gallon is made from about two-ninths of a bushel, or 12.4 pounds of corn. It can also be made, at no greater, and probably a little less expense for the process, from forty-five pounds of sawdust.

Put it in another way. It takes 11.1 bushels of corn to produce the same amount of alcohol as can be obtained from a long ton (2,240 pounds) of dry sawdust.

The Classen process is owned in the United States by the Lignum Inversion Company, of Chicago, which is to be succeeded by the Classen Lignum Company, that will take over the rights of the former and increase its scope. The Lignum Inversion Company has had for about four months in almost constant operation an experimental plant in Highland Park, near Chicago.

DESCRIPTION OF THE PROCESS.

As stated at the beginning, the successful production of glucose or sugar from wood cellulose as a laboratory proposition had preferably been by treating it with sulphuric acid heated, but the sulphuric acid is a

liquid and could not be removed from the resulting solution except at such great expense as to make the process commercially a failure. Professor Classen conceived the idea of using sulphurous instead of sulphuric acid. Sulphurous acid is a gas. The result is, that when given an opportunity under a moderate degree of heat, it releases or blows itself out of the wood, leaving the treated wood practically free from substances that will prevent fermentation of the contained sugar.

A plant for the manufacture of alcohol from sawdust consists first of the acid apparatus in which the necessary solution of the sulphurous acid gas in water is made, and where the gas when released from the boiler or digester is reabsorbed in the water and thus saved. A view is given of the apparatus used in the plant at Highland Park. Next is a revolving boiler or digester similar to that used in making chemical pulp. Next comes an exhausting battery, which is a series of tanks

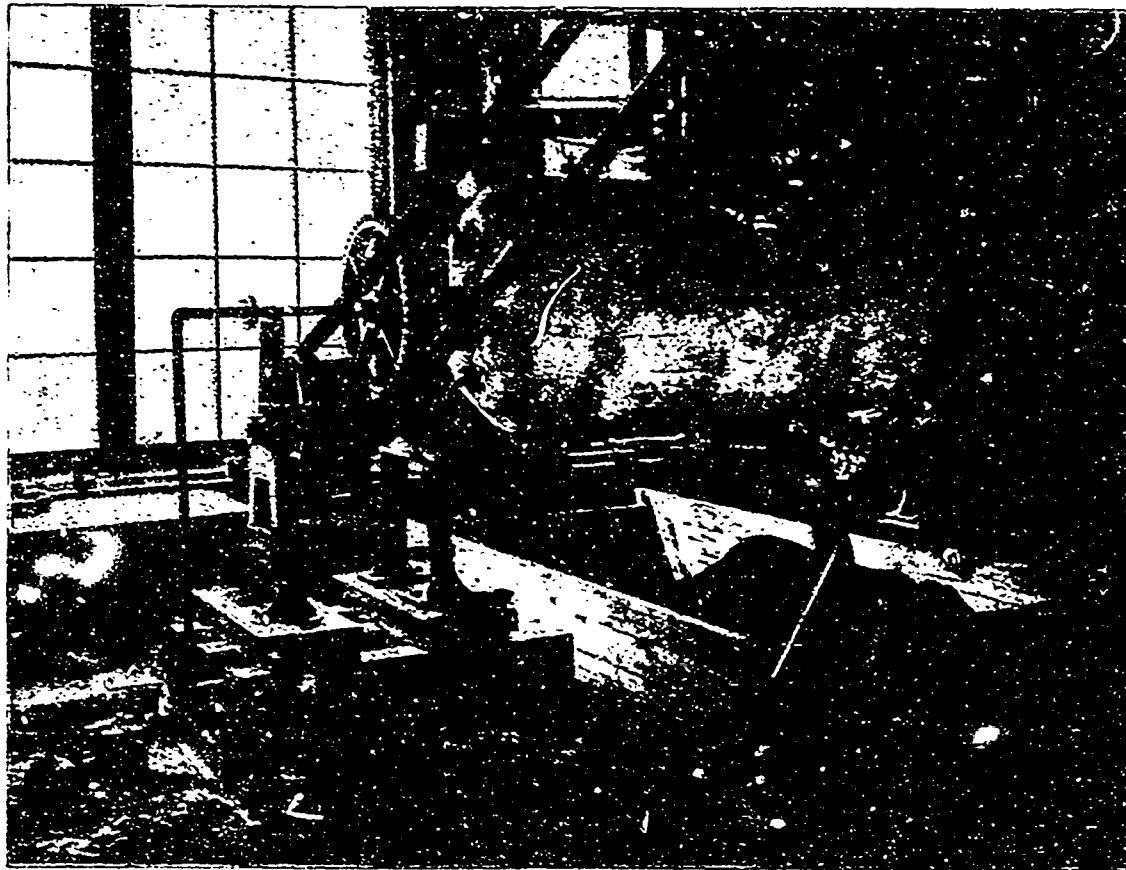


FIG. 1.—ROTARY DIGESTER FOR CONVERTING CELLULOSE OF SAWDUST INTO SUGAR.

market value. The best that can be done with it is to use it as fuel, and that it is so used is a matter of course. In some mills located where there is no market for refuse, the slabs are burned under the boilers, and sawdust, edgings, trimmings, etc., is the refuse. In most modern mills, however, automatic furnace feeders are used, in which case sawdust is the basis of the fuel, mixed with larger refuse to loosen it up. The amount of refuse varies greatly, but in any modern mill of large capacity it is probably in the neighborhood of twelve to fifteen per cent. of the actual contents of the log.

The utilization of this material at some profit shows double results. It not only makes a profit out of what otherwise is thrown away, but also gives returns on a cash investment. Sawdust and slabs cost something to bring to the mill in the log, in some instances this expense being an important part of the entire cost of a saw-mill's output. To the intelligent lumberman the