

UNITED STATES PATENT OFFICE.

EDSON BRADLEY AND EDWARD N. DICKERSON, JR., OF NEW YORK, N. Y.

PROCESS OF MAKING ALCOHOLIC DISTILLED LIQUOR.

SPECIFICATION forming part of Letters Patent No. 504,074, dated August 29, 1893.

Application filed May 10, 1888. Serial No. 273,484. (No specimens.)

To all whom it may concern:

Be it known that we, EDSON BRADLEY and EDWARD N. DICKERSON, Jr., of the city, county, and State of New York, have invented a new and useful Improvement in Processes of Making Alcoholic Distilled Liquors, of which the following is a full, true, and exact description.

In the process patented to Allen and Bradley, August 22, 1882, No. 263,087, a method is described of returning into subsequent processes the slop, the result of previous processes, after screening and cooling the same. By that process it is possible to return but a small proportion of the total slop, and a large amount of the valuable particles which it contains are discharged from the process and wasted, so far as the production of spirits is concerned. The reason of this is not because the process cannot assimilate all the valuable particles thus rejected, but because they are accompanied with so much water that the subsequent processes cannot receive them together with the large surplus of water in which they are carried. We propose, therefore, after screening that slop as described in the said Allen and Bradley patent, to concentrate the valuable particles into so much liquid only that they can be returned into subsequent processes to a much greater extent than has heretofore been possible. This concentration can be produced in various ways. It can, for instance, be done by evaporating the surplus water from the slop, which should preferably be done as soon as the slop is blown from the still and strained, and before it has lost the heat of the still. This evaporation may be done in various ways. It may be done by an independent fire, or in order to effect the evaporation with greater economy, boiler steam may be used to heat the slop in a closed vessel, the steam passing through internal tubes, and then the water evaporated from the slop may be used for subsequent heating of the stills or other places where high heat is not required. In case an outside fire is used, of course the steam produced from the evaporation of the liquid should be utilized in the other parts of the process. In case it is not desired to heat the slop to so high a temperature, it can be evaporated by a vacuum pan in the ordinary method of

evaporating liquids at low temperatures. We prefer, however, to condense the slop by means of a centrifugal machine as being more rapid and less expensive than the previous methods named. We prefer, however, to use a concentrating centrifugal machine, operating upon the opposite principle than the ordinary sugar drying machines. By placing the slop in a rapidly revolving shell,—the particles heavier than water are thrown outward, and the water in a comparatively pure condition remains on the inside of the revolving ring. This water can be withdrawn by an inserted scoop or spout in the well-known way, and then the charge in the centrifugal machine can be withdrawn to be returned into subsequent processes. We prefer, however, since an absolute concentration and deposit is not required, to make the process a continuous one. That is, we feed into the machine the slop to be concentrated. The rotating shell is provided at its periphery with an opening, or series of openings, through which the concentrated slop is thrown out and falls into a surrounding receiver; while the water within is constantly withdrawn by a scoop or spout in the well-known method. In this way we can concentrate the slop containing the valuable particles to any desired extent. In case the slop so concentrated is not to be used back immediately, it must be cooled before it naturally falls to a temperature, say below 150°, by an artificial cooling device, preferably a pipe cooler, to say 80° or under, and then received into a tub, where it may be permitted to stand for some time without serious harm,—though we prefer, whenever possible, to re-use the slop as soon as concentrated. If it shall be so stored in a receptacle for future use, however, such receptacle should be provided with a stirring apparatus to put the particles of slop in agitation and suspension before the slop is returned. The slop then is to be returned in connection with the mash to be fermented. This return may be done either in the mash tub or fermenters. We prefer not to mash with the hot slop, but to add it to the mash in the fermenters, either through the mash tub or directly. In case it is returned through the mash tub, it is obvious that the cooling apparatus of the mash tub may be used to cool the concentrated slop

instead of the additional pipe cooler. We may also, instead of using the concentrated slop in connection with the regular mash of the process, use it independently, adding thereto a sufficient amount of malt to effect the conversion of any unconverted starch contained therein, and subsequently ferment the same with or without the addition of fresh yeast, as may be desired; or, instead of fermenting it separately, after the slop has been mashed with an additional quantity of malt, it may be run into the fermenters with the previously made mash of fresh grain.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The process herein described of increasing the yield of alcohol, which consists in screening the slop of coarse particles, of concentrating the fine particles of the slop in a less quantity of liquid by removing water therefrom, and of returning the said fine particles in their concentrated condition into subsequent processes, substantially as described.

2. The process herein described for increasing the yield of alcohol, which consists in screening the slop of coarse particles, concentrating the same by removing therefrom surplus water, rapidly cooling the slop and returning the same with the fine particles in suspension into subsequent processes, substantially as described.

3. The process herein described for increasing the yield of alcohol, which consists in screening the slop of coarse particles and concentrating the same by removing therefrom the surplus water, and then treating the concentrated slop with an addition of malt before its return to the fermenters, substantially as described.

In witness whereof we have hereunto subscribed our names this 8th day of May, 1888.

EDSON BRADLEY.

E. N. DICKERSON, JR.

Witnesses:

JULIA W. BRADLEY,
H. CONTANT.