

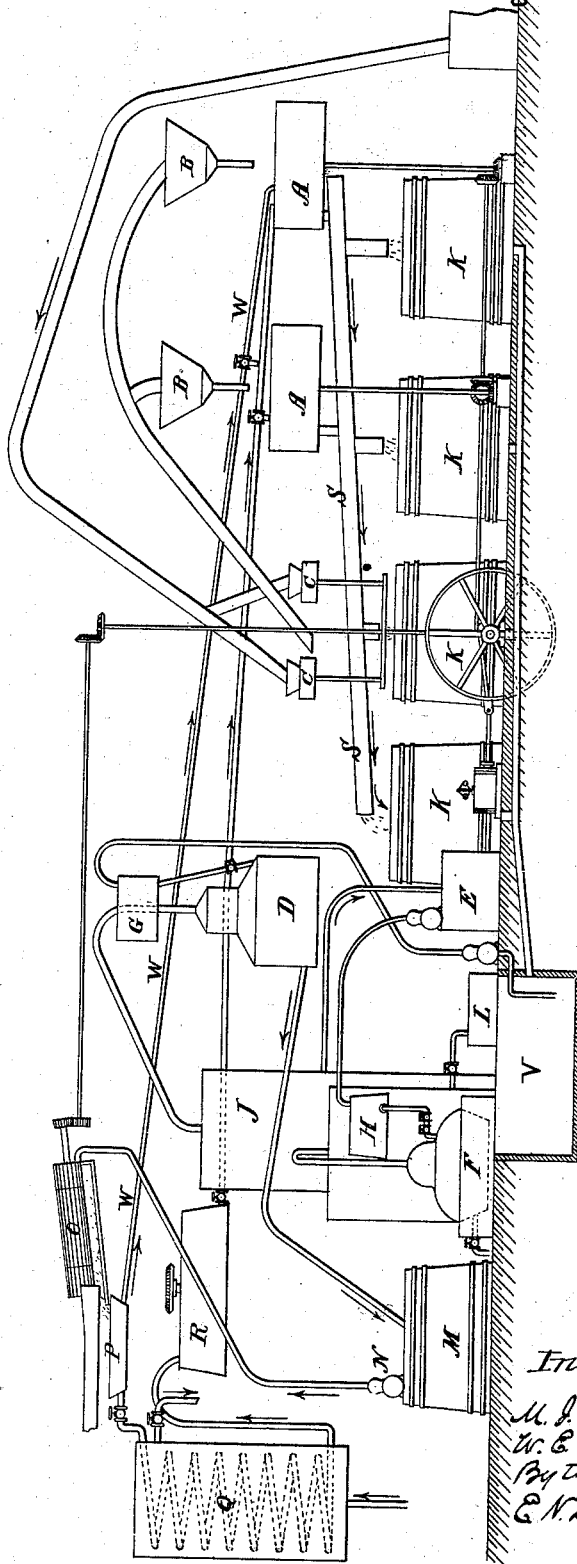
(No Model.)

M. J. ALLEN & W. E. BRADLEY.

PROCESS OF MAKING WHISKY.

No. 263,087.

Patented Aug. 22, 1882.



*Attest:*  
*Courtney A. Cooper,*  
*William Barton*

*Inventors.*

*M. J. Allen*  
*W. E. Bradley*  
*By their atty*  
*E. N. Dickerson*

# UNITED STATES PATENT OFFICE.

MARSHALL J. ALLEN, OF NEW YORK, N. Y., AND WILLIAM E. BRADLEY, OF FRANKFORT, KENTUCKY.

## PROCESS OF MAKING WHISKY.

SPECIFICATION forming part of Letters Patent No. 263,087, dated August 22, 1882.

Application filed April 29, 1882. (No model.)

*To all whom it may concern:*

Be it known that we, MARSHALL J. ALLEN, of the city, county, and State of New York, and WILLIAM E. BRADLEY, of the city of Frankfort, county of Franklin, State of Kentucky, have invented a new and useful Improvement in the Process of Making Whisky, of which the following is a specification.

The object of our invention is to increase the yield of whisky from a given amount of grain by utilizing in subsequent processes the refuse products of previous processes, and this we do by first preparing the refuse product and bringing it into a condition in which it may be advantageously used; and, secondly, by introducing such prepared product into the subsequent processes of whisky-making.

In all those methods of making whisky in which the entire grain introduced passes through the entire process and is delivered as a refuse product at the end of the operation it has generally been customary to reject the spent beer or slop, which contains very valuable ingredients, at the end of the operation. By our improvement we separate from this slop or spent beer the bran, chaff, and refuse particles by mechanical means, and then so operate with the strained slop as to preserve it from acetic, lactic, or putrid fermentation, and utilize it in the process of making whisky, returning with it all the useful bodies which it contains.

The sheet of drawings hereto annexed represents a general view of a part of a distillery arranged for the practice of our improved process. We do not limit ourselves, however, to the special apparatus for carrying out the process, but show one form of apparatus by which it may be carried into effect. We shall not go into detail in the description of this apparatus, as the arrangement will be easily understood by those acquainted with the art.

In the drawing, A represents the mash-tubs; B, the mill-hoppers; C, the millstones; D, the beer-still; E, low-wines receiver; F, doubler-still; G, beer heater and charger; H, low-wines charger for doubling-still; I, doubling-still, condenser, and flake-stand; J, beer-still; K, fermenting-vats; L, whisky-receiver; M, hot-slop or spent-beer receiver; N, hot-slop

pump for forcing slop up to strainer; O, slop-strainer; P, strained-slop receiver for supplying slop-cooler Q; Q, flake-stand for cooling strained slop; R, receiver for cooled strained slop, provided with stirring apparatus; S, trough for conveying mash to fermenters; W, pipe for hot strained slop when used for mashing. The movement of the liquid through the pipes is indicated by the arrows. It will of course be understood that the present drawing does not represent all the apparatus of a distillery, but only so much of it as is used in connection with our improved process.

It is well known that the spent beer contains in suspension, in the first place, a considerable amount of refuse material of comparative large size—such as the chaff, bran, and larger particles of grain—and, in the second place, minute particles of sugar or glucose, starch, and yeast. This second class of particles it is very important to preserve and introduce into the subsequent operations of whisky-making. This second class of particles are so minute as that they will pass through the meshes of a fine sieve, and yet are sufficiently solid and separate from the liquid to form a deposit in any vessel in which the liquid may remain at rest. The purpose of our invention is to retain these fine or valuable particles in the liquid which is to be returned, and to separate from this liquid the coarse or refuse particles, while at the same time the liquid is maintained in a sweet condition.

In carrying out our process practically in connection with what is known as the "sweet-mash process" for making whisky, also in the sour-mash process, where the mashing is done in large mash-tubs by machinery, we proceed as follows: The slop or spent beer, as it is blown from the still, is run through a straining apparatus similar to the bolting-machine in a flour-mill, provided with a copper-wire straining-cloth of about thirty wires to the inch. The thick portion strained out is rejected, and may be used as food for cattle, and the liquid portion is run through a coil in a tank of cold water or some equivalent apparatus. In this way it is rapidly cooled from a temperature near the boiling-point down to a point as low as the water will produce. It

should be below 80°. This cooled liquid slop is then stored ready for use in a tank supplied with suitable agitators to keep the small particles which it may contain in suspension, or to stir them up previous to the further utilization of the slop. It is absolutely necessary for the best results of our process that all of the sugar, starch, and yeast particles be returned with the spent beer and utilized in the subsequent operation of making whisky. Having so mechanically strained or filtered and cooled our spent beer, we add this cold slop to the liquid in the mash-tub at the end of the mashing for the purpose of cooling and thinning down the mash, and when the mash is run into the fermenting-vats we also use the cold thin slop or spent beer to complete the filling up of the fermenters, instead of water. In practice we usually run the requisite quantity of slop into the fermenting-vats before the mash is let down, and we also use the cold thin slop to wash out the mash-tubs; and this slop, with the products remaining in the mash-tubs, is likewise passed into the fermenters. In other words, we aim to introduce into the operation all of the thin slop possible. We utilize the cold slop instead of water in thinning down the mash, and also in filling up the fermenters, as previously described. We find, as the result of this process, a greatly-increased yield, which we cannot obtain in any other way known to us.

The special points to be observed in carrying out our process successfully are, first, the sieving out or separation by mechanical means, preferably an ordinary sieve, of the coarse or refuse particles; secondly, the cooling of the slop or spent beer quickly by suitable means in order to prevent the increase and accumulation of acid in the same; and, thirdly, the returning of this slop, together with the valuable particles which it contains, and its utilization in the subsequent processes of whisky-making.

We are aware that the broad idea of utilizing the spent beer is old; but, so far as we know, it has always been done in one of the following ways: Either no separation of the chaff from the spent beer at the end of the process has been attempted, in which case the return of the spent beer, together with the chaff which it contains, will soon prevent the successful operation of the process; or, second, the spent beer has been allowed to stand and settle at the end of the process, and no attempt in such case has been made to return in subsequent processes the valuable particles which it contains; or, third, the chaff having been separated from the spent beer, the spent beer has been allowed to stand and settle and deposit the different particles which it contains, and of these the yeast bodies have been removed and used in other operations besides that of distilling, and no attempt in such case has been made to return the sugar and starch particles which have deposited. In a fourth process the entire grain has not been allowed to go through

the process; but the bulkier particles of grain have been stopped somewhere in the process of manufacture. This process produces a low yield and cannot be advantageously practiced. Reference is made to a treatise on the Manufacture and Distillation of Alcoholic Liquors, by Duplais, published in Philadelphia by Henry Carey Baird, 1871, for a fuller description of some of the above processes, which will be found on pages 144 to 159.

We are also aware that it has been proposed to remove the coarse particles of spent beer by straining, preliminary to a treatment with sulphuric acid to recover glucose, to be used in subsequent operations—a complex treatment compared to that which we adopt, which is purely mechanical in its nature.

We have found that by the separation of some of the waste particles mechanically the delay and resulting diseased fermentations occurring when the liquor is clarified by allowing such particles to settle by gravity are avoided, and by agitating the liquor the valuable particles are put in suspension, so as to be carried with the liquor and be utilized.

It is obvious that, though we have shown certain means for carrying out our processes in connection with known processes of whisky-manufacture, yet our process might be carried out by other apparatus than that shown or in modified methods of manufacture without substantially departing from the spirit of our invention. Thus, for instance, the refuse portions might be sieved out before distillation, and, provided the slop was rapidly cooled and immediately after leaving the still returned to be used in the main process, while still containing the valuable products, some of the advantages would still be obtained, but in a less degree than by the method shown. The rapid cooling of the slop and its utilization in subsequent processes might also be practiced to a limited extent even if it were not strained; but of course the return of the unstrained slop would soon clog the process.

We do not here claim the saving of the sugar, starch, and yeast of spent beer by first freeing the latter of its coarser particles by mechanical means, maintaining the useful particles in suspension, and then using this slop, with its suspended ingredients, in a fresh mash, as this forms the subject of a separate application for Letters Patent of the United States, of which this is a division; but

We claim—

1. In the manufacture of whisky, the process described, consisting in rapidly cooling spent beer and then mixing the slop with fresh material for subsequent fermentation, substantially as set forth.

2. In the manufacture of whisky, the process of saving the sugar, starch, and yeast contained in spent beer, which consists in freeing such spent beer before permitting it to cool by mechanical means—such as sieving of the bran, chaff, and other coarse waste particles—

rapidly cooling the thin slop, and then adding the same to and mixing it with fresh material for subsequent fermentation, substantially as set forth.

5 3. In the manufacture of whisky, the process of saving the sugar, starch, and yeast contained in spent beer and utilizing the same, which consists in freeing the spent beer of the bran, chaff, and other coarse particles, rapidly  
10 cooling the slop, and then mixing the thin slop thus obtained with fresh mash, substantially as described.

15 4. In the manufacture of whisky, the mode of saving the sugar, starch, and yeast contained in a spent beer and in using the same, which consists in freeing the spent beer of coarse particles by mechanical means—such as a sieve—of rapidly cooling this thin slop, of causing such an agitation of the slop as will

hold the particles of sugar, starch, and yeast 20 in suspension, and then mixing the thin slop so treated with fresh grain, substantially as set forth.

In testimony whereof I, the said M. J. ALLEN, have signed my name to this specification in 25 the presence of two subscribing witnesses.

MARSHALL J. ALLEN.

Witnesses:

EDWARD H. HALL,

EDWARD C. HOMAN.

In testimony whereof I, the said W. E. BRADLEY, have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM E. BRADLEY.

Witnesses:

GEORGE F. BERRY,

J. P. WILLIAMS.