

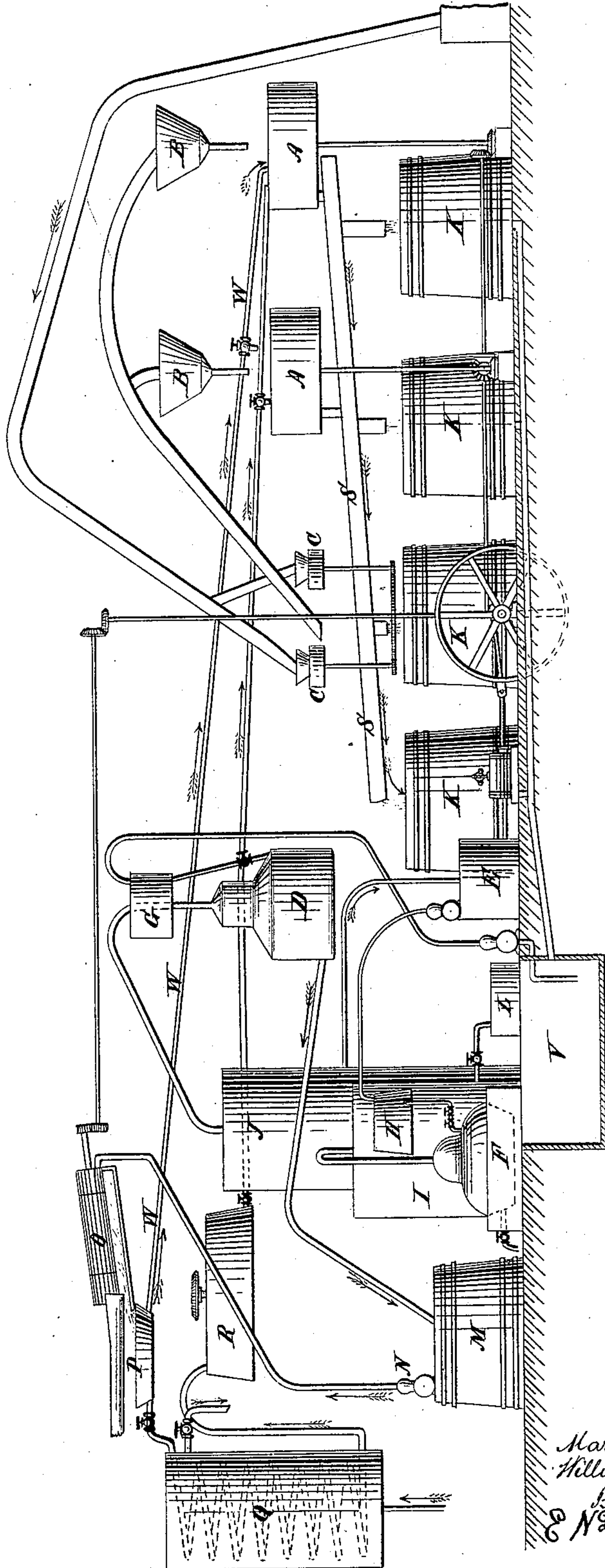
(No Model.)

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

PROCESS OF MAKING WHISKY.

No. 287,213.

Patented Oct. 23, 1883.



Witnesses:

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# 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. 287,213, dated October 23, 1883.

Application filed October 29, 1881. (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 utilize the remaining liquor containing the valuable ingredients in suspension in the process of making whisky.

The drawing hereto annexed represents a general view of 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, double 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 supply-

ing slop-cooler Q; R, receiver 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 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.

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. The liquid is maintained in an agitated condition to keep the small particles which it may contain in suspension 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 our spent beer, we add it to the liquid in the mash-tub at the end of the mashing, for the purpose of thinning down the mash, and when the mash is run into the fermenting-vats we also use the 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.

In the hand process we may divide our slop into two portions. One we may cool, and the balance is run into a tank provided with coils, through which steam is passed in order to obtain a temperature of near 200° Fahrenheit. This hot slop is used for scalding and mashing the grain in the small tubs ordinarily used in the sour-mash hand-made process.

We may utilize the slop instead of water in breaking up the mash, and also in filling up the fermenters, as previously described.

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; and, secondly, the returning of this slop to the mash, together with the valuable particles which it contains, and before they can settle or be deposited, 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 secure glucose to be used in subsequent operations—a complex treatment, compared with 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 fermentation occurring when the liquor is clarified by allowing such particles to settle are avoided, and by agitating the liquor the valuable particles are maintained 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, provided the slop was returned for use in the main process containing the products useful in the subsequent manufacture, and in such a condition as not to be injurious to the subsequent operation of the process.

When the slop is not to be used immediately, it should be cooled, to prevent injurious fermentation; but such cooling is not made the subject of this application, but of another division thereof.

We claim—

1. In the manufacture of whisky, the process of saving the sugar, yeast, and starch contained in spent beer, which consists in separating by mechanical means the coarser waste particles, and while the valuable particles are in suspension mixing the slop with fresh material for subsequent fermentation.

2. In the manufacture of whisky, the process of removing the coarse waste particles of chaff and bran mechanically (as by sieving) from the spent beer, and then mixing the latter, while heated, with fresh material for fermentation, substantially as set forth.

3. In the manufacture of whisky, the process of saving the sugar, yeast, and starch contained in spent beer, which consists in separating by mechanical means the coarser waste particles, in agitating the slop containing such sugar, starch, and yeast, so as to maintain them in suspension, and then mixing the slop with fresh material for subsequent fermentation, substantially as set forth.

4. In the manufacture of whisky, the process which consists in screening, straining, or otherwise mechanically separating the bran and other coarse matter from the slop, and then cooking fresh meal for subsequent operations with this screened slop, substantially as specified.

5. In the manufacture of whisky, the process which consists in screening the slop, cooking fresh meal with such screened slop, and then cooling the cooked product with another addition of said screened slop, substantially as set forth.

6. In the manufacture of whisky, the pro-



cess which consists in screening the slop, cooking fresh meal with said screened slop, cooling the cooked product with another addition of said screened slop, and diluting the mash  
5 with still further addition of screened slop, all substantially as set forth.

7. In the manufacture of whisky, the process which consists in screening, straining, or otherwise mechanically separating the bran  
10 and other coarse matter from spent beer, permitting said spent beer to cool to the required temperature, and mixing it immediately with materials for subsequent fermentation, as and for the purpose specified.

15 8. In the manufacture of whisky, the process which consists in screening, straining, or

otherwise mechanically separating the bran and other coarse matter from spent beer, permitting said spent beer to cool to the required temperature, and mixing it immediately with  
20 fresh wort, in the manner and for the purpose specified.

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