
A.D. 1830 N^o 5974.

Apparatus for Brewing and Distilling

COFFEY'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, **ÆNEAS COFFEY**, of the Dock Distillery, Dublin, Distiller, send greeting.

WHEREAS His present Most Excellent Majesty King William the Fourth, by His Letters Patent under the Great Seal of Great Britain, bearing date at Westminster, the Fifth day of August, in the first year of His reign, did 5
give and grant unto me, the said Æneas Coffey, His especial licence that I, the said Æneas Coffey, my eñors, adñors, and assigns, and such others as I, the said Æneas Coffey, my eñors, adñors, or assigns, should at any time agree with, and no others, from time to time and at all times during the term of years therein mentioned, should and lawfully might make, use, 10
exercise, and vend, within England, Wales, and the Town of Berwick-upon-Tweed, and also in all His said Majesty's Colonies and Plantations abroad, my Invention of "**Certain Improvements in the Apparatus or Machinery used in the Process of Brewing and Distilling:**" in which said Letters Patent is contained a proviso, that I, the said Æneas Coffey, 15
shall cause a particular description of the nature of my said Invention, and in what manner the same is to be performed, to be inrolled in His said Majesty's High Court of Chancery within six calendar months next and immediately after the date of the said in part recited Letters Patent, as in and by the same, reference being thereunto had, will more fully and at large 20
appear.

NOW KNOW YE, that in compliance with the said proviso, I, the said Æneas Coffey, do hereby describe the manner in which my said Invention

is to be performed by the following description thereof, reference being had to the Drawing annexed, and to the figures and letters marked thereon, that is to say :—

5 My first invention is an improved apparatus for cooling brewers' or distillers' wort; which apparatus is also applicable to other purposes in the processes of brewing and distilling, and is constructed as follows :—

I cause a number of pipes or tubes to be made of thin sheet copper or other metal, but copper tinned I consider to be the best material. These pipes or tubes are to be straight, open at each end, of moderate length, and of small
10 diameter. By moderate length I mean such length as that each tube, when in an upright or perpendicular position, can be conveniently cleansed by means of a straight rod with a bit of sponge on the end of it, or by any similar device. I have found six feet in length and one inch diameter to be convenient dimensions, but other sizes may perhaps answer equally well. It is
15 necessary, however, that all the pipes used in the same apparatus be of equal length. I next procure two vessels of size proportionate to the number of tubes, which vessels I consider to be best made of copper, but other materials may answer. One of these vessels, which I call the uppermost vessel, is open at the top, and its bottom is to be perforated with holes equal in diameter and number
20 to the diameter and number of the pipes intended to be used, and which holes may be from one to three inches, or more, distant or separated from each other. The other vessel, which I call the undermost vessel, is a closed vessel, except that it has a pipe with a discharge cock at the bottom, and that its top is to be perforated with holes exactly in the same manner as the bottom of
25 the uppermost vessel (that is to say), it is to be so perforated that if the bottom of the uppermost vessel be laid on the top of the undermost vessel the holes in each will correspond. One end of each of the tubes or pipes is to be then firmly fixed in one of the holes in the top of the undermost vessel and the other end of each tube or pipe in the corresponding hole in the bottom of
30 the uppermost vessel; and the whole being erected in its proper position, the uppermost vessel will be elevated perpendicularly over the undermost, and the distance between them equal to the length of one of the pipes or tubes, each of which pipes or tubes will form a perpendicular communication, through which any liquid poured into the uppermost vessel may descend in the undermost,
35 and be drawn off through the discharge cock of the latter. When the apparatus is to be used for cooling wort, it is to be immersed in a cistern or bath of competent dimensions, which bath should be fed by a sufficient supply of cold water flowing in at the bottom, and out at the top thereof. The hot wort being then let into the uppermost vessel is cooled in its passage down the
40 perpendicular pipes or tubes, and may be drawn off through the discharge cock in quantity proportioned to the size of the apparatus. I do not make an exclusive claim to the principle or practice of using pipes or tubes immersed in water for cooling brewers' or distillers' wort; but I claim as new, and my

invention, the improved arrangement of such pipes, by dividing them into short straight lengths perpendicularly fixed, and opened at the top, as hereinbefore described and set forth; which arrangement almost entirely prevents the deposition of sediment in the pipes, and allows the person superintending them at all times, even when they are in action, to keep them perfectly clean by the simple application of a bit of sponge at the end of a straight rod, and thus their conducting power is preserved in its full energy during the longest process, which is not the case with any other arrangement of cooling pipes. The same arrangement of pipes may also be used with advantage to heat wort or distillers' wash by making the external cistern or bath steam-tight, and surrounding the pipes with steam instead of water.

The annexed drawing, Figure 1, shews a section of an apparatus for cooling wort. E, F, G, H, is the upper vessel; I, K, L, M, the lower vessel. The bottom G, H, and the top I, K, are united by the tubes or pipes *o, o, o*; *p, p*, is a larger tube in the centre to allow room for a spindle for turning an agitator, *r, s*. A, B, C, D, the bath or cistern, supplied through the pipe Y with cold water, which flows off heated through T. The vessels E F G H, I K L M, may be of any shape; but I consider cylindrical vessels as the most convenient in general.

My next improvements are in the apparatus used in the process of distilling and I describe them with reference to the Drawing annexed, marked Figure 2. A, B, B, is a section of the principal part of the distilling apparatus strictly so called, wherein the wash is deprived of its alcohol, and the vapours analysed. It consists of a cylindrical or rectangular vessel A, surmounted by a distilling column B, B, the horizontal section of which may be either cylindrical or rectangular; but I have found it most convenient when rectangular. The lower part, forming about one-half the length of their column, is divided into compartments by horizontal plates of thin copper or other metal. Each of these plates turns down at one end until it nearly touches the plate beneath it, as shewn at *d, d, d, d*, &c. and leaves a passage by which any liquid falling on a plate may descend to that next under it, and so on from plate to plate at the alternate ends, until the liquid falls into the vessel A through the pipe W. Each plate is furnished with several light valves opening upwards, through which the steam may ascend, and it may also be performed with holes for that purpose; but these holes must not be so numerous or so large as to admit of all the steam passing up through them without raising the valves. C is a pipe through which the alcoholic vapour, after having been analyzed and raised to the required strength, is conveyed into a close vessel D, in which it is condensed on the surface of the pipe *o, o, o*, and falls in a liquid state into the pipe E, and is carried forward to a small worm or refrigeratory of the ordinary construction, which is not shewn in the Drawing; F, a vessel through which the spent wash flows after being discharged from the distilling apparatus in a state of ebullition; G is a wash charger or elevated vessel,

containing the wash to be distilled. Instead of this elevated vessel a force pump may in most instances be advantageously substituted to drive the wash through the distilling apparatus with the required velocity. *o, o, o, o, o, o*, is the pipe through which the wash is to be forced with considerable velocity, 5 either from a wash charger sufficiently elevated, or by the use of a force pump. It is necessary that this velocity should be such as to prevent the deposition of sediment in the pipe. The requisite velocity and the diameter of the pipe may therefore vary according to the thickness or thinness of the wash; I would not recommend with any corn wash a less velocity than an hundred feet per 10 minute. The pipe *o, o, o*, through which the wash is thus forced, passes first into the spent wash cistern *F*, then through the close vessel *D*, and lastly through the upper part of the distilling column, in each of which, by a number of coils or turns into the pipe, the wash is detained long enough to acquire a considerable increase of temperature, until it is at last discharged nearly boiling 15 on the upper plate at *m*, and comes into contact with the vapours rising from below. Care must be taken that the wash shall not reach its boiling temperature while enclosed in the pipe *o, o*, for which purpose a thermometer is to be fixed at *n*, by attending to which and by increasing or diminishing the supply of wash through the cock *x*, this temperature may be regulated at pleasure. 20 The wash as discharged from the pipe *o, o*, flows along the upper plate, falls at *d* on the next plate, flows over this and again falls, and so on alternately until it reaches the vessel below through the pipe *w*, from whence it is discharged into the spent wash cistern through the cock *P*; at the same time a sufficient quantity of steam generated in a proper boiler, not shewn in the Drawing, is 25 conveyed into the apparatus through the pipe *R, R*, the lower part of which within the vessel *A* is perforated with small holes, the better to spread and divide the steam. This steam passes up through the plates, partly by the holes perforated in them, and partly through the light valves, which yield to a very slight pressure. In thus passing up through the column, the steam goes 30 through the layer or stratum of wash flowing over the plates, and thus the steam is made to pass through every portion of the wash as many times as there are horizontal plates in number. The wash, during its course, parts with some of its alcohol to the steam on every plate until it is entirely deprived of its strength or spirit, which it will be in general on seven or eight plates; 35 but it will be prudent to guard against accidents or inattention by employing a greater number, as shewn in the Drawing. *a* is a steam pipe, about half an inch diameter, rising from the vessel *A*, and opening into a small box *b*, from which rises a small worm, immersed in a water bath. The steam enters the lower part of the worm, and a sufficient supply of water is given to the bath to 40 condense the much greater portion which falls back through the pipe *e*; a very small quantity of this steam is allowed to pass up uncondensed, and issues at the upper orifice of the worm, which is contracted to about one-eighth or one-tenth of an inch diameter. The flame of a lighted taper or small lamp is to be

kept constantly at the orifice, and should the smallest quantity of alcohol find its way down with the wash to the lower vessel it will be immediately detected by the vapour taking fire, and thereby warning the attendant to increase the supply of steam from the boiler, or to diminish the supply of wash, or both, as he may see fit. The distilling apparatus, which I have herein described, may be varied in many of its details according to local and other circumstances, but the improvements which I claim as new, and as my Invention, are,— 5

First, the plan and practice of forcing the wash to pass rapidly through a pipe or pipes of small diameter, during the time it is acquiring heat and before it reaches its boiling temperature. 10

Second, the plan and practice of causing the wash, after it has come in contact with the vapours, to flow into a continued and uninterrupted stream over numerous metallic plates, furnished with valves, as herein described.

And third, the method of ascertaining whether or not the wash exhausted of its alcohol by means of the apparatus herein described or any similar apparatus, whereby the vapour to be tried undergoes a process of analyzation or rectification, and is deprived of much of its aqueous part before it is submitted to trial. 15

In witness whereof, I, the said Æneas Coffey, have hereunto set my hand and seal, this Fifth day of February, One thousand eight hundred and thirty-one. 20

ÆNEAS COFFEY. (L.S.)

WILSON.

AND IT BE REMEMBERED that on the Fifth day of February, in the year of our Lord 1831, the aforesaid Æneas Coffey came before our said Lord the King in His Chancery, and acknowledged the Specification aforesaid, and all and every thing therein contained and specified, in form above written. And also the Specification aforesaid was stamped according to the tenor of the Statute made for that purpose. 25

Enrolled the Fifth day of February, in the year of our Lord One thousand eight hundred and thirty-one.
