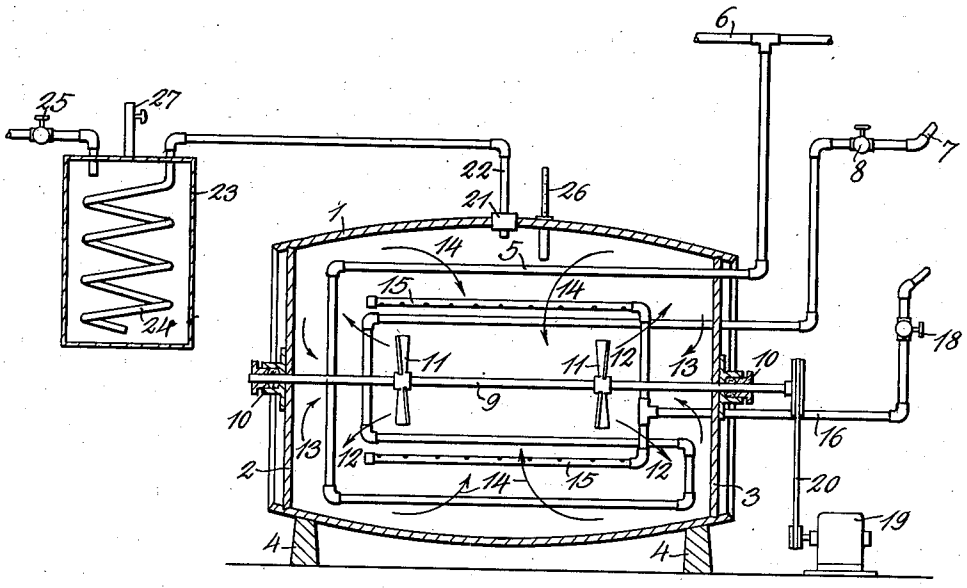
Feb. 5, 1935. A. B. CAYWOOD 1,990,266

PROCESS OF AGING LIQUOR

Filed Oct. 13, 1933



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Patented Feb. 5, 1935 1,990,266

UNITED STATES PATENT OFFICE

1,990,266

PROCESS OF AGING LIQUOR

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Application October 13, 1933, Serial No. 693,464

1 Claim. (Cl. 202—78)

This invention relates to improvements in methods for aging spirits such as commercial alcohol.

It is well known that raw spirits of alcohol contain harmful ingredients such as acetic acid, fusel oil, methyl alcohol and perhaps other chemicals that must be removed before the ethyl alcohol is considered fit for human consumption.

Several methods have been employed in the past for aging spirits, but all of them require a comparatively long time to effect the purpose and therefore are not suitable except where sufficient time is available. In many cases the government refuses to release liquor from bonded warehouses unless it has been stored for at least five years, which therefore makes a delay between the production and the consumption which can only be given where production has for a time been well ahead of consumption so as to store up a surplus.

It is the object of this invention to produce a method of aging which will accomplish substantially the same results as the older methods in a comparatively short space of time and which method therefore lends itself particularly to the manufacture of alcoholic liquors at this time when there is not a sufficient surplus available to permit the old aging and rectifying processes to be employed.

The method that forms the subject of this invention, briefly described, consists in enclosing the liquor in a cask whose inner surface has been charred by fire in the usual manner. Steam pipes are provided within the cask and properly connected with a supply of steam so that the temperature of the liquor can be raised to any extent desired and increased at any rate desired. The liquor is usually first raised to a temperature of 110 degrees Fahrenheit, after which it is gradually increased along a straight line gradient until at the end of ten hours the temperature has attained 150 degrees Fahrenheit, which temperature is slightly below the boiling point of ethyl alcohol. Simultaneously with the heating, air is introduced under pressure and this is mixed with the liquor by means of impellers or agitators which serve to keep the liquor in continuous movement and to thoroughly mix the air bubbles therewith so as to produce an oxidizing effect which assists very greatly in the removal of objectionable constituents.

After the liquor has been heated for ten hours, as indicated, while being aerated and agitated, it can be removed to other casks, whose sides have been charred and is then kept at a temperature of between 95 and 100 degrees Fahrenheit for a period of thirty days, whereupon the liquor can be removed and bottled and will then be found in prime condition for consumption.

In carrying out the process an apparatus is employed which has been shown on the drawing in elevation with parts in vertical section. In the single view on the accompanying drawing, and which consists of a barrel preferably made from white oak, and which has been indicated by reference numeral 1, the ends of the barrel are closed by means of closures 2 and 3, the entire inner surface of the barrel or cask being charred as above indicated. The barrel rests on cradles 4 and located within the barrel is a coil 5 of copper tubing which has one end connected with the steam pipe 6 and the other end connected with the sewer pipe 7. A valve 8 serves to control the rate at which steam is permitted to enter the pipe 5 and to condense therein and by properly regulating the exit by means of valve 8 the temperature can be made to remain constant over any period of time or can be gradually increased along a predetermined gradient as may be desired. A shaft 9 is mounted for rotation in suitable bearings 10 at the ends of the barrel and this shaft carries propellers 11 that are reversely arranged in such a manner that when the shaft is rotated at the proper speed, the propellers will set up currents which circulate outwardly on a diagonal as indicated by the arrows 12 in the drawing. Some of the liquor returns along the path indicated by arrow 13 and another portion returns along the path indicated by arrow 14. It is now apparent that when the agitators are operating there will be a continuous circulation of the liquor within the barrel. In order to introduce air into the liquor during the aging process two or more pipes 15 are located within the barrel and are connected with the inlet pipe 16, that is provided near its end with a valve 18 which serves to control the flow of air into the liquor. A motor 19 is provided which has been shown as connected with the shaft 9 by means of a belt 20. It is, of course, apparent that any suitable way of transmitting power from the motor to the shaft can be employed. In order to remove the liberated vapor, the bung 21 has been provided with an opening for the reception of a pipe 22. This pipe extends to a condenser 23 and preferably terminates in a coil 24. The condensate fills the condenser and serves as a cooling medium for the vapors as they enter the coil. The fixed gases and condensate are removed from the condenser by means of a pump 25, and the latter can then be subjected to fractional distil-

lations for the purpose of separating the different parts which separation is usually not attempted during the rectification of the liquor. A thermometer 26 is usually provided so that the attendant can determine at any time the temperature of the liquor within the barrel. Instead of an ordinary thermometer, it is, of course, possible to employ a recording thermometer so that a permanent record can be had of the temperature conditions that prevailed during the aging process. The apparatus shown in the drawing is filled with liquor to within a short distance of the top, after which the steam is allowed to flow and heat the liquor until it reaches a temperature of 110 degrees F. During the heating the agitators are usually kept in operation so as to assure a uniform temperature throughout all parts of the barrel and to uniformly aerate the contents. After the temperature has reached 110 degrees, the rate of flow of steam is increased so that slightly more heat is liberated than that lost by radiation and evaporation and the temperature gradient is so adjusted that a temperature of 150 degrees F. will be reached at the end of ten hours. As acetic acid has a boiling point of substantially 118 degrees Fahrenheit, this constituent will begin to distill over as soon as this temperature is reached. Fusel oil has a boiling point of about 120 degrees Fahrenheit, and this will be the next to distill over, and in this way the harmful constituents are removed by fractional distillation.

By increasing the temperature gradually from 110° F. to 150° F. a fractional distillation is effected which is more effective for the purpose than if the contents were quickly raised to the highest temperature required and kept constant for by such a procedure the many volatiles would be evaporated simultaneously whereas with the method employed by me the harmful ingredients are eliminated in the order of their volatility which produces the best results.

During the period of fractional distillation air is introduced through openings in pipe 15, and this will be thoroughly mixed with the liquor by the action of the impellers. The oxygen contained in the air will serve to oxidize any organic materials and will also serve to combine with the vapors so as to increase the volume of the latter and the undissolved air will pass off with the vapors into the condenser from which it will be ultimately removed as fixed gases through a pipe 27.

After the liquor has been subjected to fractional distillation at a gradually rising temperature for a period of ten hours, it can then be removed from the rectifying barrel and placed in other barrels having charred inner surfaces, after which it is maintained in a heated room and at a temperature varying from 95 to 100 degrees Fahrenheit for a period of about thirty days. At the end of this period, the liquor will be found to be in suitable condition for consumption and experience has shown that liquors rectified and aged in the manner disclosed above are substantially equal to those that have been aging for a number of years, and this method is therefore especially well adapted for use where sufficient time is not available for the ordinary aging methods, and besides by using a method like the one described, the cost of the process is greatly decreased and it is also unnecessary to carry as large a stock as otherwise because on account of the shorter period of treatment, a smaller surplus will be sufficient to take care of the market needs.

Having described the invention what is claimed as new is:

The method of rectifying and aging distilled alcoholic spirits which consists in confining the liquor in a container in contact with charcoal, agitating the same in the presence of air and simultaneously increasing its temperature from 110 degrees Fahrenheit to a point slightly below the boiling point of alcohol, the temperature increase taking place over a period of about ten hours whereby the constituents having a lower boiling point than alcohol will be distilled off in the order of their volatility, then maintaining the liquid at a temperature between 95 and 100 degrees Fahrenheit for a period of about thirty days, and removing the vapors released during the heating period.

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