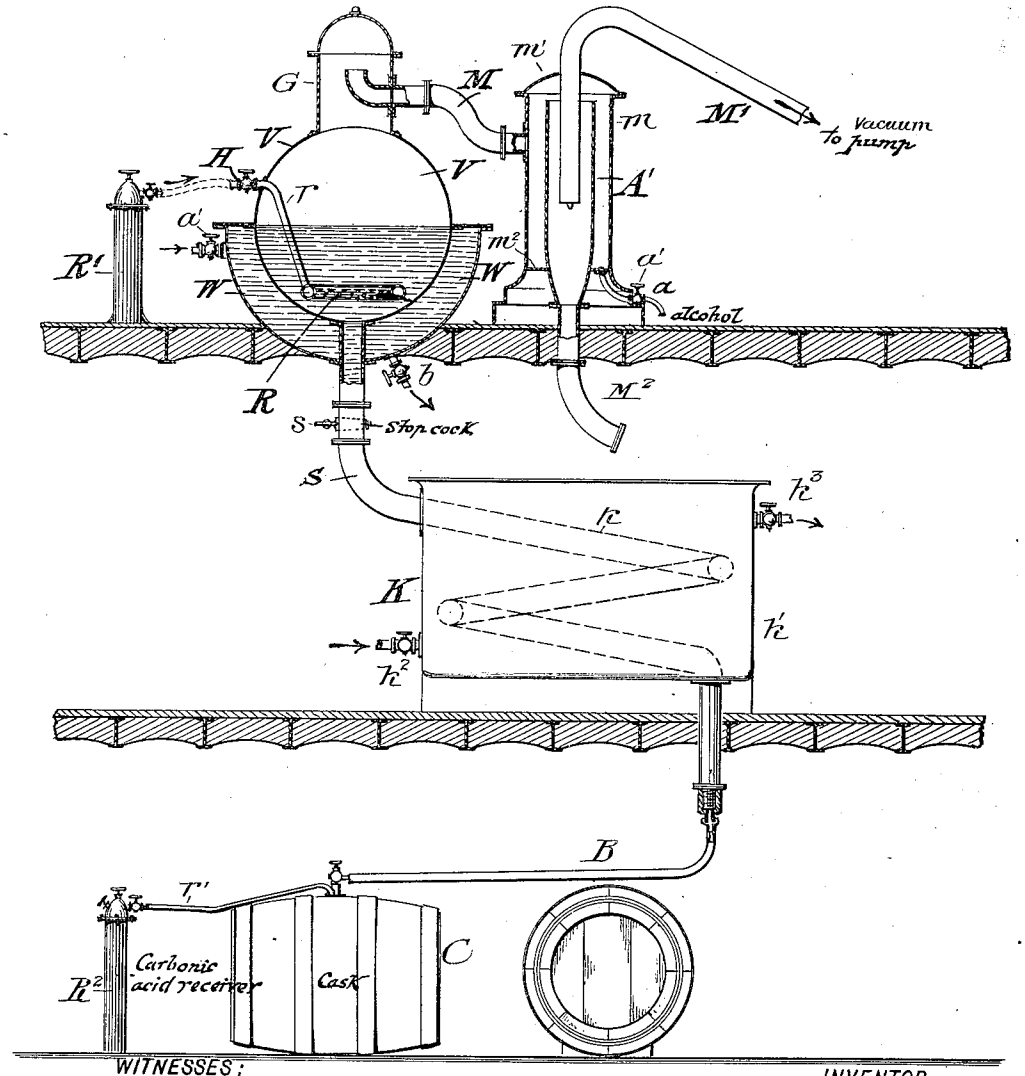
No. 662,172. Patented Nov. 20, 1900.

A. MÜLLER.

PROCESS OF PRODUCING DEALCOHOLIZED FERMENTED BEVERAGES.

(Application filed July 17, 1900.)

(No Model.)



WITNESSES:

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AUGUST MÜLLER, OF STUTTGART, GERMANY.

PROCESS OF PRODUCING DEALCOHOLIZED FERMENTED BEVERAGES.

SPECIFICATION forming part of Letters Patent No. 662,172, dated November 20, 1900.

Application filed July 17, 1900. Serial No. 23,897. (No specimens.)

To all whom it may concern:

Be it known that I, AUGUST MÜLLER, Ph. D., a citizen of the Empire of Germany, residing in Stuttgart, in the Kingdom of Würtemberg, Germany, have invented certain new and useful Improvements in Processes of Producing Dealcoholized Fermented Beverages, of which the following is a specification.

The object of the present invention is to provide a process by which an alcohol-containing fermented beverage, as beer, may be deprived of some or all of its alcohol, as desired, without injuring the color, smell, or taste of such beverage. A successful process of this kind has long been sought, but was difficult to obtain by reason of the fact that the heating of the beverage, in contact with air, to a temperature sufficient to distil off the contained alcohol brings about other and undesirable changes in the condition of the beverage—such, for instance, as the gumming of the ethereal oils and precipitation of a portion of the soluble substances. For overcoming these disadvantages this invention consists in subjecting the alcohol-containing beverage to distillation at less than ordinary atmospheric pressure in an atmosphere of carbonic-acid gas. The process is facilitated if the beverage is at the same time continuously agitated.

The process may be conveniently carried out in the apparatus shown in the accompanying drawing.

V indicates a vacuum-pan of any suitable construction, provided with a suitable valved pipe for supplying the beverage to the pan. This pipe being located preferably at the end of the pan (not shown in the sectional view) does not appear in the drawing. A water-bath W is preferably employed for heating the pan, as a uniform temperature is thereby easily obtained. Pipes *a* and *b* serve for admitting water to and withdrawing the same from the bath. The head G of the pan V is connected by a pipe M with the shell *m* of a condenser A. Through the top *m'* of the condenser a pipe M' extends into the condenser-tube A', said pipe being connected at its outer end with a vacuum-pump of any suitable construction. To the bottom m^2 of the condenser is connected a discharge-pipe *a*, provided with a cock *a'* for drawing off the alcohol collecting in the condenser. The condenser-tube A' is simply a plain tube, as indicated in the drawing, and is connected in any suitable manner at its lower end to a pipe M^2, through which alcohol condensing within the tube is conducted off to any suitable receptacle. In the pan V is located, preferably near the bottom of the same, a perforated coil R, which is supplied with carbonic-acid gas from a receiver R' through a pipe *r* having a stop-cock H. The pan V is also provided with a thermometer and vacuum-gage. (Not shown.) A pipe S, having a stop-cock *s*, connects the pan V with the coil *k* of a cooler K, the tank *k'* of which is provided with inlet and outlet pipes k^2 k^3, respectively, for the cooling-water with which the tank is filled. The coil *k* is connected at its lower end by a hose-pipe B with the cask in the cellar, a receiver R^2 of carbonic-acid gas being also preferably connected with said cask C by a suitable pipe *r'*.

The process is carried out in this apparatus in the following manner: Before supplying the beverage to be dealcoholized into the pan V the cock H is turned on, and all the air contained in the pan is forced out by the carbonic-acid gas, so that an atmosphere of the latter gas is created in the pan. The beverage is then admitted. Carbonic-acid gas is permitted to escape from the coil R and rise through the beverage continuously during the distillation, thereby agitating the same and facilitating the operation. When the temperature of the beverage becomes about 40° centigrade, the air-pump is slowly set in motion, so as to prevent the too-violent agitation of the beverage by the escape of the carbonic acid incorporated therein. The vacuum in the pan is then gradually increased by proper regulation of the supply of carbonic-acid gas and the speed of the vacuum-pump until a pressure of about fifty-five milimeters is indicated on the vacuum-gage, at which pressure the distillation is continued. From time to time a sample may be taken from the pan and tested as to the quantity of alcohol contained therein. When the desired amount is driven off, the process is terminated and the low pressure in the pan equalized to the atmospheric pressure by an extra supply of carbonic-acid gas. The stop-cock *s* is then

opened and the beverage conducted through pipe S into the coil *k* and thence into the casks in the cellar, in which it is allowed to remain, preferably, for a few days under a pressure of from one to one and one-half atmospheres of carbonic-acid gas, when it is ready for use. The alcohol distilled off passes with the carbonic-acid gas from the coil R through the pipe M into the condenser. Here the alcohol condenses and collects at the bottom m^2 of the condenser, from which it may be drawn off through pipe *a*, and a portion of the alcohol condenses within the condenser-tube A′ and flows off through the pipe M^2. The carbonic-acid gas is drawn off through the pipe M′ to the vacuum-pump and may be disposed of in any suitable manner.

The dealcoholized beverage produced by the process compares favorably in color, smell, and taste with the original alcohol-containing beverage. The alcohol obtained by the process is pure and colorless and is suitable for general use in the arts.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The herein-described process of producing dealcoholized fermented beverages, which consists in subjecting the alcohol-containing beverage to distillation at less than ordinary atmospheric pressure, in an atmosphere of carbonic-acid gas, substantially as set forth.

2. The herein-described process of producing dealcoholized fermented beverages, which consists in subjecting the alcohol-containing beverage to distillation at less than ordinary atmospheric pressure, in an atmosphere of carbonic-acid gas, under continuous agitation, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

AUGUST MÜLLER.

Witnesses:
HEINRICH ZIEGLER,
OSCAR BAROSS.