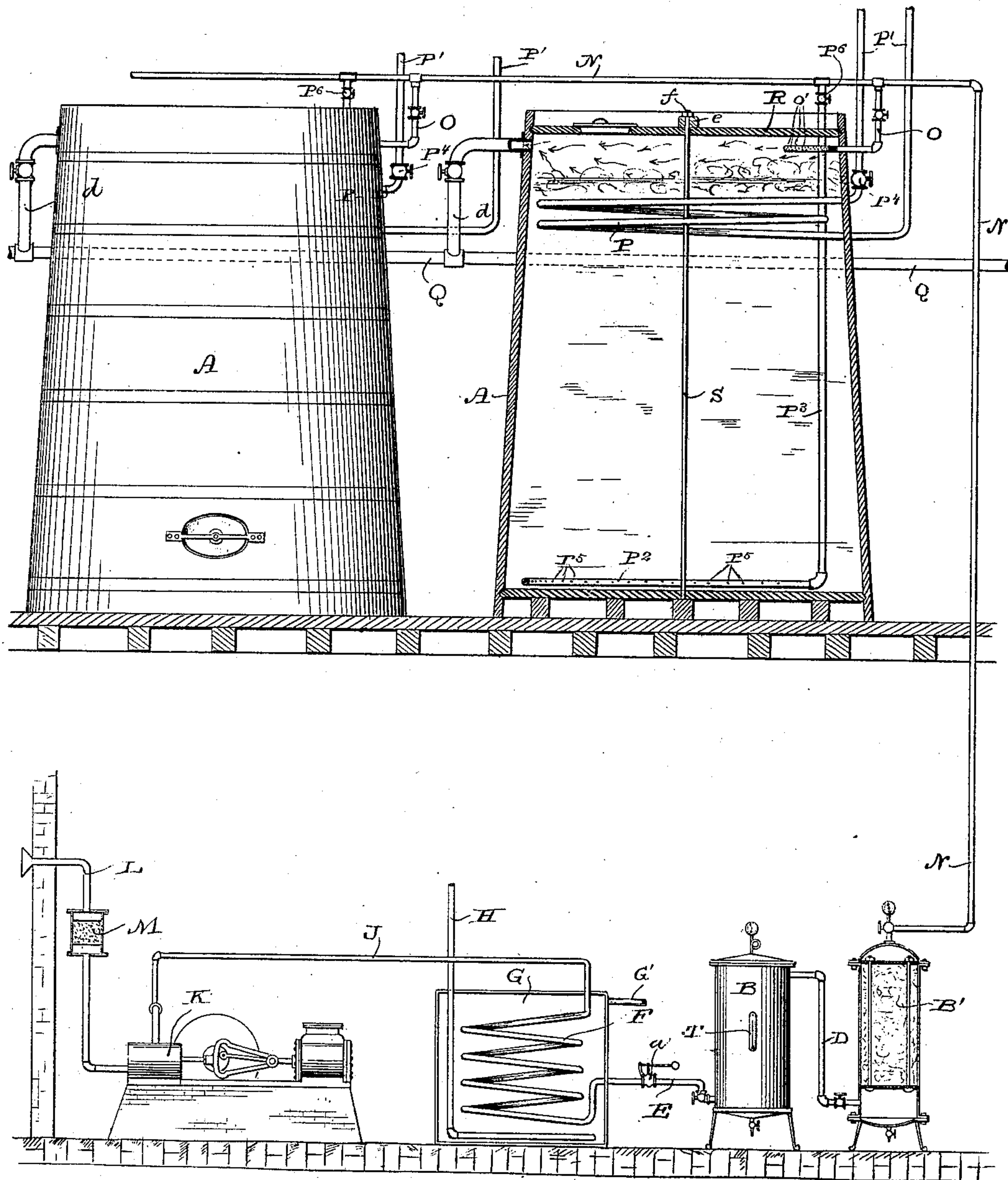


(No Model.)

J. F. THEURER.  
DEVICE FOR FERMENTING BEER.

No. 452,149.

Patented May 12, 1891.



Witnesses  
Geo. W. Young,  
William K. Hug

Inventor  
Jacob F. Theurer.  
By H. G. Underwood  
Attorney



# UNITED STATES PATENT OFFICE.

JACOB F. THEURER, OF MILWAUKEE, WISCONSIN.

## DEVICE FOR FERMENTING BEER.

SPECIFICATION forming part of Letters Patent No. 452,149, dated May 12, 1891.

Application filed July 25, 1890. Serial No. 359,921. (No model.)

*To all whom it may concern:*

Be it known that I, JACOB F. THEURER, of Milwaukee, in the county of Milwaukee, and in the State of Wisconsin, have invented certain new and useful Improvements in Devices for Fermenting Beer; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to the treatment of beer, and will be fully described hereinafter.

In the drawing, the figure represents a pair of fermenting-tubs which may form part of a series, together with apparatus for supplying filtered air to the fermenting-tubs at any desired temperature.

A are the fermenting-tubs, and B is an air-chamber, B' an air-filter, and D is a pipe that leads from the air-chamber B to the bottom of filter B', while E is another pipe that leads from the bottom of air-chamber B into a coil F, that is located in a tank G, into which a pipe H leads from a steam or hot or cold air or water supply, the coil F having a connection J with an air-pump K, that gets its air through a pipe L, that leads from the outer air, which pipe may, if found desirable, contain a filter M.

The pressure of air in chamber B may be regulated by a pressure-valve *a*, that is located between the chamber B and the coil proper. A pipe N leads from the top of filter B' up to the fermenting-tubs, and a small perforated pipe O leads from the horizontal portion of pipe N into each of the tubs A.

P is a coil, one of which is located in each tub A, and pipes P', having valves P<sup>4</sup>, lead from any convenient water-circulating medium into these coils.

A coil P<sup>2</sup>, having minute perforations P<sup>5</sup>, is located in the bottom of each fermenting-tub A, and this lower coil is connected by a pipe P<sup>3</sup> with the air-pipe N, a valve P<sup>6</sup> being provided for regulating the supply of air to this lower coil, whose purpose is to aerate the contents of the tub A. Another pipe Q is connected with each tub by an upwardly-extending pipe *d*, and this pipe is to carry off any excess of carbonic-acid gas that is generated by the fermentation, as well as the air from pump K. The lid R of each fermenting-tub is held securely in place by a tie-rod S, that passes up from the bottom of the tub through

a cleat *e* to receive a nut *f*, by which it is held down in place.

The pump K may be of any desired form having a regulator to give the desired pressure.

The operation of my improved apparatus is as follows: In warm weather it is desirable to reduce the temperature of the air which is forced into the fermenting-tubs before it reaches said tubs. This reduction of the temperature of the air is very cheaply and readily effected by means of the temperature-regulating tank G, through which a circulation of water is maintained. The air passing through the coil in said temperature-regulating tank is cooled by the contact of the water with said coil, and by means of the forcing device the reduction of the temperature of the air is further assisted by the compression of said air in said pipes, by which compression the air is caused to more readily part with its heat, which is taken up by the water in the tank G. In order to maintain any desired temperature, it is only necessary to regulate the speed of the air-forcing device so as to maintain a certain specified pressure in said pipes. A thermometer T indicates the temperature of the air within the reservoir or tank B. By means of the automatic pressure-valve *a* between the air-tank B and the temperature-regulating tank G, the pressure of the air in said tank B is automatically regulated, and the uniformity of the temperature of the air which passes into the fermenting-tubs is therefore insured. The process of fermentation has a tendency to raise the temperature of the liquid in the tubs, and in order to regulate the temperature of said liquid the coil P is employed, which coil is connected with a source of supply of a suitable temperature-regulating fluid, by the circulation of which in said coil the temperature of the fermenting liquid may be regulated to any desired degree. During the first stages of fermentation the valve P<sup>6</sup> is opened, so as to admit a proper supply of air to the pipe P<sup>3</sup>, and said air then passes through coil P<sup>2</sup> and out through perforations P<sup>5</sup> into the liquid. By reason of the employment of the coil P to regulate the temperature of the fermenting liquid it is only necessary to force just the proper amount of air



through the coil P<sup>2</sup> into the liquid to properly aerate and oxygenate the liquid so as to keep up a lively fermentation, and the maintaining of the temperature of said liquid is therefore not dependent upon the quantity of air forced through it. If in cold weather the air is too cold for the purposes of fermentation, a circulation of warm water is maintained in the tank G, and the air passing through said tank is warmed to the proper degree of temperature. During the last stages of fermentation it is no longer necessary to aerate the liquid to any extent, and the valve P<sup>6</sup> is therefore either partially or entirely closed. Now, in order to effectually carry off the carbonic-acid gas from the interior of the tubs, the valve-governing pipe O is opened and air from pipe N is admitted through said pipe to the tubs above the liquid. This pipe O is preferably arranged circumferentially around one side of the tub and provided with perforations for the discharge of air, so as to blow fresh air over the entire surface of the liquid in the tub and drive the carbonic-acid gas out through branches d and pipe Q.

By my improvements I am enabled to ferment in closed tubs, and all annoyance and danger due to the presence of carbonic-acid gas in the fermenting-cellar is obviated, while I am at the same time enabled to regulate the process of fermentation, as may be desired, by the employment of the aerating and temperature-regulating devices before described.

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

1. In a system for fermenting, the combination, with a fermenting-tub, of a regulated air-forcing device, a temperature-regulating tank interposed between the air-forcing device and the tub, an air-pipe leading from the air-forcing device through said temperature-regulating tank and arranged to discharge air into the liquid at the bottom of the tub, and a temperature-regulating coil within the tub, substantially as described.

2. In a system for fermenting, the combi-

nation, with a closed fermenting-tub, of a regulated air-forcing device, a temperature-regulating tank interposed between the air-forcing device and the tub, an air-pipe leading from the air-forcing device through said temperature-regulating tank and provided with branches, one of said branches arranged to discharge air into the liquid at the bottom of the tub and the other to discharge air into the top of the tub above the liquid, and a temperature-regulating coil located within the tub, substantially as described.

3. The herein-described system for fermenting in closed tubs, consisting in the combination of a regulated air-forcing device, a pipe communicating with said air-forcing device and extending to the outside of the building, a temperature-regulating tank, a coil in said tank connected at one end with said air-forcing device and at the other with an air-chamber, air-pipes leading from said air-chamber to the top and bottom of the fermenting tub or tubs, and a filter or purifier located between said air-chamber and the tubs, substantially as described.

4. The combination, in a system for fermenting in closed tubs, of a regulated air-forcing device, a temperature-regulating device, a pipe leading from said air-forcing device through said temperature-regulating device to the tubs and provided with branches arranged to deliver air into the liquid at the bottoms of said tubs and into the tops of said tubs above the liquid, respectively, temperature-regulating coils located in said tubs, and pipes leading from the tops of said tubs to the exterior of the building for carrying off the gases of fermentation, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

JACOB F. THEURER.

Witnesses:

H. G. UNDERWOOD,  
WM. KLUG.