

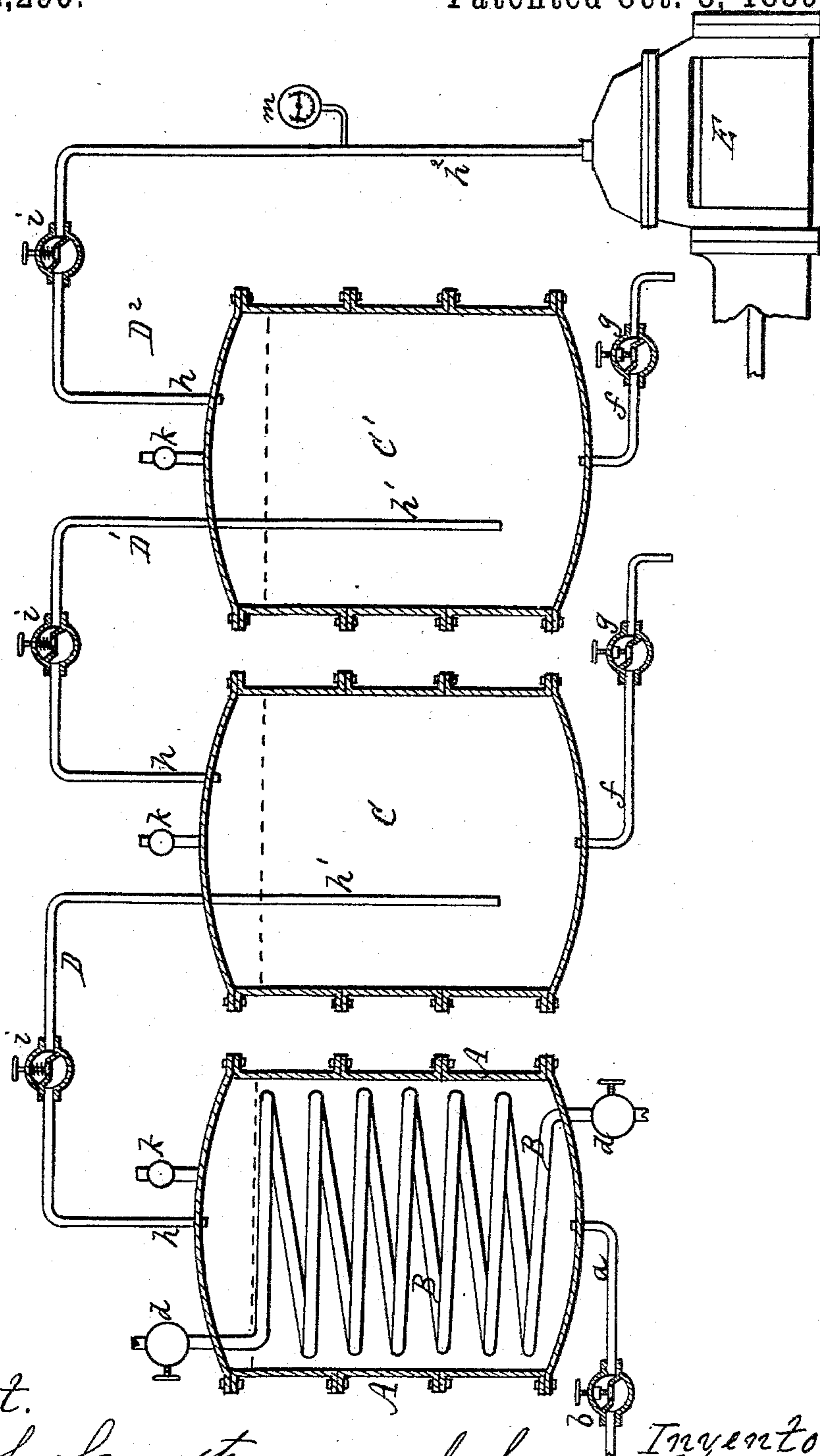
(No Model.)

J. M. PFAUDLER.

APPARATUS FOR COOLING LIQUIDS.

No. 412,290.

Patented Oct. 8, 1889.



Attest.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR COOLING LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 412,290, dated October 8, 1889.

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To all whom it may concern:

Be it known that I, JOHN M. PFAUDLER, of Rochester, in the county of Monroe and State of New York, have invented a certain new and useful Improvement in Apparatus for Cooling Liquids; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the drawing accompanying this specification.

My improvement relates to apparatus for cooling liquids, and is particularly applicable to cooling beer and other malt liquors.

The ordinary method of cooling beer is in open pans, subject to the atmosphere, where the temperature is partially reduced, after which the liquid is drawn off over cooling-pipes to finish the operation. The process is necessarily very slow and is liable to many objections, as filth and dirt are liable to get into and contaminate the liquid.

My invention consists of a vacuum apparatus for the purpose constructed, arranged, and operating as hereinafter described and definitely claimed.

The drawing shows a central longitudinal vertical section of the apparatus, parts being in elevation.

A indicates the receiving-tank, the same being a vessel of any desired form and size, but closed, so that a vacuum may be produced therein by the means hereinafter described. The liquid is entered into and discharged from the tank through a pipe *a* at the bottom, which is provided with an ordinary cut-off valve *b*.

B is a coil of pipe that rests inside the receiving-tank, the same entering at the bottom and passing through the top, and being provided with one or more cut-off valves *d d*, as shown. Cold water or any other cooling liquid or fluid is passed through the pipe to cool the liquid in the tank.

C C' are cold-water-condensing tanks, of which one or more may be used, as desired. They are also made air-tight, and are designed to hold cold water to condense the steam that is drawn off from the receiving-tank A. The cold water is fed into and discharged from these tanks through pipes *f f*, that are provided with cut-off valves *g g*.

D D' D² are exhaust-pipes connecting the

several tanks A C C'. One end *h* connects with the top of one tank, while the other end *h'* extends down nearly to the bottom of the next tank, so as to be immersed in the water. The final end *h²* of the last pipe connects with the ordinary exhaust-pump E, as shown at the right hand in the drawing. Each of these exhaust-pipes is provided with an automatic check-valve *i*, which allows the steam to pass off in the direction of the pump, but prevents any return. The tanks are each provided with a vent *k*, which allows air to escape when the liquid is fed in and to enter when the liquid is drawn off.

m is a vacuum-gage connected with the pipe D² to indicate the vacuum.

The operation is as follows: The hot beer or other liquid is let into the receiving-tank A, which is filled to any desired height, but not so as to cover the end *h* of the exhaust-pipe D, which end opens through the top of the tank. Cold water is also let into the tanks C C', so as to cover the ends *h' h'* of the pipes D D', but not the ends *h h*. The pump E is now worked to draw off the steam. The body of steam in the receiving-tank passes back through pipe D by reason of its pressure and the greater portion is condensed in the first water-tank C. Such portion as is not condensed passes up into the air-space at the top of C, and thence escapes into the next tank C', where the greater portion is condensed; but such portion as escapes through the water to the top of C' is drawn off by the pump. This amount is so small that the pump is not affected by excess of steam as it would be if connected directly with the top of tank A. In the cooling of beer the liquid is very hot, and a very large volume of steam is raised, which has to be rapidly removed in order to cool the beer rapidly. Most of this steam is condensed before it reaches the pump, and the exhaust from that is sufficient to remove it quickly. Consequently the reduction of the temperature is very rapid.

After the steam has been removed, as above described, and as the next step in the process, the pipe B in the receiving-tank is opened and cold water or any other cooling agent is passed through the same to cool the liquid by conduction. The temperature has become sore-

duced at that time that the running of the cold water through the pipe will finish the cooling very expeditiously.

By the use of this apparatus liquids can be cooled much more rapidly than by the old process, where they are open to the air, with the great advantage of cleanliness by excluding all dirt and foreign substances. A great saving in labor and expense is effected.

It should be understood that I do not limit my invention to the cooling of beer or other malt liquors, but design that it shall cover the cooling of all liquids or other substances where such a process can be used.

The water in the tanks C C' can be changed as often as necessity requires. The heated water in the tanks can be drawn off for other purposes, and in breweries especially it would be of service in washing, &c., as large quantities of heated water have to be used, and generally specially heated for the purpose.

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

1. In an apparatus for cooling liquids, the

combination of a closed receiving-tank, a closed condensing-tank containing a cooling-liquid, a pipe leading from the top of the receiving-tank to the interior of the condensing-tank, an exhaust-pump, and a pipe leading from the top of the condensing-tank to the pump, as and for the purpose specified.

2. In an apparatus for cooling liquids, the combination of a closed receiving-tank, a closed condensing-tank, an exhaust-pump, a pipe connecting the top of the receiving-tank with the interior of the condensing-tank, a pipe connecting the top of the condensing-tank with the pump, said pipes provided with check-valves, and a cooling-pipe extending through the receiving-tank, as shown and described, and for the purpose specified.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN M. PFAUDLER.

Witnesses:

R. F. OSGOOD,
JAMES SARGENT.