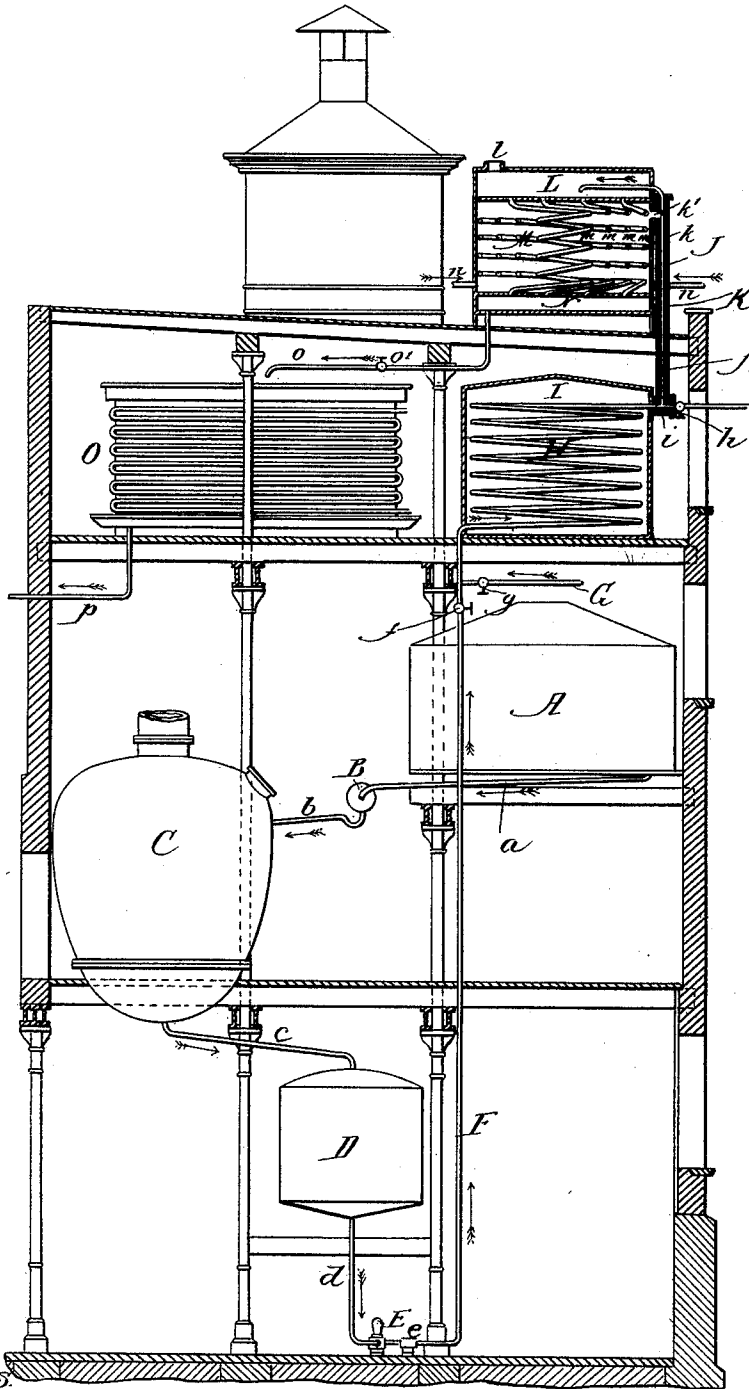


(No Model.)

J. S. COOKE.
APPARATUS FOR COOLING BEER.

No. 414,193.

Patented Nov. 5, 1889.



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APPARATUS FOR COOLING BEER.

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To all whom it may concern:

Be it known that I, JOHN S. COOKE, residing at Chicago, in the county of Cook and State of Illinois, and a citizen of the United States, have invented a new and useful Improvement in Apparatus for Cooling Beer, of which the following is a specification, reference being had to the accompanying drawing, in which the figure is an elevation, with some of the parts in section, showing the apparatus arranged in a brewery in one form.

The objects of this invention are to improve the construction and operation of the apparatus employed in the process of cooling beer in brewing, as hereinafter more particularly described, and pointed out in the claims.

In the drawing, A represents the mash-tub.

B is the filter, connected with the mash-tub by a pipe *a*.

C is the kettle, connected with the filter by a pipe *b*.

D is the strainer, connected with the kettle by a pipe *c*.

E is a force-pump, connected with the strainer by a pipe *d* and with an air-chamber *e*.

F is a pipe leading from the pump and air-chamber for conducting the beer to the cooling apparatus, and having a shut-off valve *f*.

G is a steam-pipe having a shut-off valve *g*, and connected with an extension of the coil of the hot-water tank above the point of connection of the pipe F to such coil, which means above the shut-off valve *f*.

H is the coil for the hot-water tank, the exit end of which coil has a shut-off valve *h*.

I is the hot-water tank, having an inlet *i*, through which the discharge end of the coil H passes.

J is a pipe leading from the coil H and having a shut-off valve *j*.

K is the conduit surrounding the pipe J, so as to leave a space *k* between the pipe and conduit, and communicating with the inlet *i* for supplying cold water to the tank I.

L is an inclosed receiver having top, bottom, and side walls, with an outlet *l* in the top, forming an overflow for the froth of the beer, and into which receiver the pipe J leads.

M is a chamber having located therein a

series of coils *m*, formed of small tubes, the coils being located one around the other and having communication with the receiver L, and this chamber M is supplied with cold water from pipes *n*, and has an outlet *k'* leading into the conduit K.

N is a receiver having top, bottom, and side walls, and into which the beer is delivered from the coils *m*.

O is a Baudelot cooler, onto and over which the beer is delivered by a pipe *o*, leading from the receiver N, and from which the beer is conducted to the fermenting-tub (not shown) by a pipe *p*, as usual.

The parts represented by the letters A, B, C, D, and E, the hot-water tank with its coils, and the Baudelot cooler are of the usual construction, except that the Baudelot cooler requires a less number of coils, and the devices can be arranged as shown or in any other suitable manner, and, as shown, the cooling-chamber is located at the top of the brewery; but such chamber and the hot-water tank and Baudelot cooler could be arranged lower down at any point desired without detriment to the cooling process.

The mash-tub, filter, kettle, strainer, and force-pump operate as usual, and from the force-pump the beer or wort is carried by the pipe F into the coil H of the tank I, and for this purpose the shut-off valve *f* is opened and the shut-off valve *g* of the steam-pipe G is closed, as is also the shut-off valve *h*. The hot beer or wort, entering the coil H and passing through such coil, is partially cooled, and the heat extracted is utilized in heating the water in the tank I, by which means a partial cooling of the beer or wort is had and the heating of the water in the tank is accomplished. The beer or wort, after passing from the coil, enters the pipe J, the valve *j* of which is open, and is subjected to the cooling effects of the cold water around the pipe J in the conduit K, and the beer or wort is delivered by the pipe J into the receiver L, and the excess of froth, if any, is carried off by the overflow *l*, and from the chamber or receiver L the beer or wort passes through the coils *m*, and in its passing is subjected to the cooling influence of the cold water in the chamber M, and, inasmuch as the pipes forming the coils *m* are

of small diameter and a number of coils are used, the beer or wort will be delivered through the chamber by the coils *m* in small streams, so as to be readily and quickly affected by the cold water. The beer or wort, after passing through the coils *m*, enters the chamber or receiver *N*, and is delivered therefrom to and over the Baudelot coil, and the beer or wort, when delivered to and over the Baudelot coil from the cooling devices, will have its temperature reduced to a great extent, as in its passage it is cooled by the coil in the tank *I*, by the water in the conduit *K*, and by the passage through the pipes *m* in the cold-water chamber *M*, and by such previous reduction of the heat of the beer or wort it will be delivered to the Baudelot coil at a reduced temperature, requiring only a small Baudelot coil to complete the cooling process.

The water in the tank *I* can be heated from the coil *H* by supplying steam to the coil from the pipe *G*, and when so heated the shut-off valves *f* and *j* are to be closed down and the shut-off valves *g* and *h* opened, as when steam is used for heating the water in the tank *I* the beer is not being passed through the cooling devices. The steam can be used for cleaning the coil *I* and the chambers *L*, *M*, and *N* and pipes *J* and *o* and coils *m* by closing the shut-off valve *h* and opening the shut-off valve *j*, and when it is desired to wash the cooling devices with water the valves *g* *h* are closed and the valves *f* *j* opened, and water can be forced from the pump *E* through the pipe *F* and coil *H*, pipe *J*, chambers *L* and *N*, coils *m*, pipe *o*, to and over the Baudelot coil, effectually washing and cleaning these parts.

The water heated in the tank *I* is not for distillation purposes, but is used for all purposes for which heated water is used about distilleries, such as for cleaning or washing purposes and for feed-water for the boiler.

The advantage of having both pipes *F* and *G* connecting with the coil *H* is that the coil of pipe *H* is not only made a conveyer-pipe for beer, but also a conveyer-pipe for steam when the supply of beer is cut off. The advantage of this is that, besides heating the water in the tank *I* for use in the building, the steam circulating within the pipe acts as a purifier for the pipe and as a destructive agent for any deleterious matter that may form or accumulate in the pipe. This is important, as germs may very rapidly grow within the pipe in the short time that the pipe is not in operation for the passage of the beer.

The running of the hot beer or wort through the coil *H* utilizes the heat to heat the water in the tank *I* while reducing the temperature of the beer or wort, and by using a number of coils *m* of small capacity the beer is carried over a long surface in small streams, thereby receiving the full benefit of the cold water in the chamber *M*, and this reduction of

the temperature of the beer before reaching the Baudelot cooler dispenses with the use of a large and expensive cooler; and it will further be seen that the beer or wort, from the time it leaves the force-pump until it reaches the Baudelot cooler, is carried by an inclosed passage, thus retaining the flavor of the beer or wort and its full strength, and at the same time no dirt or other foreign substance or material can pass into the beer or wort. The beer or wort can be cooled to a large extent by passing it through the coil *H* without any water in the tank *I*, to be delivered directly to the cooling-coils *m*, and one or more of such cooling-coils can be used, the beer or wort being passed from one cold-water chamber and coil to another.

The coil *H* can be dispensed with and the pipe *F* be led directly to the receiving-chamber *L*, forming a discharge-pipe *J*, and the beer or wort be cooled by passing directly from the pump to the receiving-chamber and to the coils *m*, and the apparatus, although primarily designed for cooling beer or wort, can be used for cooling malt liquors generally, or for cooling or reducing the temperature of any liquid, and in use it will be seen that the cooling process is a continuous one from the start to the finish, and by so being the time required for cooling is greatly reduced over the time required by the old openpan process, and with the apparatus any desired reduction of the temperature can be had before reaching the Baudelot coil or cooler.

The overflow *l* is to be closed by a cap, and, if desired, the pipe *o* can be provided with a shut-off valve *o'*, by which the outflow through the pipe *o* can be regulated, and by means of the valve *j* in the pipe *J* the flow to the receiving-chamber *L* can be increased or diminished as required.

What I claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus for cooling beer, the combination of pipe *F*, leading from a force-pump, water-tank *I*, coil *H* in said tank and connected with pipe *F*, the cooling-chamber *M*, located above tank *I* and having receiver *L* formed in its upper part, and provided with a series of coils *m*, leading from said receiving-chamber, and the pipe *J*, leading upwardly from tank *I* and connecting coil *H* with the receiving-chamber *L*, substantially as described.

2. The pipe *F*, leading from a force-pump, coil *H*, water-tank *I*, and pipe *J*, in combination with the water-conduit *K*, inclosing said pipe *J*, receiver *L*, into which said pipe *J* delivers, and cold-water chamber *M*, having the series of coils *m*, leading from said receiving-chamber, substantially as and for the purpose specified.

3. In a beer or wort cooling apparatus, the combination, with a delivery-pipe *J* and a receiving Baudelot cooler *O*, of a cooling device intermediate of said pipe and Baudelot cooler, consisting of a chamber *L*, to receive wort from said pipe, a cold-water chamber *M*, a series of

coils *m*, leading from said chamber and through said cold-water chamber, and a pipe *o*, for conveying the wort to said Baudelot cooler, substantially as described.

5 4. In a beer or wort cooling apparatus, the combination, with a water-tank I, having a coil H, connecting with the pipe F, and a Baudelot cooler O, of a cooling device intermediate of said tank and Baudelot cooler, composed of a
10 receiving-chamber L, a pipe J, leading from said coil to said chamber, the cold-water chamber M, the conduit K, connecting said chamber with tank I and inclosing the pipe J, the
15 coils *m*, leading from the chamber through chamber M, a chamber N, into which said coils open, and a pipe *o*, conducting the wort from chamber N to the Baudelot cooler, substantially as described.

20 5. In a beer or wort cooling apparatus, the combination, with the coil H and a Baudelot

cooler O, of a cooling device intermediate of said coil and Baudelot cooler, composed of a receiving-chamber L, a pipe J, leading from said coil to said chamber, a cold-water chamber M, a delivery-chamber N, coils *m*, leading
25 from said chamber L through chamber M to chamber N, and a pipe *o*, for conducting the wort from chamber N to the Baudelot cooler, substantially as described.

6. The combination, with a hot-water tank I and a coil H therein, of the beer-supply pipe F and steam-pipe G, both of said pipes connecting with said coil for enabling hot beer or steam to be employed in heating the water in the tank, substantially as described.

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Witnesses:

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