No. 767,325. PATENTED AUG. 9, 1904.

J. O. BEAZLEY.

LIQUID COOLER.

APPLICATION FILED MAR. 26, 1903.

NO MODEL.

Fig. 1

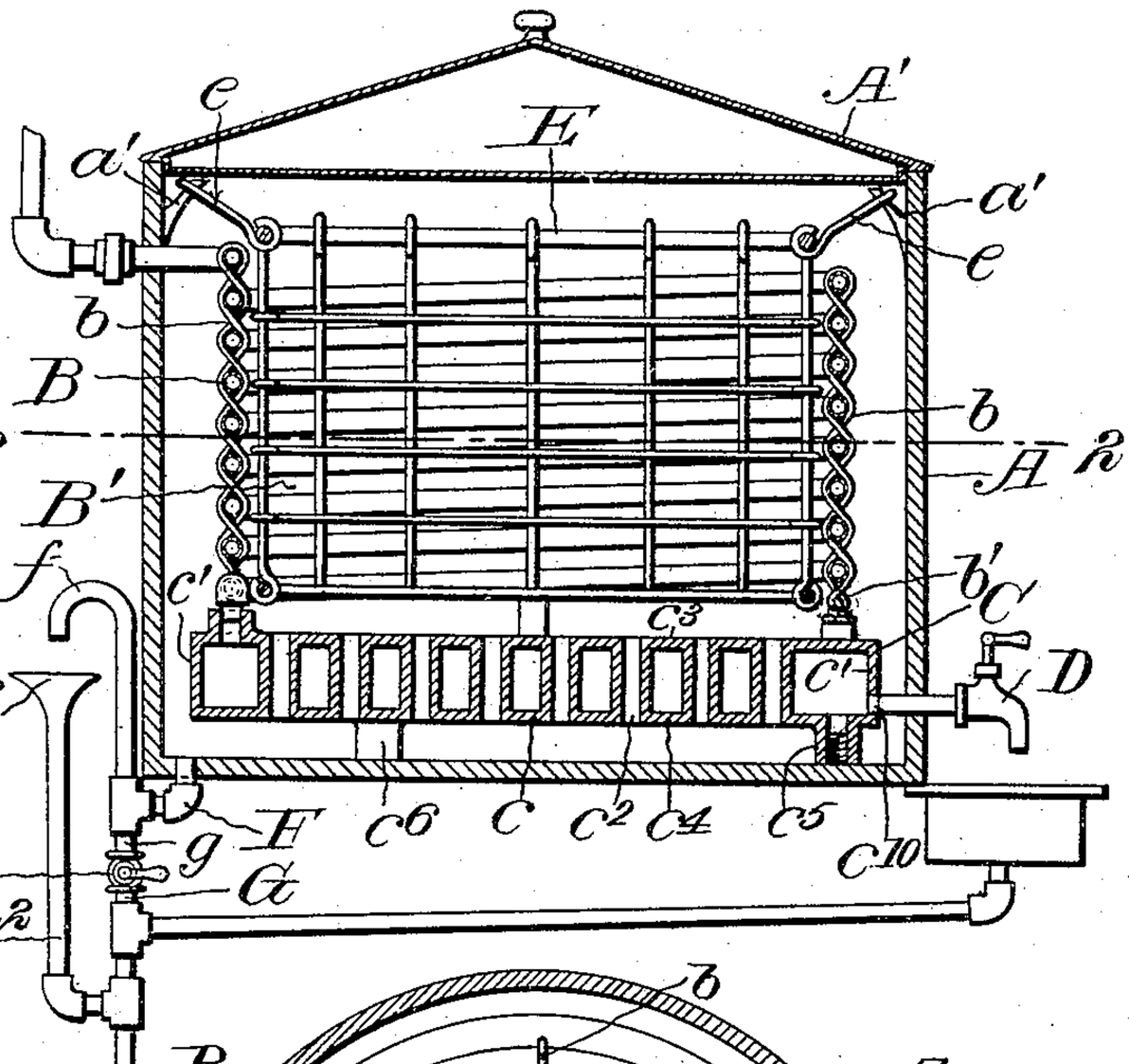


Fig. 2.

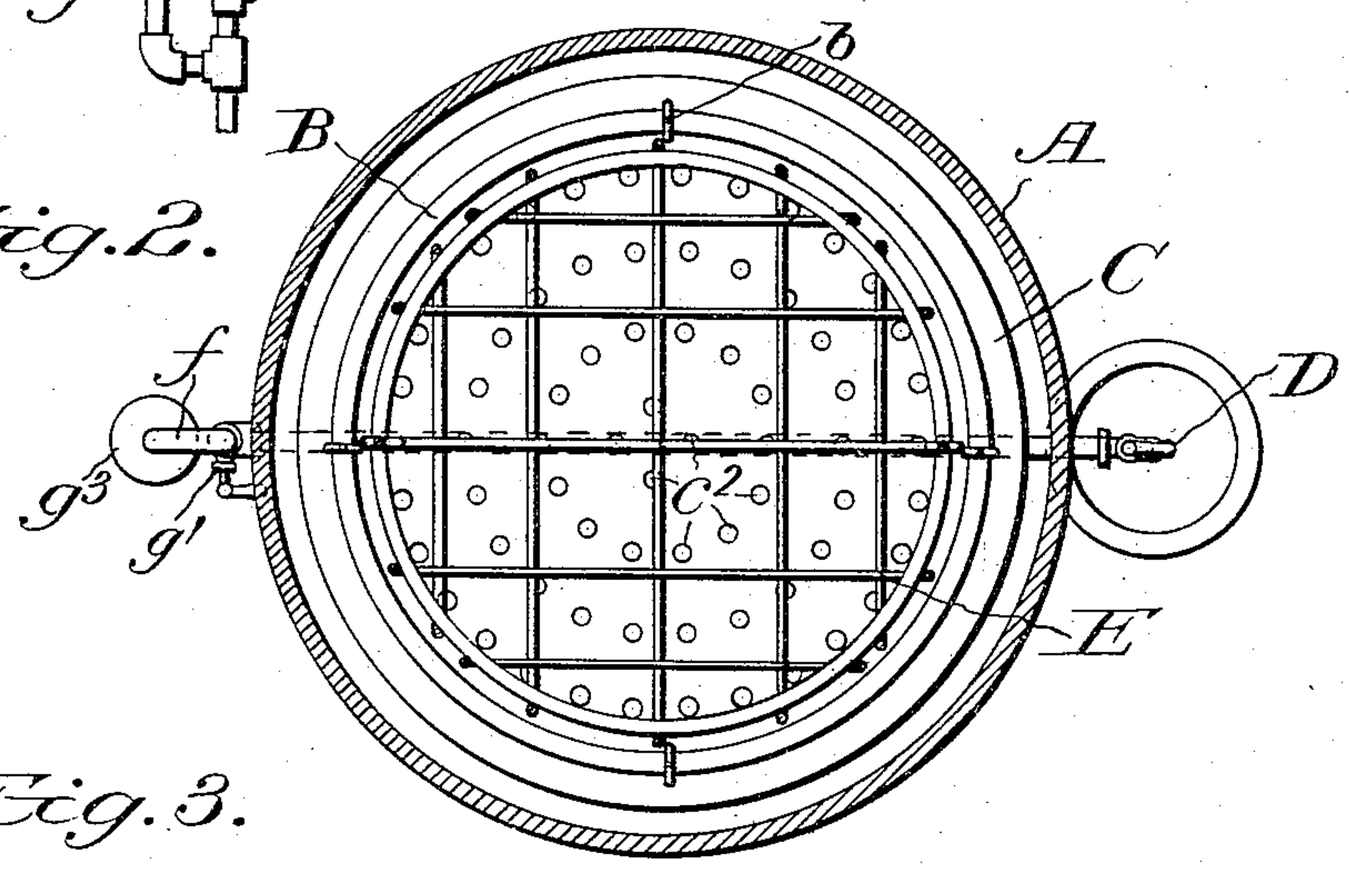
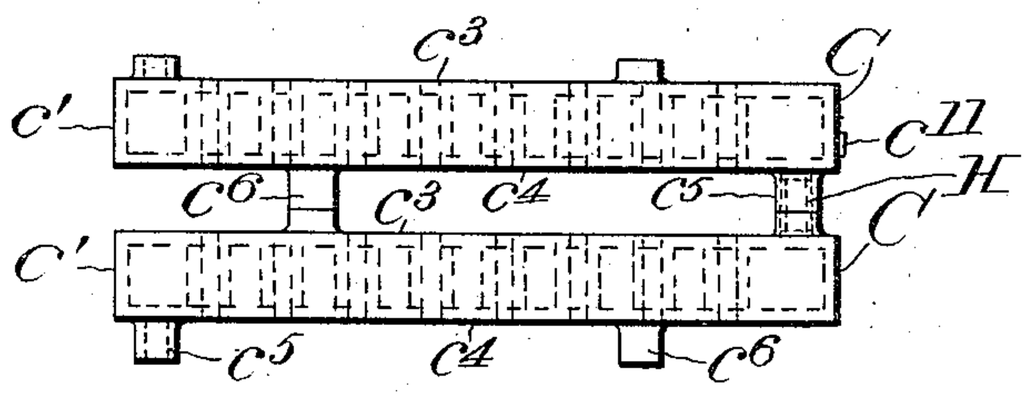


Fig. 3.



Witnesses

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No. 767,325. Patented August 9, 1904.

UNITED STATES PATENT OFFICE.

JOSEPH O. BEAZLEY, OF BALTIMORE, MARYLAND.

LIQUID-COOLER.

SPECIFICATION forming part of Letters Patent No. 767,325, dated August 9, 1904.

Application filed March 26, 1903. Serial No. 149,769. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH O. BEAZLEY, a citizen of the United States of America, and a resident of the city of Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Liquid-Coolers, of which the following is a specification.

My invention relates to certain improvements in that class of pressure liquid-coolers in which the ice used for the cooling is kept from direct contact with the liquid to be cooled; which is delivered from a source of supply to the cooler as the cooled liquid may be withdrawn therefrom.

As my improved cooler is specifically designed as a cooler for drinking-water, I will hereinafter for convenience refer to the liquid cooled as "water."

My invention relates to means whereby the water to be cooled is passed through a series of chambers for giving a preliminary cooling to the water by means of air cooled by the melting of ice and circulating around one of the chambers and for finally cooling the water by means of the water resulting from the melting of the ice, the water from the melting ice circulating around another of the chambers; and for this purpose it consists in the construction, arrangement, and combination of the several parts of which it is composed, as will be hereinafter more fully described and claimed.

Referring to the accompanying drawings, in which corresponding parts are designated by corresponding marks of reference, Figure 1 is a vertical central section of a cooler constructed in accordance with this invention. Fig. 2 is a horizontal section on line 2 2 of Fig. 1. Fig. 3 shows how a series of final-cooling chambers such as shown in Fig. 1 may be assembled.

In order to reduce radiation, I use a receptacle A, the walls of which may be filled with suitable non-conducting material, as is well known, and provided with a cover A′, as is usual. Within the upper part of the receptacle is contained the preliminary-cooling coil B, having a diameter somewhat less than the diameter of the central recess A′ of the receptacle. This coil may be considered as a preliminary annular cooling-chamber having a central recess B′. For the purpose of holding the several convolutions of the coil B apart, so that spaces are formed through which the cooled air may circulate from the recess B′ to the exterior of the coil, I weave a wire or wires *b* between the convolutions, thus forming a frame on which the coils are supported, the lower ends of the wires being twisted to form legs *b*′, resting on the flat cooling-chamber C. The upper end of the coil projects through the wall of the receptacle and is connected to the water-supply pipe of the building in which the cooler may be placed.

Within the lower part of the central recess A′ is contained the final-cooling chamber C, consisting of a flat hollow disk, with the interior of which the lower end of the coil B is connected. A suitable faucet D is provided for drawing off the cooled water from the chamber C as desired, and the water so drawn will be replaced by water forced through under pressure from the water-supply. The chamber C has but slight thickness from top to bottom and by preference is constructed of a single hollow casting *c*, having side walls *c*′ and a top and a bottom c^3 and c^4, and has passing through the central cavity thereof from top to bottom hollow nipples or tubes c^2. The nipples, as they are hollow, provide an extensive cooling-surface for the water in the final-cooling chamber C, as will be hereinafter more fully described. Upon the bottom plate c^4 I cast a plurality of legs c^5 c^6 for the purpose of affording a support for the chamber C and coil B. One of these legs c^5 is by preference of such size as to permit it to be bored, as will be hereinafter more fully described. The interior of the chamber C is by preference enameled. The front wall of the casing *c* is tapped at c^{10} to receive the faucet D.

The receptacle A has upon its interior, near the top, hooks *a*′, adapted to receive rings *e* upon a basket E, which is thereby supported within the interior of the coil B and which is intended to receive ice. The basket is removed from the cooler for filling and after filling is returned to place, thus avoiding the liability of damage to the cooler by the dropping of the ice therein.

A waste eduction-pipe F is led into the bot-

tom of the receptacle A and is connected to one arm, g, of the waste-pipe G, the connection being controlled by a stop-cock g'. The eduction-pipe in addition to this connection with the water-pipe has an upwardly-extending member f, which discharges at about the level of the top of the final-cooling chamber C into a funnel g^3, attached to the other arm, g^2, of the waste-pipe.

In the use of my device the basket is filled with ice and, with the cover of the receptacle, is put in place. The air within the interior of the receptacle is rapidly cooled by the melting of the ice and in turn cools the preliminary-cooling coil B and the water contained therein. The water formed by the melting of the ice itself falls upon the top of the final-cooling chamber C and passes through the perforated nipples therein to the bottom of the receptacle, where, as the cock g' is normally closed, it accumulates until it reaches the level of the discharge end f of the eduction-pipe F, which thus maintains the water-level at about the height of the top of the final-cooling chamber. As this chamber is practically submerged in water formed by the melting of the ice, the water from the coil flowing therethrough will be brought to a low temperature, and as this cold water is drawn off through the faucet D it will be replaced by cooled water from the preliminary-cooling coil B. I find this preliminary cooling of the water by means of air cooled by the ice and the final cooling of the water by means of the water resulting from the melting of the ice in cooling the air to be most economical, so that with a small amount of ice a large quantity of water may be cooled.

By placing the eduction-pipe F at the bottom of the receptacle and providing it with an upwardly-extending automatically-discharging member I withdraw water from the bottom of the receptacle, and this is of advantage, inasmuch as water has its greatest density slightly above the melting-point of ice, so that the water from the melted ice as it absorbs heat from the final-cooling chamber C and its contents sinks to the bottom of the receptacle to be automatically withdrawn and is replaced by colder water as the ice melts. Also by the connection of the eduction-pipe with the waste-pipe I am enabled to empty the receptacle for cleaning purposes when desired.

In some cases it may be desirable, as where water is constantly consumed, to provide additional cooling-surface for the final-cooling chamber, and this may be provided for by using a number of the chambers hereinbefore described in series, and this I have represented in Fig. 3. In this figure two of the chambers C are used, the one upon the other, each of the chambers being identical in construction with that hereinbefore described. The aperture c^{10} in the upper chamber is, however, in this case closed with a plug c^{11}, and the casing c^5, forming one of the legs of that chamber, is tapped to receive a nipple H, connecting it with the lower chamber.

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

1. In a liquid-cooler, the combination with a final-cooling chamber consisting of a flat disk having tubes passing therethrough from top to bottom thereof, of a coiled pipe mounted upon the flat cooling-chamber and communicating therewith, and woven with wire to maintain the several convolutions of its coils in position and apart from each other, a receptacle inclosing the coil and flat cooling-chamber and having lugs upon the interior thereof, an ice-basket contained within the coil and supported upon the lugs, means for feeding a liquid to the coil and means for withdrawing the liquid from the flat cooling-chamber, substantially as described.

2. In a liquid-cooler, the combination with an annular preliminary-cooling chamber having a central recess, of a series of final-cooling chambers, the said series of final-cooling chambers consisting of a plurality of flattened hollow disks having tubes extending therethrough, the said disks being piled one upon the other and provided with spacing-lugs and nipples for connecting the one with the other, the preliminary-cooling chamber resting upon the upper disk and being in connection with the interior thereof, a casing inclosing the cooling-chambers, and means for feeding a liquid to the preliminary-cooling chamber and withdrawing the liquid from the lower of the final-cooling chambers, substantially as described.

Signed by me at Washington, District of Columbia, this 14th day of March, 1903.

JOSEPH O. BEAZLEY.

In presence of—

ERNEST HOWARD HUNTER,
VERNON M. DORSEY.