G. A. STRICKER.

LIQUID COOLER.

APPLICATION FILED OCT. 3, 1913.

1,134,243. Patented Apr. 6, 1915.

Fig. 1.

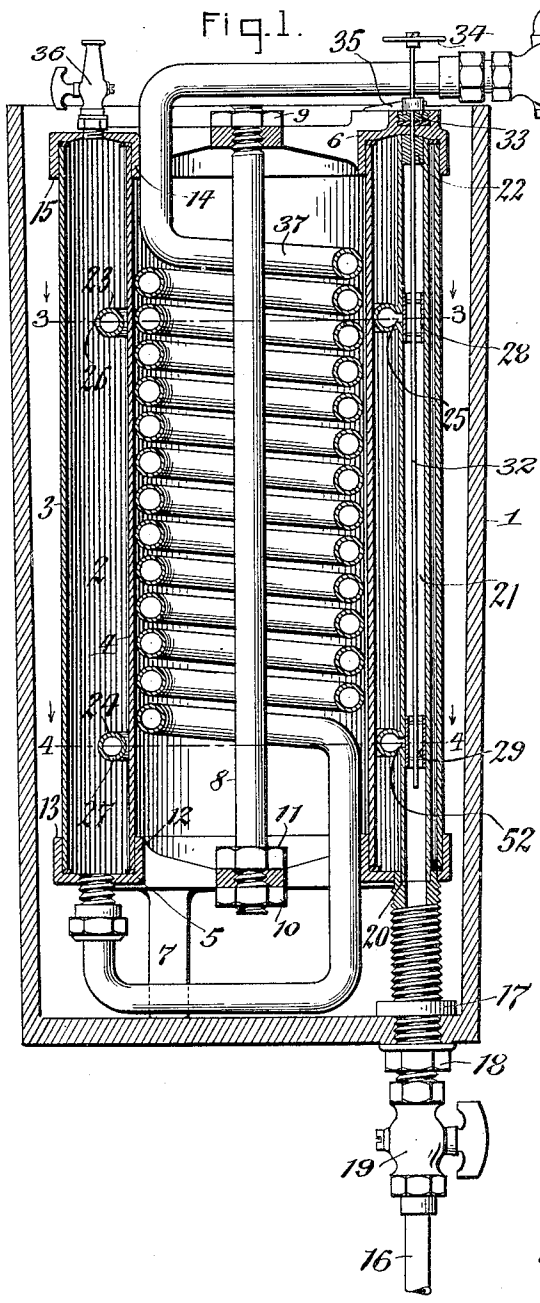


Fig. 2.

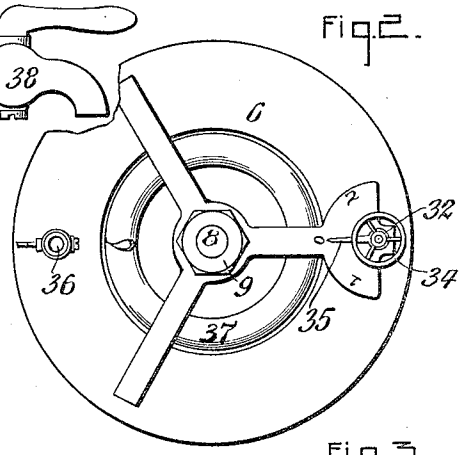


Fig. 3.

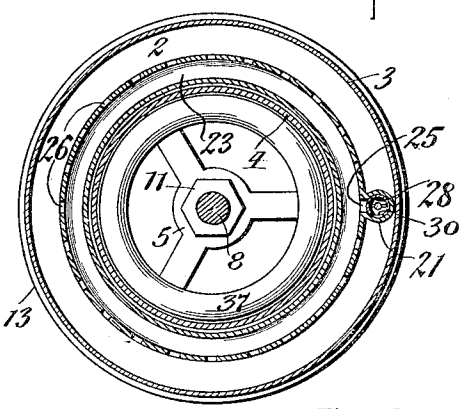
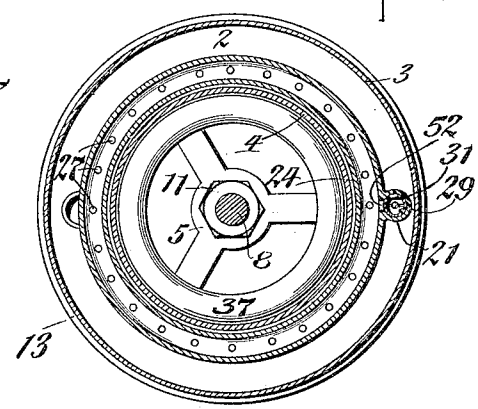


Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

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LIQUID-COOLER.

1,134,243. Specification of Letters Patent. Patented Apr. 6, 1915.

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To all whom it may concern:

Be it known that I, GEORGE A. STRICKER, a citizen of the United States, and resident of Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Liquid-Coolers, of which the following is a specification.

This invention relates to a liquid cooler which is more particularly designed for cooling beer before it is served to customers although the same may also be used for cooling other kinds of liquids.

It is the object of this invention to provide a cooler for this purpose which is comparatively simple and compact in construction, which can be readily taken apart for inspection, repairs and cleaning so that it is sanitary, and which is so designed that the beer or other liquid which is being cooled will be prevented from becoming flat or foamless and also prevented from becoming too lively or foamy.

In the accompanying drawings: Figure 1 is a vertical sectional elevation of a liquid cooler constructed in accordance with my invention. Fig. 2 is a fragmentary top plan view thereof. Figs. 3 and 4 are horizontal sections in the correspondingly numbered lines in Fig. 1.

Similar characters of reference indicate corresponding parts throughout the several views.

1 represents a box or receptacle of any suitable construction which is adapted to contain crushed ice or other refrigerating agent adapted to reduce the temperature of the liquid to be cooled. Within this ice box is arranged the cooling chamber 2 which forms part of my improvements and which preferably has the form of a hollow cylinder or annulus. This chamber may be built up in any suitable way but preferably comprises an outer upright cylindrical wall 3, an inner upright cylindrical wall 4 arranged within the outer wall but separated therefrom by an intervening annular space, a lower head 5 which is preferably permanently secured to the lower ends of the inner and outer walls by brazing or otherwise so as to close the space between these walls, and an upper head 6 which is preferably detachably secured to the upper ends of the inner and outer walls, so as to close the space between these walls when the apparatus is in use but permit access to the interior of this chamber when this is desired for cleaning, inspection or repairs. The cooling chamber may be supported within the ice box in any suitable manner, for instance, by means of one or more legs 7 projecting downwardly from the lower head and resting on the bottom of the ice box. The upper head of the cooling chamber may be held in place by various means, such for instance, as a tie bolt 8 arranged vertically within the inner wall of the cooling chamber and provided at its upper and lower ends with the screw nuts 9, 10 which engage respectively with the upper side of the upper head and the underside of the lower head, and a screw nut 11 arranged on the tie rod and engaging with the upperside of the lower head, as shown in Fig. 1. The lower head is provided with upwardly projecting flanges 12, 13 which engage respectively with the inner side of the inner wall and the outerside of the outer wall and the upper head is provided with similar flanges 14, 15 engaging with the inner side of the inner wall and the outerside of the outer wall for the purpose of holding these parts in their proper concentric position relatively to each other. The central parts of the upper and lower heads are made of skeleton or open work form so as to permit the refrigerating medium such as crushed ice to be placed within the inner wall of the cooling chamber as well as around the outer wall thereof and thereby increase the cooling effect of this refrigerating medium on the liquid within the cooling chamber.

The liquid to be cooled may be introduced into the cooling chamber at any suitable point and by any suitable means but it is preferable to employ for this purpose means whereby the liquid may be delivered into the cooling chamber either in the upper part or in the lower part thereof in the form of a spray as will be more fully hereinafter described. The liquid after being cooled may also be withdrawn from this chamber at any suitable place and by any suitable means but such withdrawal of the liquid from this chamber is preferably effected at the lower end thereof as will presently appear. The preferred means for delivering the liquid to be cooled to the cooling chamber comprises an upright supply pipe 16 extending upwardly through the bottom of the ice box and secured thereto by means of clamping

nuts 17, 18 arranged on an external thread of this pipe and engaging with the upper and lower sides of this bottom. Below the ice box this supply pipe is provided with a valve 19 for controlling the passage of the liquid therethrough. At its upper end this supply pipe is secured to the lower head of the cooling chamber and is provided within the latter with an upwardly facing counter bore or seat 20 around the outlet end of the supply pipe.

21 represents an upright liquid distributing pipe which detachably engages its lower end with the seat of the supply pipe so as to form practically a continuation of the latter while its upper end engages with the upper head of the cooling chamber and is provided with a plug 22.

23, 24 represent upper and lower liquid spraying rings or annular pipes whereby the liquid to be cooled may be delivered from the distributing pipe either into the upper or the lower part of the cooling chamber. These spraying rings or pipes preferably fit comparatively close around the periphery of the inner wall of the cooling chamber and are secured to the distributing pipe and communicate therewith by means of ports 25, 52, respectively. The upper spraying ring or pipe is provided on its outer side with an annular row of openings 26 so that the liquid issuing therefrom is directed outwardly against the inner side of the outer wall of the cooling chamber, while the lower spraying ring or pipe is provided on its underside with an annular row of openings 27 so that the liquid issuing therefrom is delivered downwardly from the lower spraying pipe toward the bottom of the cooling chamber. The liquid to be cooled may be directed from the distributing pipe into the upper or the lower spray ring by means of a valve mechanism which preferably comprises upper and lower cylindrical distributing valves 28, 29 which rotate within the upper and lower parts of the bore of the distributing pipe and having ports 30, 31, respectively, and which are adapted to be moved into and out of register with the ports 52, 25 extending from the distributing pipe to the upper and lower spray rings. These two distributing valves are both mounted upon an upright valve rod or stem 32 arranged axially within the distributing pipe and extending upwardly through the plug at the upper end of the distributing pipe and through a stuffing box 33 in the adjacent part of the upper head and provided above the cooling chamber with a handle 34 for turning the valve stem and its valves. The ports of the upper and lower valves 28, 29 are out of line circumferentially or in the direction in which these valves rotate so that upon turning the valve rod and bringing the port of one of the valves into register with the companion port leading to the respective spray ring the port of the other distributing valve will be out of register with the port of its companion spray ring, and vice versa, and it is also possible to turn these valves so that the ports of neither one of them is in register with the ports of the spray rings and thereby cut off communication between the distributing pipe and both spray rings.

In order to enable the attendant to determine the position of the distributing valves from the exterior of the cooling chamber and adjust these valves as desired, an external indicating device is provided which preferably comprises a pointer or finger 35 arranged on the valve rod above the upper head of the cooling chamber and traversing a scale or graduated segment having three positions indicated thereon relatively to which the pointer may be shifted for setting the distributing valves. When the pointer is placed opposite the intermediate mark 0 of this scale the distributing valves are so shifted that both the upper and lower spray rings are cut off from the distributing pipe while upon shifting the pointer opposite the numeral 1 which is arranged at the left of the zero mark the liquid will be permitted to pass from the distributing pipe into the lower spray pipe and upon shifting the pointer in line with the numeral 2 at the right of the zero mark the distributing pipe will be placed in communication with the upper spray pipe.

During the normal operation of the cooler the lower distributing valve is closed and the upper distributing valve is opened so as to permit the liquid to pass from the distributing pipe into the upper spray ring and laterally outward through the openings of the latter against the bore of the outer cooling wall in the form of a spray. By this means the liquid upon passing downwardly through the cooling chamber to its outlet at the lower end thereof is subjected to a prolonged cooling effect owing to the greater area of the cooling chamber which this liquid traverses, thereby increasing the cooling efficiency of the apparatus accordingly for a given amount of refrigerating agency.

When the liquid to be cooled becomes flat as is likely to occur in the case of beer when the same has become chilled or not drawn away from the cooler with sufficient rapidity, or when the same has been standing in the cooler over night, it is desirable to enliven the beer or render the same more foamy so that it is more palatable. In order to thus enliven the beer the upper distributing valve is closed and the lower distributing valve is opened, thereby permitting the beer to pass from the distributing pipe into the lower spray ring and to be discharged downwardly from the latter toward the bottom

of the cooling chamber in the form of a spray. When this occurs the beer in the lower part of the cooling chamber is stirred up or agitated which causes the same to become lively and foamy and more agreeable to drink. After the beer has been thus enlivened the lower distributing valve may be again closed and the upper distributing valve opened, so that the beer or other liquid is compelled to travel downwardly through a longer path in the cooling chamber before escaping therefrom and thereby insure the proper cooling of the liquid.

When beer has been standing in the cooler over night and becomes chilled it is desirable to permit any air which may have gathered in the upper part of the cooling chamber to escape therefrom into the atmosphere. This is preferably accomplished by providing the upper part of the cooling chamber with a vent valve 36, as shown in Fig. 1. Upon opening this vent valve and also admitting beer into the cooling chamber until all the air has been expelled therefrom which is evident when the beer escapes from the vent valve, the latter may be closed, inasmuch as the cooling chamber is then full of liquid and capable of developing its maximum cooling efficiency.

When it is desired to clean the interior of the cooling chamber, and the distributing device contained therein this can be readily accomplished by removing the upper nut 9 of the tie rod and then taking the upper head from the inner and outer walls and also slipping the spray rings upwardly from the inner wall as well as disengaging the distributing pipe from the supply pipe, and thereafter the spray pipe may be slipped off from both distributing valves so that the several parts are dismembered and capable of being thoroughly cleaned, thereby permitting of keeping this cooler in a sanitary condition.

It has been found in practice that when the beer is delivered directly from the cooling chamber for consumption that the same at times is excessively foamy or lively and therefore hard to control. For the purpose of avoiding undue foaming or enlivening of the beer a cushion coil 37 is provided which is connected at one end with the cooling chamber and at its other end with the valve 38 through which the liquid is dispensed. As the beer or other liquid passes from the cooling chamber through this cushion coil the resistance which it encounters in its passage through the cushion coil operates to retard the same and reduce its tendency to foam excessively, thereby permitting the beer to be withdrawn through the valve 38 at a proper rate of speed and without delivering an excessive amount of foam. In the preferred arrangement of the cushion coil the same is arranged within the inner wall of the cooling chamber and comparatively close to the bore of the same and its lower end is connected with the lower part of the cooling chamber while its upper end extends through the upper head of the cooling chamber and to the dispensing valve or cock 38. In this manner the cushion coil which is in close contact with the cooling medium placed within the inner wall of the cooling chamber also serves to increase the cooling effect upon the beer or other liquid passing through the same, thereby increasing the cooling efficiency of the apparatus accordingly.

This liquid cooler is very compact in construction, it has no delicate parts which are liable to get out of order, and it can be very conveniently operated for cooling the beer as well as controlling the foam of the same.

I claim as my invention:

1. A liquid cooler comprising an annular cooling chamber having inner and outer upright walls and an outlet for the liquid to be cooled, annular pipes arranged within the upper and lower parts of said chamber around the inner wall thereof and each provided with outlet openings, and a supply pipe connected with said annular pipes.

2. A liquid cooler comprising an annular cooling chamber having inner and outer upright walls and an outlet for the liquid to be cooled, annular pipes arranged within the upper and lower parts of said chamber around the inner wall thereof and each provided with outlet openings, a supply pipe connected with said annular pipes, and means for placing either one or the other of said annular pipes in communication with said supply pipe.

3. A liquid cooler comprising an annular cooling chamber having inner and outer upright walls and an outlet for the liquid to be cooled, annular pipes arranged within the upper and lower parts of said chamber around the inner wall thereof, said upper annular pipe having outlet openings in its outer side and said lower annular pipe having outlet openings in its underside, and a liquid distributing pipe adapted to be placed in communication with either one or the other of said annular pipes.

4. A liquid cooler comprising an annular cooling chamber having inner and outer upright walls and an outlet for the liquid to be cooled, annular pipes arranged within the upper and lower parts of said chamber around the inner wall thereof, said upper annular pipe having outlet openings in its outer side and said lower annular pipe having outlet openings in its underside, an upright liquid distributing pipe arranged in said chamber and provided in its side with upper and lower ports opening respectively into the upper and lower annular pipes, and means for opening either one or the other

of said ports comprising upper and lower rotatable valves arranged in said supply pipe and controlling said upper and lower ports, and a valve rod connecting said valves and extending through the top of said chamber.

5. A liquid cooler comprising an annular cooling chamber having inner and outer upright walls and an outlet for the liquid to be cooled, annular pipes arranged within the upper and lower parts of said chamber around the inner wall thereof, said upper annular pipe having outlet openings in its outer side and said lower annular pipe having outlet openings in its underside, an upright liquid distributing pipe arranged in said chamber and provided in its side with upper and lower ports opening respectively into the upper and lower annular pipes, and means for opening either one or the other of said ports comprising upper and lower rotatable valves arranged in said supply pipe and controlling said upper and lower ports, a valve rod connecting said valve and extending through the top of said chamber, a handle arranged on the upper end of said valve rod, and a pointer arranged on said rod and traversing a scale.

6. A liquid cooler comprising a cooling chamber having inner and outer cylindrical walls, a lower head connecting the lower ends of said walls and an upper head connecting the upper ends of said walls, a liquid supply pipe extending upwardly through the lower head of said chamber and having a seat at its upper end, an upright liquid distributing pipe arranged within the chamber detachably engaging its lower end with the seat of said supply pipe, annular pipes encircling the upper and lower parts of said inner wall and having outlet openings, and means for connecting either one or the other of said annular pipes with the distributing pipe.

7. A liquid cooler comprising a cooling chamber having inner and outer cylindrical walls, a lower fixed head connecting the lower ends of said walls and an upper detachable head connecting the upper ends of said walls, a liquid supply pipe extending upwardly through the lower head of said chamber and having a seat at its upper end, an upright liquid distributing pipe arranged within the chamber detachably engaging its lower end with the seat of said supply pipe and detachably engaging its upper end with said upper head, annular pipes encircling the upper and lower parts of said inner wall and having outlet openings and ports connecting the same with the upper and lower parts of said distributing pipe, and means for controlling said ports comprising rotatable valves arranged in said distributing pipe and adapted to open and close said ports alternately, and a valve rod connecting said valves and extending upwardly through said distributing valve through a stuffing box in the said upper head.

Witness my hand this 27th day of September, 1913.

GEORGE A. STRICKER.

Witnesses:
E. M. GRAHAM,
ANNA HEIGIS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."