Nov. 10, 1936. R. W. GLASER ET AL 2,060,496

COOLING DEVICE

Filed April 29, 1935

Fig. 1.

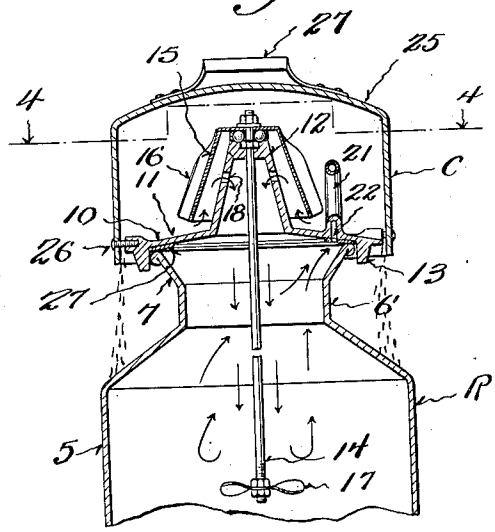


Fig. 2.

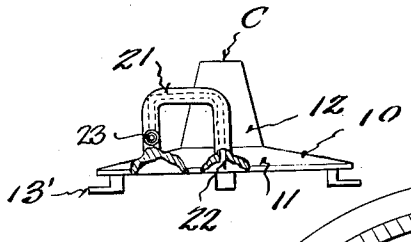


Fig. 3.

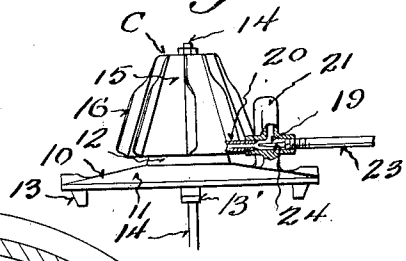
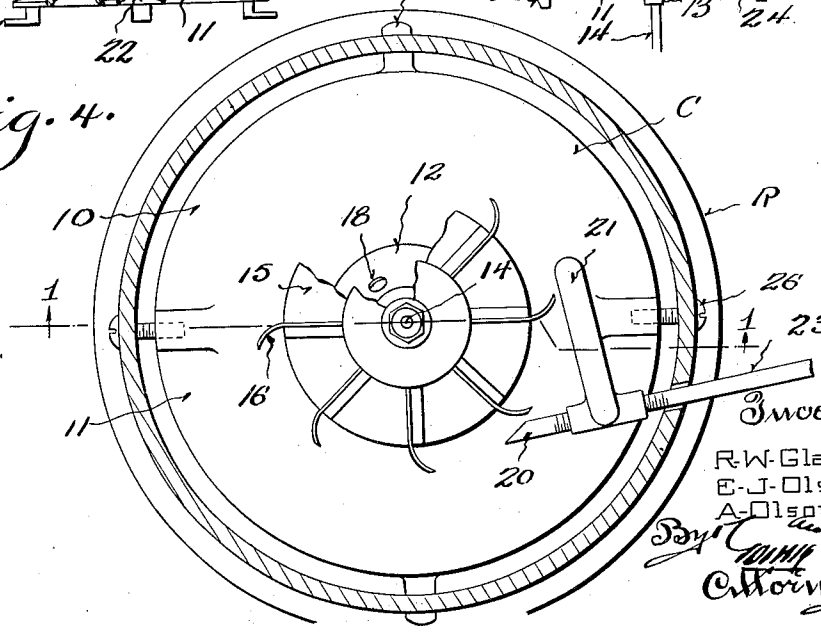


Fig. 4.



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COOLING DEVICE

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3 Claims. (Cl. 31—4)

This invention appertains to cooling devices, and more particularly to a novel means for aerating and cooling liquids.

One of the primary objects of our invention is to provide a liquid-cooling device embodying a head for detachable connection with the receptacle containing the liquid to be cooled having novel means for introducing cold water under pressure on said head for cooling the liquid, the water under pressure being also utilized for operating a rotor connected with a propeller, or the like, for agitating the liquid to bring about the uniform cooling thereof.

Another salient object of our invention is the provision of novel means for leading the cold water from the head over the sides of the receptacle, whereby to effectively cool the exterior of the receptacle.

A further object of our invention is the provision of novel means for withdrawing the warm air from the interior of the receptacle away from the top of the liquid to be cooled, and for introducing cooled, washed air into the receptacle against the liquid.

A further important object of our invention is to provide novel means for cooling and washing the air by the cold water under pressure utilized for operating the rotor, means being provided for removing excess moisture from the cooled, washed air prior to the entrance thereof into the receptacle.

A still further object of our invention is to provide novel means for cooling liquids of the above character, which will be durable and efficient in use, one that will be simple and easy to manufacture, and one which can be placed upon the market at a reasonable cost.

With these and other objects in view, the invention consists in the novel construction, arrangement, and formation of parts, as will be hereinafter more specifically described, claimed, and illustrated in the accompanying drawing, in which drawing:—

Figure 1 is a central vertical section through our improved liquid-cooling device, showing the same in use, the view being taken on the line 1—1 of Figure 4, looking in the direction of the arrows.

Figure 2 is a side elevation of the head, with parts thereof broken away and in section, the hood and rotor being shown removed.

Figure 3 is a side elevation of the head, with parts thereof broken away and in section, looking at right angles from Figure 2, the hood being shown removed, and the rotor being shown in its operative position.

Figure 4 is a detailed horizontal section through our improved device taken substantially on the line 4—4 of Figure 1, looking in the direction of the arrows, the view being shown on an enlarged scale.

Referring to the drawing in detail, wherein similar reference characters designate corresponding parts throughout the several views, the letter C generally indicates our improved liquid cooler, and R a receptacle with which the same can be used. The cooler C is particularly adapted for lowering the temperature of milk, but obviously the device can be used for cooling other liquids. By way of example, the receptacle R has been shown to be of the milk can type, and hence the same includes the body 5 having the neck 6. The neck 6 is provided with the wide flaring mouth 7.

The cooler C comprises a head 10, which is adapted to be detachably associated with the receptacle R, and this head can be formed from a casting, or in any other desired manner. As illustrated, the head includes the substantially concavo-convex shaped disk or plate 11, having formed axially thereon the hollow frustro-conical extension 12. The disc 11 forms a substantially flaring skirt portion on the hollow extension 12 for overlying the neck of the can. Depending from the concavo-convex plate or skirt 11 are spaced lugs or fingers 13, which are adapted to engage the outer surface of the flaring neck 7. This holds the head 10 centered and in place on the receptacle R.

Extending axially through the frusto-conical extension 12 is a rotatable shaft 14, which is adapted to extend into the body of the receptacle R. The upper end of the shaft 14 has rigidly connected therewith a rotor 15. The rotor 15 can also be of a frusto-conical shape, and has formed thereon, or secured thereto, the curved buckets or blades 16, against which is adapted to impinge the fluid under pressure utilized for actuating the rotor and its shaft. The extreme lower end of the shaft has connected therewith a propeller 17, which is adapted to stir and aerate the liquid in the receptacle, which is to be cooled.

Particular attention is invited to the fact that the sides of the rotor 15 are spaced from the sides of the frusto-conical extension 12, to form an air passage between the rotor and said extension. The extension 6 is provided with a plurality of air inlet openings 18, the purpose of which will be hereinafter more fully set forth.

Novel means is utilized for actuating the rotor,

and for providing a cooling medium for the liquid to be cooled. This means includes an ejector 19 having the outlet nozzle 20 disposed substantially tangentially to the buckets or blades 16. This ejector 19 is rigidly connected with the upper surface of the concavo-convex disk or skirt 11, and has communicating therewith an air inlet pipe or tube 21. This tube 21 in turn communicates with an air inlet opening 22 formed in the disk 11. Extending into the ejector 19, in advance of the air inlet tube 21, is the cold water pipe 23. The cold water is introduced into the pipe 23 under pressure, and is admitted from the jet 24, and flows with considerable force from the nozzle 20 against the blades 16. As the water flows from the nozzle 20, a suction is created in the air conducting tube 21, and consequently air is drawn into the tube from the opening 22.

Associated with the head 10 is a hood 25, which is utilized for preventing the entrance of dust and the like into the head. The skirt of the hood 25 is connected with the head 10 by means of screws, or other like fastening elements 26, and suitable lugs are formed on the head to receive said elements. Radially extending lugs 13' on the head 10 engage under the hood 25 and prevent swing of the hood on the screws 26 as pivots.

By referring to Figures 1 and 4, it will be noted that a space is provided between the periphery of the head 10 and the lower edge of the hood, and water from the head is adapted to flow through the space and on to the sides of the receptacle R to lower the temperature thereof. The hood 25 can be provided with a handle 27, whereby the entire cooling device can be readily removed from or placed on the receptacle.

In use of our improved liquid-cooling and aerating device the same is associated with the receptacle R in the manner illustrated, and the cold water under pressure is allowed to flow through the pipe 23. The cold water hitting the buckets or blades 16 will rotate the rotor, and consequently turn the propeller 17 in the liquid, thus bringing about the agitation thereof. As the rotor is turned, the warm air from the interior of the receptacle will be drawn into the tube 21, as heretofore brought out, and this air will flow in between the rotor and the extension 12 through the openings 18, and into the receptacle R down on the surface of the liquid in the receptacle. This air will be cooled by the cold water in the head, and the air will also be washed by said water as the water flows down the sides of the rotor. Excess moisture will be removed from the washed air, in that the air tends to strike against the inner surface of the rotor, and the outer surface of the extension 12, and deposit excess moisture thereon, which drains down on the disk 11. As stated, the water drains from off of the head 10, down on to the sides of the receptacle.

From the foregoing description, it can be seen that we have provided novel means for simultaneously cooling both the inside and outside of a receptacle so as to bring about the rapid lowering of the temperature of the liquid contained therein. It also can be seen that the entire body of the liquid will be uniformly cooled, due to the agitation of the liquid during the cooling process.

If desired, a gasket 27 can be placed between the head 10 and the neck of the receptacle R, so as to form a seal between the head and receptacle, to preclude the possibility of any of the cooling liquid entering the receptacle.

Changes in details may be made without departing from the spirit or scope of our invention, but what we claim as new is:—

1. A liquid cooler comprising a receptacle containing the liquid to be cooled, a head associated with the receptacle having an axially disposed hollow extension provided with air inlet openings, a rotatable shaft carried by the extension provided with an agitator, a rotor secured to the head and disposed about the extension of said head in spaced relation thereto, an ejector carried by the head having a nozzle disposed substantially tangentially to the blades of the rotor, a cold water pipe connected to the ejector, said ejector having an air inlet opening extending through said head for communication with the interior of the receptacle, and means for leading the cold water from the ejector over the receptacle.

2. As a new article of manufacture, a device for cooling liquids in receptacles comprising a head having an axially disposed hollow extension and depending peripheral lugs adapted to engage the neck of a receptacle, a rotatable shaft carried by said extension provided with an agitator, a rotor secured to the shaft provided with curved blades, said rotor being disposed in spaced relation to the extension defining an air passageway therebetween, said extension being provided with air inlet openings, an ejector carried by the head having a nozzle disposed in a predetermined relation to the blades for directing a jet of water under pressure against said blades, means for leading cold water under pressure to the ejector, the ejector having an air inlet communicating therewith and extending through said head, and a projecting hood extending over said head and connected with the periphery of said head in spaced relation thereto.

3. A liquid cooler comprising a receptacle containing the liquid to be cooled, a head associated with the receptacle having an axially disposed hollow extension provided with air inlet openings for the receptacle and a flaring skirt, a rotatable shaft carried by the extension provided with an agitator, a rotor secured to the head and disposed about the extension of said head in spaced relation thereto defining an air inlet space, an ejector carried by the head having a nozzle disposed substantially tangentially to the blades of the rotor, and a cold water pipe connected to the ejector, said ejector having an air intake port, the water from the rotor being adapted to flow down the same over the skirt, whereby to wash and cool air flowing into the space between the rotor and the head.

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