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### (54) **Beverage cooling and pumping**

(57) A soda pump for use in an ice bank cooling system which has an agitator (19) to prevent stratification of the water from which the ice bank is formed. The shaft (11) of the pump impeller (15) is magnetically coupled to the drive motor (10) and the agitator (19), which is mounted below the pump (14), is either directly driven or by a supplementary magnetic coupling (122, 123) from the impeller shaft (11).

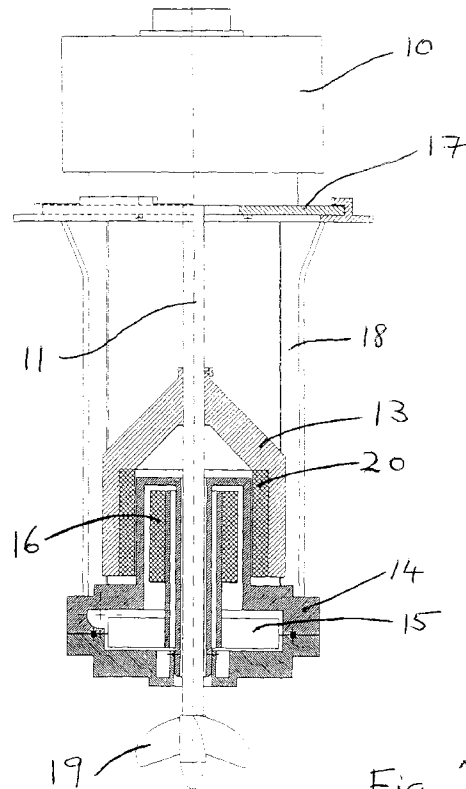


Fig 1

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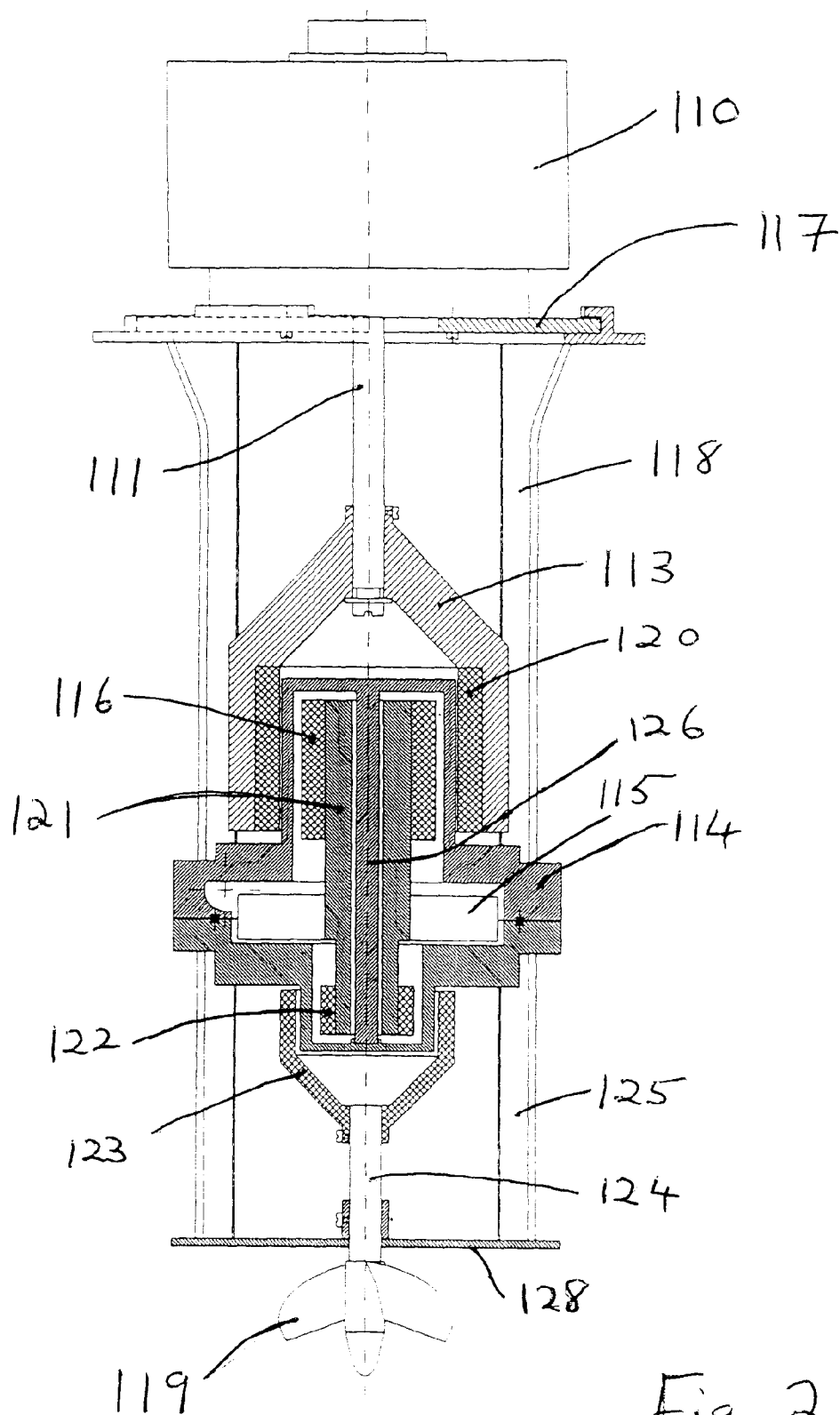


Fig 2

## Description

This invention relates to a beverage or beverage component cooling and pumping system. Such systems are frequently used as part of an ice bank cooling system for the chilling of beverages such as carbonated water or beer. Another name for carbonated water is soda.

In ice bank cooling systems there is a reservoir containing two sets of coils. The first coil comprises the expansion portion of a refrigeration circuit and acts to cool the water in the reservoir to form an ice bank. The second coil, which passes through the water/ice bath or reservoir, is a heat exchanger for cooling a beverage or a beverage component such as a concentrate diluent.

A pump may be located within the reservoir to pump the chilled beverage towards its dispense point. Such pump is typically driven by a motor located above the reservoir, and the same motor may be used to drive an agitator in the form of a paddle to prevent temperature stratification of the water within the reservoir. One example of such a system is described and illustrated in European patent specification 445 457, Figure 2 of which is hereby incorporated by way of reference.

One disadvantage of this previously described system is that, with deep water baths, adequate agitation of the reservoir may not take place.

It is an object of the present invention to provide an improved agitation arrangement for deep water reservoirs.

According to one aspect of the present invention, we provide a beverage or beverage component cooling and pumping system including a reservoir of coolant liquid, an agitator for agitating liquid in the reservoir, power means located above the reservoir and arranged to drive a shaft which conveys rotation to the agitator, a pump for pumping the beverage or beverage component through a circuit, the pump being driven by the same power means as the agitator and being magnetically coupled to the power means by a magnetic coupling, characterised in that the magnetic coupling is located upon the shaft between the motor and the agitator.

According to a further aspect of the present invention, we also provide a beverage or beverage component cooling and pumping system including a reservoir of coolant liquid, an agitator for agitating liquid in the reservoir, power means located above the reservoir and arranged to drive a shaft which conveys rotation to the agitator, a pump for pumping the beverage or beverage component through a circuit, the pump being driven by the same power means as the agitator and being magnetically coupled to the power means by a magnetic coupling, characterised in that a further magnetic coupling is provided between the pump and a second shaft co-axial with the first shaft, and that the agitator is located upon the second shaft.

Two embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 shows in schematic form and partially in cross-section a power means or motor together with a pump and agitator for use in the present invention, and

Figure 2 shows a modified version of the example of Figure 1.

This description also incorporates a cooling reservoir as shown in Figure 2 of European patent 445 457.

In Figure 1, an electric motor (or power means) 10 drives a shaft 11 which extends downwardly from motor 10 into a reservoir of water. Shaft 11 passes through a detachable cover plate 17. Cover plate 17 is located in a cover for the reservoir and is designed to contain evaporation from the surface of the water.

Attached to the end of shaft 11 is a paddle-shaped agitator 19 which can agitate the water in the reservoir. Partway between the motor 10 and the agitator 19, arms 13 extend radially outwardly at an angle from shaft 11. Arms 13 encompass the driving part 20 of a magnetic coupling 20 at their ends remote from shaft 11.

A set of stays 18 depend from the perimeter of cover plate 17 in the same direction as shaft 11 to support a pump housing 14 surrounding shaft 11 between the arms 13 and the agitator 19. The pump housing 14 has within it a pump impeller 15 which drives beverage entering the pump housing 14 towards a remote dispense point (not shown) for the beverage. Typically the beverage is soda.

The pump impeller 15 is driven, not directly from shaft 11, but through the magnetic coupling. The driving part of magnetic coupling 20 co-operates magnetically with a driven magnet 16 which is radially inboard of the driving part 20, but inside pump housing 14 and connected to impeller 15. Rotation of shaft 11 thus causes direct rotation of agitator 19, and indirectly, through the magnetic coupling, the rotation of pump impeller 15. The positioning of the impeller deeper in the reservoir provides for improved agitation of the water reservoir in deep baths.

Referring to Figure 2, a motor 110 drives a shaft 111 which extends vertically downwards into a water reservoir. A pump housing 114 is located and supported by stays 118 which surround shaft 111.

Pump housing 114 contains an impeller 115 which has an annular or hollow vertical shaft 121 which can rotate about a spindle 126 which is attached to pump housing 114. Spindle 126 and cylindrical shaft 121 are co-axial with but spaced axially from drive shaft 111.

Arms 113, similar to arms 13 of Figure 1, extend from adjacent the end of drive shaft 111 remote from motor 110. Arms 113 retain the driving part 120 of a magnetic coupling which extends around the upper part of pump housing 114. Co-operating with driving part 120 is a driven magnet 116 located within pump housing 114 and attached to the upper end of hollow shaft 121. Hollow shaft 121 is thus caused to rotate by magnetic coupling between the driving part 120 and the driving part

116 of the magnetic coupling when shaft 111 is rotated by motor 110.

The lower portion of the hollow shaft 121 which carries pump impeller 115 also carries a magnetic driving component 122, located beneath impeller 115. Component 122 is cylindrical in shape and co-axial with the previously mentioned magnetic driving means and with shaft 111. An agitator 119 attached to a lower shaft 124 extends beneath pump housing 114 and is coupled magnetically to hollow shaft 121 through the magnetic drive component 122 and magnetically driven member 123. The bottom end of lower shaft 124 is located and supported so that it extends co-axially with drive shaft 111 by means of extensions 125 of stays 118 and a lower location member 128 attached to extensions 125.

In this second arrangement, neither the agitator 119 nor the pump impeller 115 is directly driven from shaft 111. Rotation of pump impeller 115 is caused through the magnetic driving means described above, and such rotational drive is subsequently passed through a second magnetic driving means to provide rotation of the agitator 119.

3. A system as claimed in claim 11 or claim 2 in which the power means (10, 110) is located on a cover plate (17, 117) characterised in that stays (18, 118) depend from said cover plate (17, 117) to support the pump housing (14, 114).

4. A system as claimed in claim 3 characterised in that said stays (118) have extensions (125) which support a location member (128) for the second shaft (124).

## Claims

1. A beverage or beverage component cooling and pumping system including a reservoir of coolant liquid, an agitator (19) for agitating liquid in the reservoir, power means (10) located above the reservoir and arranged to drive a shaft (11) which conveys rotation to the agitator (19), a pump (14, 15) for pumping the beverage or beverage component through a circuit, the pump (14, 15) being driven by the same power means (10) as the agitator (19) and being magnetically coupled to the power means by a magnetic coupling, characterised in that the magnetic coupling (16, 20) is located upon the shaft (11) between the power means (10) and the agitator (19).

2. A beverage or beverage component cooling and pumping system including a reservoir of coolant liquid, an agitator (119) for agitating liquid in the reservoir, power means (110) located above the reservoir and arranged to drive a first shaft (111) which conveys rotation to the agitator (119), a pump (114, 115) for pumping the beverage or beverage component through a circuit, the pump (114, 115) being driven by the same power means (110) as the agitator (119) and being magnetically coupled to the power means by a magnetic coupling, characterised in that a further magnetic coupling (122, 123) is provided between the pump (114, 115) and a second shaft co-axial (124) with the first shaft (111), and that the agitator (119) is located upon the second shaft (124).

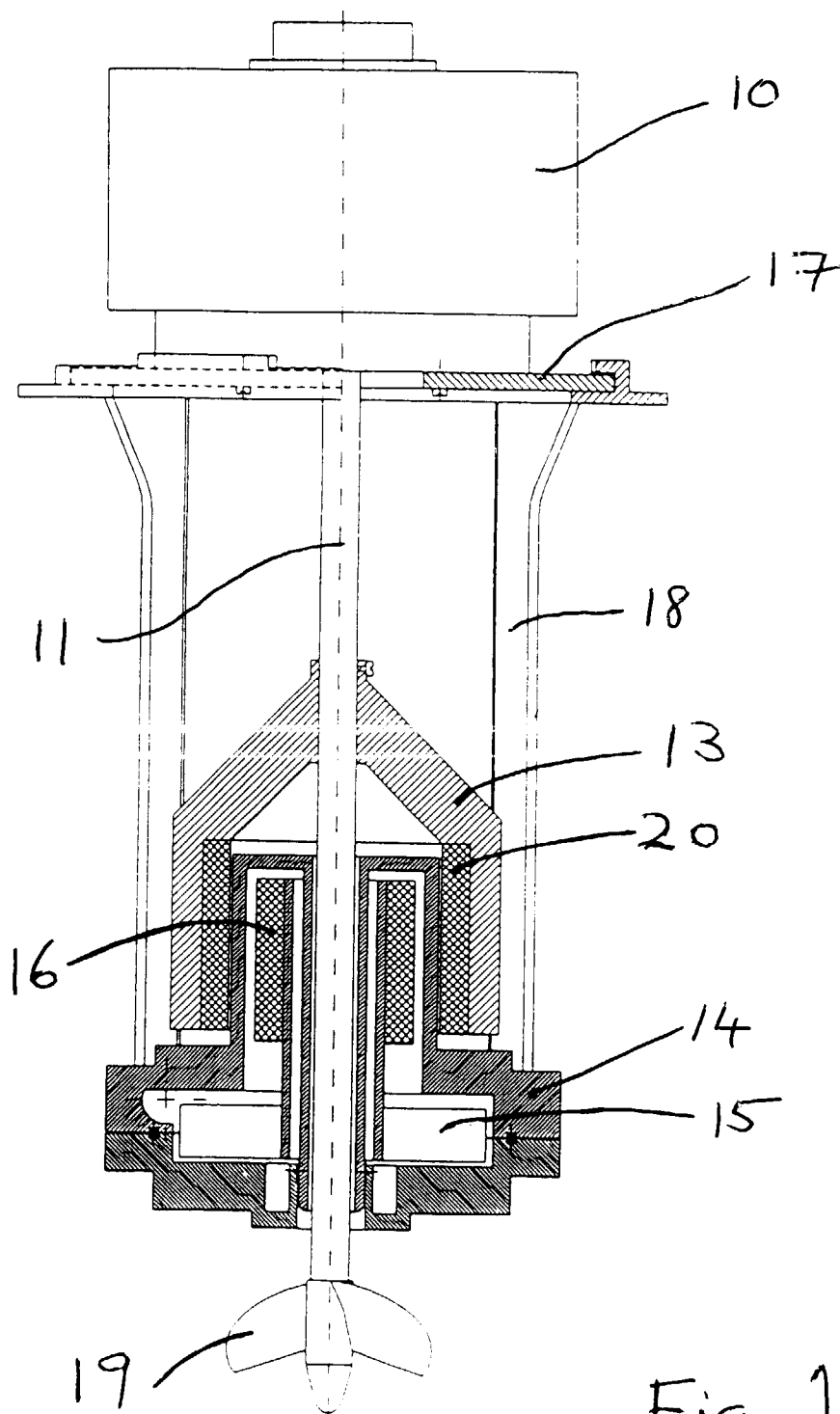


Fig 1

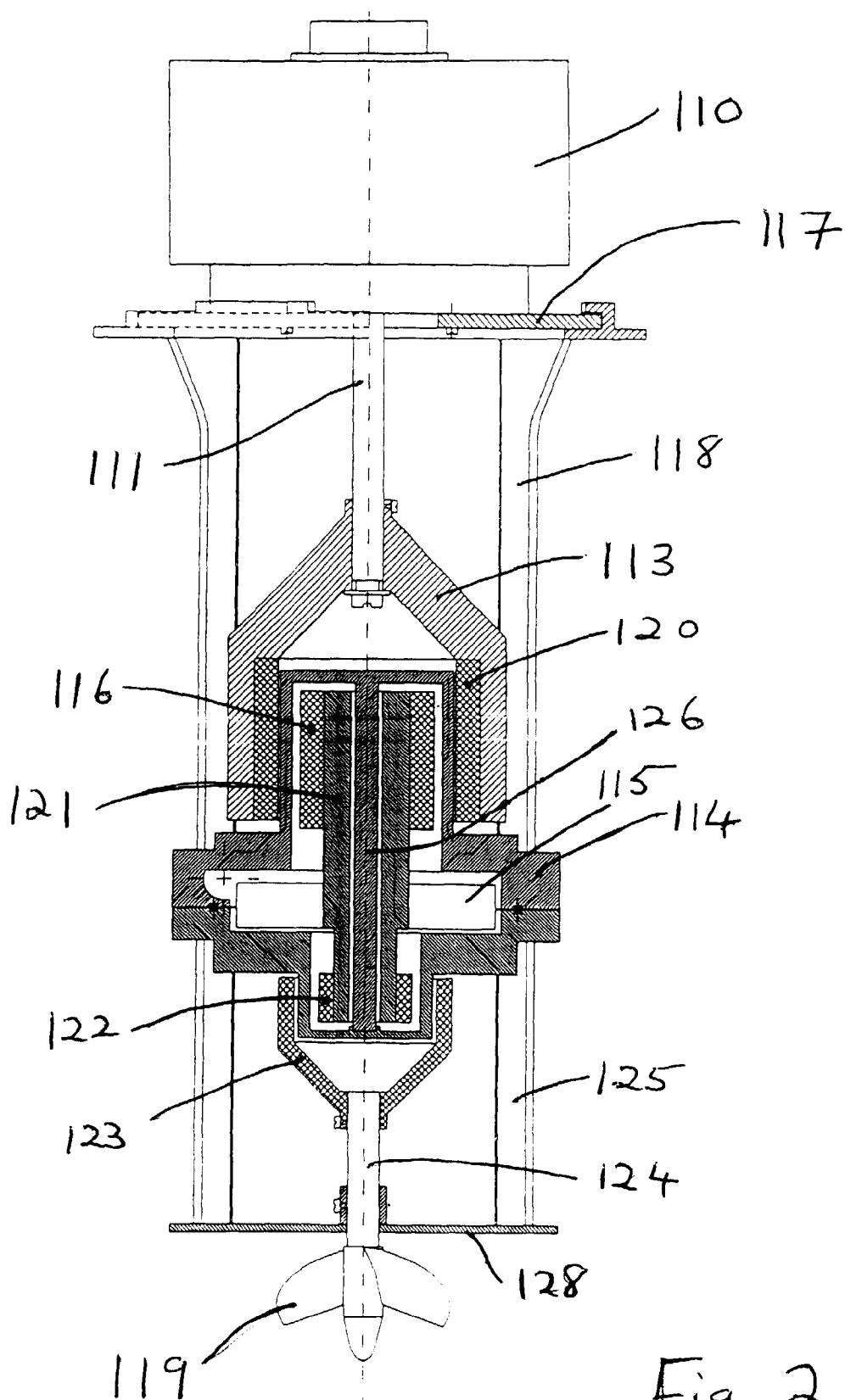


Fig 2



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# EUROPEAN SEARCH REPORT

Application Number  
EP 97 30 4139

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 5 035 121 A (COOK CHRISTOPHER M) 30 July 1991 * column 3, line 8 - line 33; figures 2,3 *	1,2	B67D1/08
A	GB 2 167 845 A (S I COOLERS LTD) 4 June 1986 * page 1, line 99 - line 129; figures 1,2,4 *	1,2	
A	US 4 008 832 A (RODTH JOSEPH JOHN) 22 February 1977 * column 4, line 52 - line 58; figure 1B *	1,2	
A	GB 2 208 536 A (IMI CORNELIUS) 5 April 1989 * figure 1 *	1,2	
The present search report has been drawn up for all claims			<b>TECHNICAL FIELDS SEARCHED (Int.Cl.6)</b> B67D F25D A23G
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>8 September 1997</b>	Examiner <b>Martínez Navarro, A.</b>
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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