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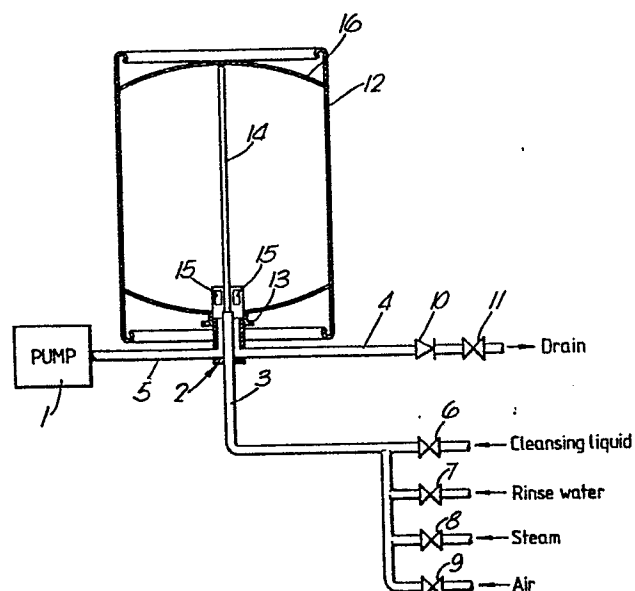
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54 **Method of cleansing kegs.**

57 A method of cleansing kegs used to hold beer and other carbonated beverages includes introducing a cleansing liquid via the spear (4) into an inverted keg (12), and withdrawing and re-injecting the cleansing liquid via the gas ports (15) in the neck fitting (13) of the keg (12) to cause effective scouring of the end wall containing the neck fitting (13) and of the neck fitting (13) by the cleansing liquid. Preferably the cleansing liquid is withdrawn and re-injected at a rate in excess of 200 l/min.



A Method of Cleansing

This invention concerns a method of cleansing kegs used to hold beer and other carbonated beverages. Before
5 such kegs are re-used it is desirable to cleanse their interior of all residues and contaminants. The cleansing process should clean all the parts of the keg which come in contact with the beverage stored in it and the quality, stability and storage life of the beverage
10 depends critically on the cleanliness of the keg in which it is stored. It is also desirable that the cleansing process is as quick as possible and that it is capable of being automated, these considerations being necessary for cost-effective cleansing on an industrial scale.

15 Typically such kegs are cylindrical and have a neck fitting formed in the middle of an end wall with a spear or dip tube extending from the neck fitting into the body of the keg and terminating just short of the other end wall. A self-closing valve and gas ports are located in
20 the neck fitting. In use pressurised gas, usually carbon dioxide, is introduced into the keg through the gas ports in the neck fitting and this drives beverage up the spear and out of the neck fitting to a dispensing outlet. Since mechanical access to the interior of the keg is not
25 normally practicable, cleansing is normally carried out by injecting a cleansing liquid via the neck fitting and spear and draining the liquid via the gas ports.

The methods used typically involve inverting the keg and injecting water containing detergent via the spear at
30 high velocity so that it strikes the other end wall of the keg, is deflected around the side wall and leaves via the gas ports. This effectively cleanses the other end wall and the part of the side wall adjacent it but has a greatly reduced effect on the remainder of the side wall
35 and on the end wall including the neck fitting. The

liquid contacting these surfaces has a greatly reduced velocity and so does not scour them effectively. A process of this sort has the disadvantage that the spear, the inlet and the valve and ports are not thoroughly
5 cleaned.

Attempts to overcome these disadvantages have either involved the use of deflectors fitted to the end of the spear to alter the path of the cleansing liquid, or use complex and time-consuming cleansing procedures with a
10 variety of gases, vapours and liquids.

According to this invention a method of cleansing kegs includes introducing a cleansing liquid via the spear into an inverted keg, and withdrawing and reinjecting the cleansing liquid via the gas ports in the
15 neck fitting of the keg to cause effective scouring of the end wall containing the neck fitting and of the neck fitting by the cleansing liquid.

Preferably the cleansing liquid is withdrawn and re-injected at high velocity to get a good degree of
20 scour of the end wall containing the neck fitting and the side walls of the keg adjacent this end wall. The withdrawal and reinjection also thoroughly cleans the self-closing valve and the remainder of the neck fitting. Preferably the cleansing liquid is withdrawn and
25 re-injected at a rate in excess of 200 l/min.

Preferably the process further includes the step of subsequently introducing the cleansing liquid via the spear at a low velocity so that a substantial part of the cleansing liquid flows down the outside of the spear to
30 cleanse it. This step preferably occurs during the withdrawal and reinjection of the cleansing liquid through the neck fitting. Preferably the withdrawal and reinjection of cleansing liquid is repeated and typically occurs three times.

Preferably a complete cleansing cycle comprises a first period during which cleansing liquid such as a detergent solution is injected at high velocity via the spear, a second period during which the cleansing liquid
5 is injected at low velocity via the spear and simultaneously liquid is withdrawn and reinjected from the keg via the gas ports, a third period during which the liquid is withdrawn and reinjected at high velocity via the gas ports whilst additional liquid is injected at
10 high velocity via the spear and a fourth period during which liquid is injected at high velocity via the spear.

Of course this cleansing cycle is followed by a rinsing cycle in which the inside of the keg is rinsed with clean water. During the rinsing cycle withdrawal
15 and reinjection may occur. Finally the keg is sterilised by steam or by a chemical sterilant.

The withdrawal and reinjection may be effected by a positive displacement piston pump or by a diaphragm pump.

This method has the advantages that it achieves
20 thorough cleansing of the internal surfaces of the keg, of the spear and of the neck fitting without the use of non-standard kegs or of special cleaning media and without any substantial increase in the cycle time of the cleansing process.

25 A method according to the present invention will now be described in detail with reference to the accompanying drawing which is a partly sectioned side elevation of the keg and cleansing apparatus.

The cleansing apparatus comprises a pump 1, a
30 cleansing head 2 having an inlet pipe 3 and an outlet pipe 4, and a pipe 5 connecting it to the pump 1. A source of liquid containing a detergent is connected to the inlet pipe 3 by a flow control valve 6; a source of rinsing water is connected to the inlet pipe 3 by a flow
35 control valve 7; a source of steam is connected to the

inlet pipe 3 by a flow control valve 8; and, a source of air under pressure is connected to the inlet pipe 3 by a flow control valve 9. The outlet pipe 4 is connected to a drain via a non-return valve 10 and a flow control valve 11.

In use an inverted keg 12 is lowered onto the head 2 and this engages a sprung valve located in a neck fitting 13 of the keg 12. A spear 14 extends into the keg 12 from the neck fitting 13 and the head 2 is arranged to connect the inlet pipe 3 to the spear 14 and the pipes 4 and 5 to gas ports 15 in the neck fitting.

For an initial period of two seconds liquid containing detergent is injected at high velocity via the valve 6 and the spear 14, scouring the end wall 16 remote from the neck fitting and the part of the side wall of the keg 12 adjacent the end wall 16. For a second period of three seconds liquid containing a detergent is injected at low velocity via the spear 14 so that it runs down and cleanses its outer surface. For a third period of two seconds liquid containing a detergent is injected at high velocity via the spear 14. Concurrently with the second and third periods liquid is repeatedly withdrawn and reinjected at high velocity via gas ports 15 by the pump 1. This scours the end wall of the keg carrying the neck fitting 13, the neck fitting 13 and the side walls adjacent this end wall. For a fourth period of three seconds cleaning liquid is again injected at high velocity via the spear 14. At the completion of the fourth period the valve 11 associated with the outlet pipe 4, is opened to allow the cleansing liquid to flow to drain and this is assisted by introducing pressurised gas into the keg 12 via the valve 9 and the spear 14.

After the cleansing liquid has drained away rinsing water is introduced into the keg 12 via the valve 7, the inlet pipe 3 and the spear 14. The rinsing treatment may be identical to that for the cleansing liquid with the pump 1 providing scouring of the end wall carrying the neck fitting 13. After the rinsing water has been drained steam is introduced into the keg 12 via the valve 8, inlet pipe 3 and the spear 14 to sterilise it.

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CLAIMS

1. A method of cleansing kegs including introducing a cleansing liquid via the spear into an inverted keg, characterised by withdrawing and
5 reinjecting the cleansing liquid via the gas ports in the neck fitting of the keg to cause effective scouring of the end wall containing the neck fitting and of the neck fitting by the cleansing liquid.
2. A method according to Claim 1, in which the
10 cleansing liquid is withdrawn and re-injected at high velocity to get a good degree of scour of the end wall containing the neck fitting and the side walls of the keg adjacent this end wall.
3. A method according to Claim 2, in which the
15 cleansing liquid is withdrawn and re-injected at a rate in excess of 200 l/min.
4. A method according to any one of the preceding Claims, in which the process further includes the step of subsequently introducing the cleansing liquid via the
20 spear at a low velocity so that a substantial part of the cleansing liquid flows down the outside of the spear to clean it.
5. A method according to Claim 4, in which the subsequent introduction of the cleansing liquid at low
25 velocity occurs during the withdrawal and re-injection of the cleansing liquid through the fitting.
6. A method according to any one of the preceding Claims, in which the withdrawal and re-injection of cleansing liquid is repeated and typically occurs three
30 times.
7. A method according to any one of the preceding Claims, in which the cleansing cycle comprises a first period during which cleansing liquid such as a detergent solution is injected at high velocity via the spear, a
35 second period during which the cleansing liquid is

injected at low velocity via the spear and simultaneously liquid is withdrawn and re-injected from the keg via the gas ports, a third period during which the liquid is withdrawn and re-injected at high velocity via the gas
5 ports whilst additional cleansing liquid is injected at high velocity via the spear and a fourth period during which cleansing liquid is injected at high velocity via the spear.

8. A method according to Claim 7, in which the
10 cleansing cycle is followed by a rinsing cycle in which the inside of the keg is rinsed with clean water.

9. A method according to Claim 8, in which during the rinsing cycle, the water is withdrawn and re-injected.

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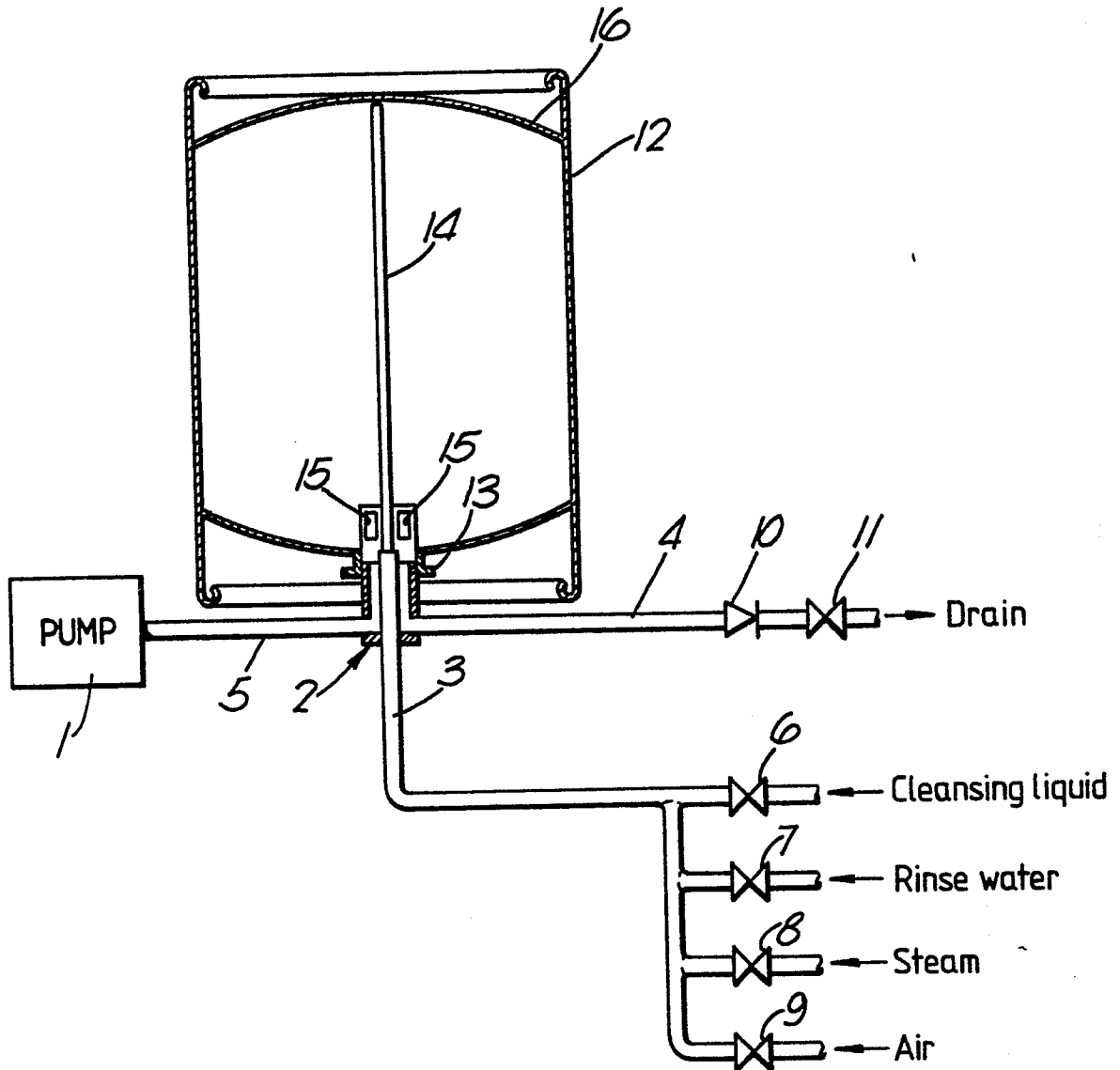
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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	DE-A-2 706 590 (BARTS) * Whole document * ---	1	B 08 B 9/12
A	EP-A-0 056 436 (SCHEPPER) ---		
A	GB-A-1 163 733 (JOSEPH SANKEY & SONS LTD) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			B 08 B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 02-06-1987	Examiner VOLLERING J.P.G.
CATEGORY OF CITED DOCUMENTS		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	
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			