

(21) Application No: 1904537.6  
(22) Date of Filing: 01.04.2019

(71) Applicant(s):  
Close Brewery Rentals Limited  
Unit 1, Kingfisher Park, Headlands Business Park,  
Ringwood, Hampshire, BH24 3NX, United Kingdom

(72) Inventor(s):  
Gary Phillips

(74) Agent and/or Address for Service:  
Cameron Intellectual Property Ltd  
Moncrieff House, 69 West Nile Street, Glasgow,  
G1 2QB, United Kingdom

(51) INT CL:  
B08B 9/093 (2006.01) B08B 3/02 (2006.01)

(56) Documents Cited:  
CN 204135011 U DE 002946184 A1  
AaquaTools, 2013, DS-AaquaBlaster-360,  
aaquatools.com, [online], Available from [http://aaquatools.com/wp-content/uploads/2013/10/DS-AaquaBlaster-360\\_V1.pdf](http://aaquatools.com/wp-content/uploads/2013/10/DS-AaquaBlaster-360_V1.pdf) [Accessed 15 October 2019].  
Clean Machine, 2018 at least, EzyLift Innovative Wine Barrel Cleaners by Clean Machine, Clean Machine, Available from: <http://www.cleanmachine.com.au/ezylift-innovative-wine-barrel-cleaners-by-clean-machine-adelaide/> [Accessed 19 Oct 2019]

(58) Field of Search:  
INT CL B08B

(54) Title of the Invention: **Sanitisation of the interiors of beer casks and cegs with UHP water**  
Abstract Title: **Beer Cask and Keg Ultra-High-Pressure Cleaning**

(57) Apparatus for sanitising the internal surfaces of a beer cask by washing the interiors with jets of water at ultra-high pressures (UHP) of around 2500 Barg, thereby scavenging away any organic/inorganic scale adhering to the container surface and rupturing any living cells present on the surface that would otherwise pose a microbiological infection hazard to the product. The apparatus includes a conveyor system for transferring the keg to a clamping station. A UHP water spray lance is inserted into the container via a robotic arm. A method for cleaning the keg is also provided comprising the lance spraying water at a pressure of 2500 Barg and the step of transferring the cask to an internal inspection station. The shive may be located by a laser beam. The nozzle on the spray arm may move at a controlled speed empirically derived for the appropriate size/type of container. After cleaning, the UHP water may be turned off automatically and the water may be recovered, filtered and re-used. After inspection, the containers may be scanned via RFID

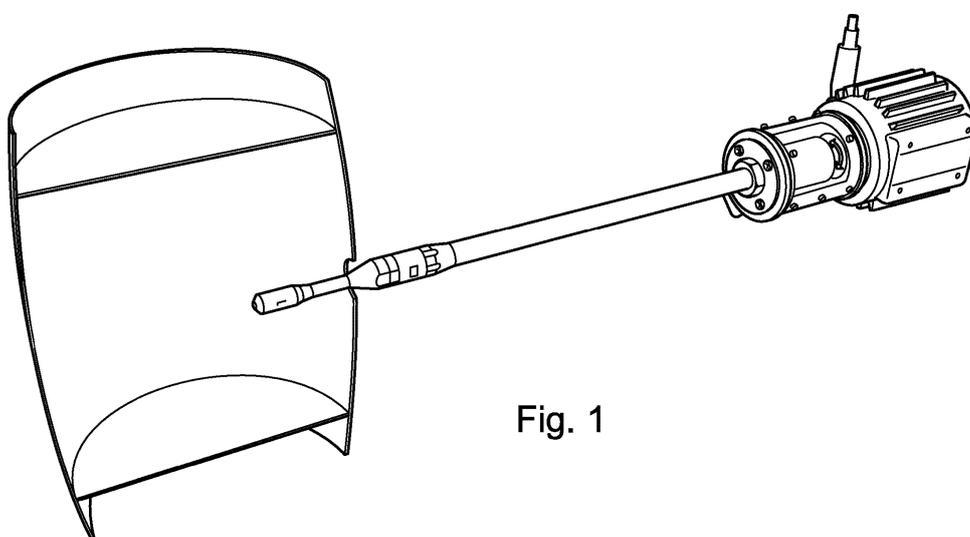


Fig. 1

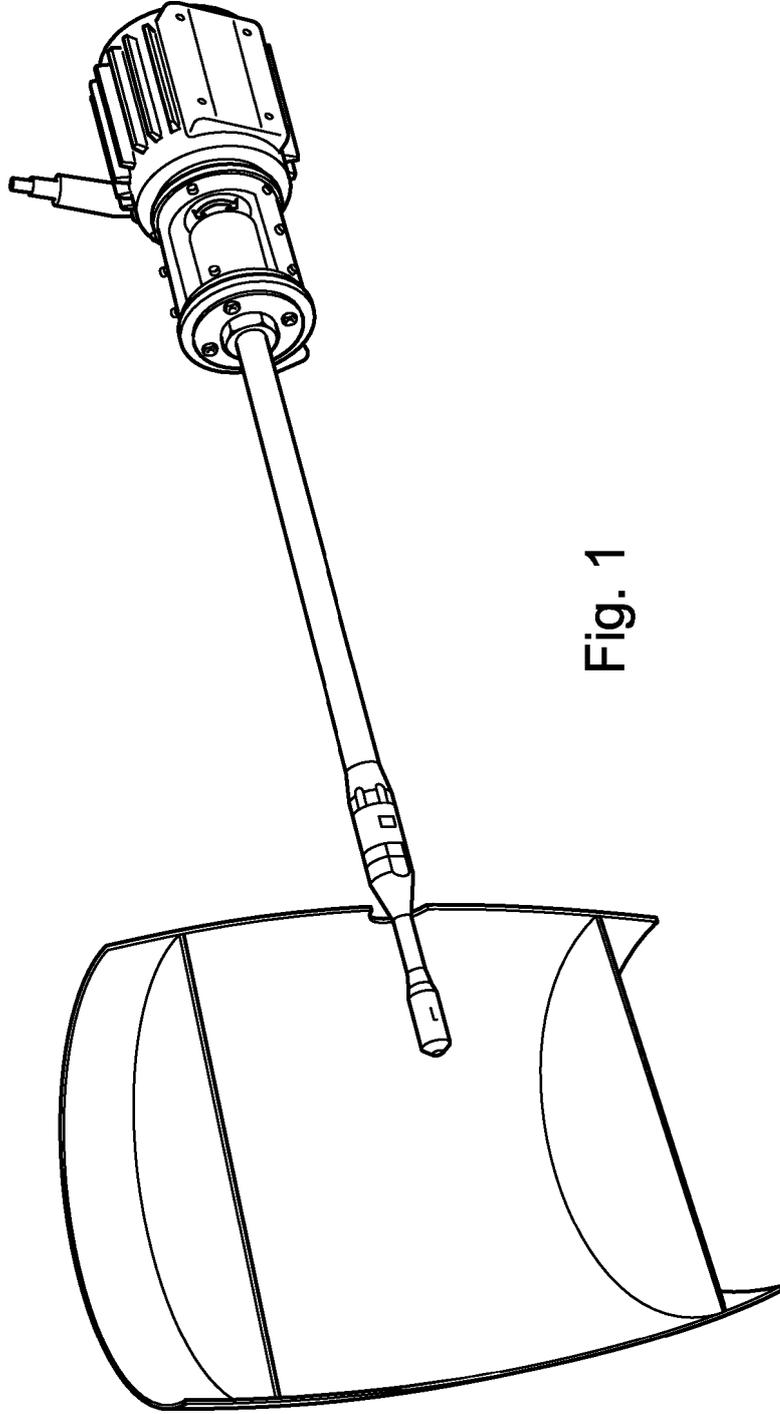


Fig. 1

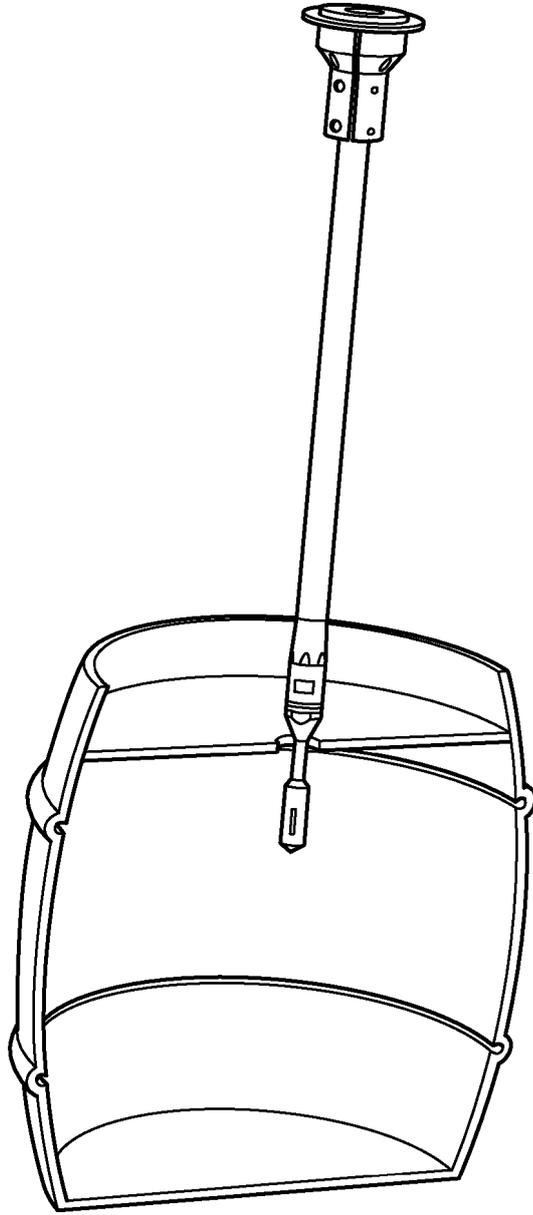


Fig. 2



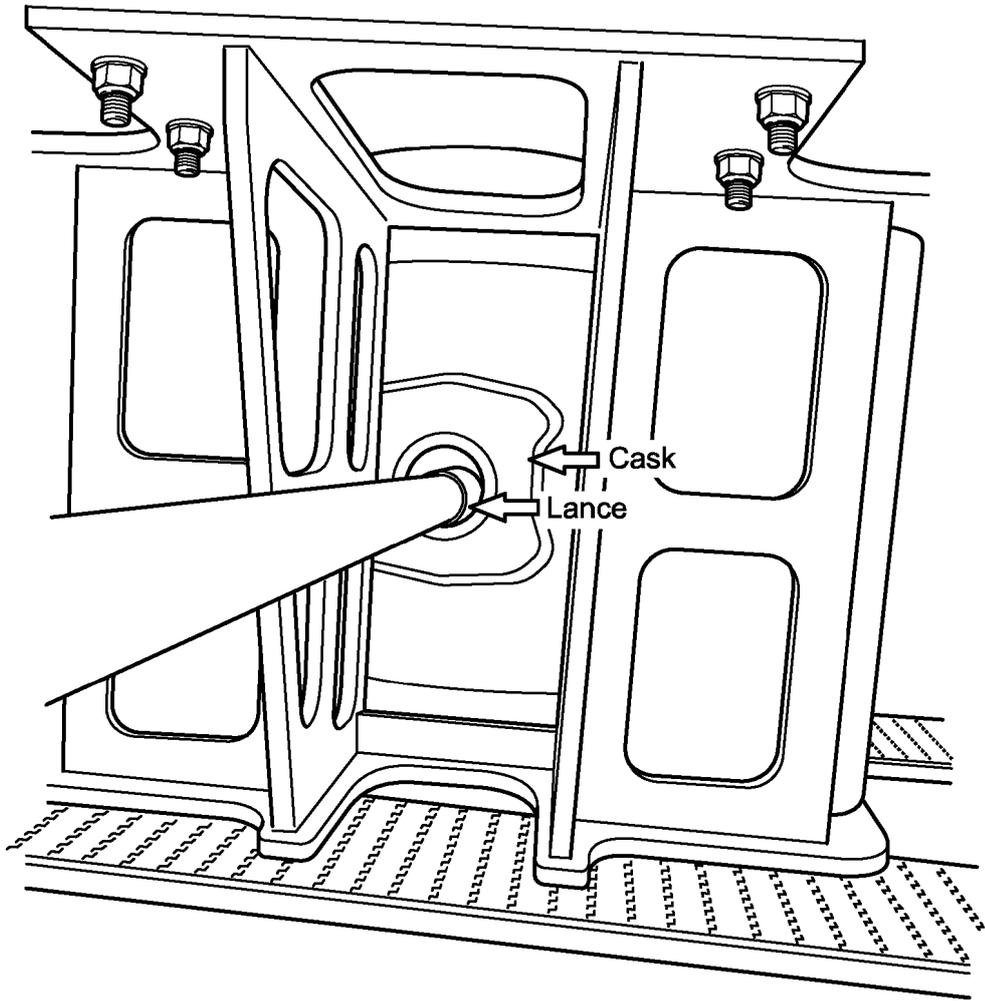


Fig. 4

18 11 19

## **PATENT APPLICATION: UHP CONTAINER CLEANING PROCESS DEVELOPED BY CBBR**

### **SYSTEM DESCRIPTION**

Close Brothers Brewery Rentals, known as CBBR, are a cask and keg cleaning and repair facility based in Thurnscoe, S Yorkshire

CBBR specialise in all aspects of container repair, maintenance and external/internal cleaning for a wholly-owned fleet of containers that are supplied to customers on either a short- or long-term rental agreement.

#### **OVERVIEW OBJECTIVE OF PROCESS STEP TO BE PATENTED**

To sanitize cask and keg containers with ultra-high-pressure water (UHP)

#### **PROJECT BACKGROUND**

The traditional method of internally cleaning casks and kegs prior to filling with beer was reliant on the application of either, or both of, chemical and heat energy. Non-pressurised casks are cleaned/washed out with hot water, whereas pressurised kegs are sanitised by super-heated steam followed by a 'wash' with weak acid as a descalant.

The use of ultra-high pressure water, which removes all residual soils and staining materials, both organic and inorganic, confers not only visually clean surfaces but also a high level of surface sanitisation by effectively 'rupturing' the cell walls of any micro-organisms present: thus the use of chemical and heat energy is replaced by high pressure energy, which is both cheaper and free from any residual chemical taints.

Ultra-high pressure water technology, using water pressures of over 2500 Barg, is a well-established technique and has led to the development of a totally new range of pumping equipment, a key application being the surface preparation of motorway bridges to remove all existing paint layers and rust residues prior to re-painting.

The application of UHP technology at CBBR to sanitise the internal surfaces of beer containers is a new venture for the industry

#### **OVERALL SYSTEM DESCRIPTION**

Containers returned from the brewing retail sector are identified/sorted/stored prior to introduction to a cleaning and sanitisation line

They are initially screened at infeed for potential maintenance and repair issues, e.g. neck and chime failures, with any rejects being isolated for appropriate remedial action, and any 'foreigners' being sorted into stock: after any remedial action and sorting, containers may be reintroduced to the conveyor system for sanitization..

Containers surviving this inspection process are duly presented via a conveyor for external washing, after which they are offered to the UHP unit for internal sanitisation.

Containers are transferred via a conveyor system to a clamping area.

**PROCESS TO BE PATENTED**

1. **KEGS** Once in position, horizontal and vertical clamps are engaged, directly after which a UHP spray cleaning lance is introduced into the container via a robotic arm.
2. **CASKS** are secured initially by horizontal clamps, rotated until the correct entry position, the shive hole, is located by a laser beam: once in position the vertical clamp is applied.
3. Ultra-high-pressure towns water at 2500 Barg is introduced into the container via a spray nozzle located at the end of the spray arm at the desired travel speed empirically derived for the appropriate size/type to the container: it is recovered after use, filtered through a coarse cloth and recycled for subsequent re-use.
4. Upon cycle completion the UHP water is turned off automatically and the robotic arm withdrawn from the container, which is then discharged.

Cleaned containers are then transferred to an internal inspection station, after which they are scanned via RFID tags located on the dome of the container into stock against customer delivery.

Keg/Cask cleaning parameters for UHP process

Pump – HDP: 174

Accessories: Electric rotatory drive, nozzle holder 01.01599.0449, round nozzle type S

Material: Stainless steel

Key Parameters	Value
Pressure (bar)	2500
V (l/min)	30.0
Nozzle	
No.	3
Ø (mm)	0.5
Type	S
Feed Rate (mm/s)	50
Time (sec)	80
RPM (1/min)	750
Travel Distance (mm)	
30l keg	325mm
50 keg	490mm
100l keg	580mm
9g cask	392mm

**CLAIMS**

1. Apparatus for sanitising the internal surfaces of a beer cask or beer keg comprising:

- 5 (i) conveyor system for transferring a cask or keg to be cleaned to a clamping area;  
(ii) a clamp for clamping a cask or keg; and  
(iii) an ultra-high pressure water spray cleaning lance adapted to be introduced into, and withdrawn from, a clamped cask or keg via a robotic arm.

10 2. A method for sanitising the internal surfaces of a beer cask or beer keg, comprising the steps of:

- (i) transferring a cask or keg to be cleaned to a clamping area;  
(ii) clamping said cask or keg;  
(iii) introducing, via a robotic arm, an ultra-high pressure water spray cleaning lance into said clamped cask or keg;  
15 (iv) spraying water into said clamped cask or keg at a pressure of 2500 Barg;  
(v) withdrawing, via said robotic arm, the ultra-high pressure water spray cleaning lance from said clamped cask or keg;  
20 (vi) releasing said cask or keg from the clamp; and  
(vii) transferring said released cask or keg to an internal inspection station.



**Application No:** GB1904537.6

**Examiner:** Dr Kathryn Willett

**Claims searched:** 1-2

**Date of search:** 20 November 2019

**Patents Act 1977: Search Report under Section 17**

**Documents considered to be relevant:**

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1	CN 204135011 U (SONG) Fig 1 shows a container cleaning machine suitable for sanitising the inside of a beer cask. The container is put onto support 3 and is conveyed to the clamping area. The containers are clamped from above and positioned above the nozzles 10, 11, which rise and high pressure wash the container.
X	1	DE 2946184 A1 (ZIPPEL) Figs 1&2 show a spray cleaning machine for beer barrels. The barrels 5 are moved by conveyor 7, 8, 9,10 and the barrels are positioned by carriers 11 that have member 13, which engages the bunghole 14 of the drum 5 and element 15 supports further. Lance 20 can be moved in and out on arm 21.
Y	1	Clean Machine, 2018 at least, EzyLift Innovative Wine Barrel Cleaners by Clean Machine, Clean Machine, Available from: <a href="http://www.cleanmachine.com.au/ezylift-innovative-wine-barrel-cleaners-by-clean-machine-adelaide/">http://www.cleanmachine.com.au/ezylift-innovative-wine-barrel-cleaners-by-clean-machine-adelaide/</a> [Accessed 19 Oct 2019] Technical specifications tab gives a control valve pressure rating of 345 Bar
Y	1	AaquaTools, 2013, DS-AaquaBlaster-360, aaquatools.com, [online], Available from <a href="http://aaquatools.com/wp-content/uploads/2013/10/DS-AaquaBlaster-360_V1.pdf">http://aaquatools.com/wp-content/uploads/2013/10/DS-AaquaBlaster-360_V1.pdf</a> [Accessed 15 October 2019]. AaquaBlaster 360 is a barrel washing system with a rotating nozzle system. See table for permissible pressure of 159 Bar.

**Categories:**

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

**Field of Search:**

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC<sup>X</sup> :

Worldwide search of patent documents classified in the following areas of the IPC

B08B



The following online and other databases have been used in the preparation of this search report

WPI, EPODOC, Patent Fulltext

**International Classification:**

<b>Subclass</b>	<b>Subgroup</b>	<b>Valid From</b>
B08B	0009/093	01/01/2006
B08B	0003/02	01/01/2006