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(51) INT CL<sup>7</sup>  
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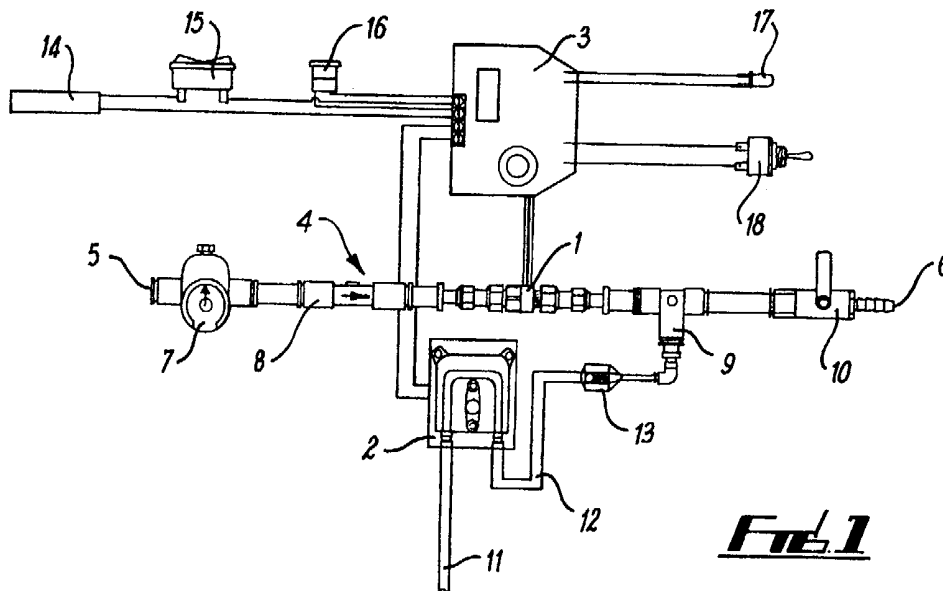
(52) UK CL (Edition T )  
**F2N N2A**  
**U1S S1242**

(56) Documents Cited  
**GB 2260795 A**                      **GB 2242181 A**  
**GB 2216979 A**                      **GB 2140121 A**

(58) Field of Search  
UK CL (Edition T ) **F2N N2A**  
INT CL<sup>7</sup> **B08B 9/02**  
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(54) Abstract Title  
**A cleaning system for beverage dispensing lines and the like**

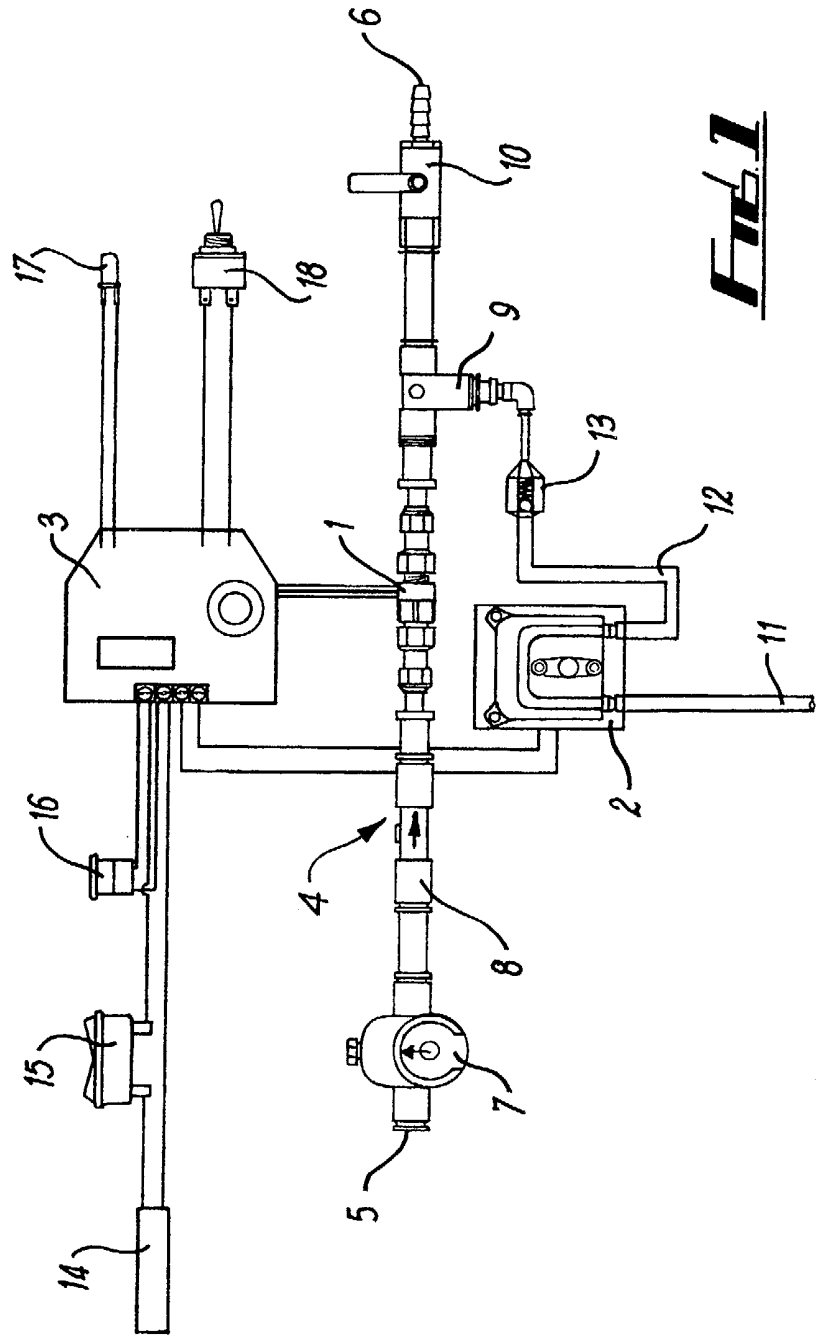
(57) A cleaning system for beverage dispensing lines and the like comprises a means for conducting water from an inlet 5 to an outlet 6, means for determining the rate of flow of the water and means for supplying a cleaning solution at a rate determined by the rate of flow of the water, to the water flowing through the means for conducting a first fluid from an inlet 5 to an outlet 6. The means for determining the rate of flow of the water preferably comprises a turbine 1 that emits electronic pulses which can be counted to provide the rate, while a pressure regulator 7 maybe positioned in the means for conducting to regulate the pressure therein. A self priming pump 25 which is controlled by a motor control in accordance with a predetermined program preferably constitutes the means for supplying the cleaning solution.



**GB 2376512 A**

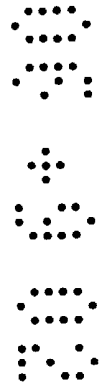
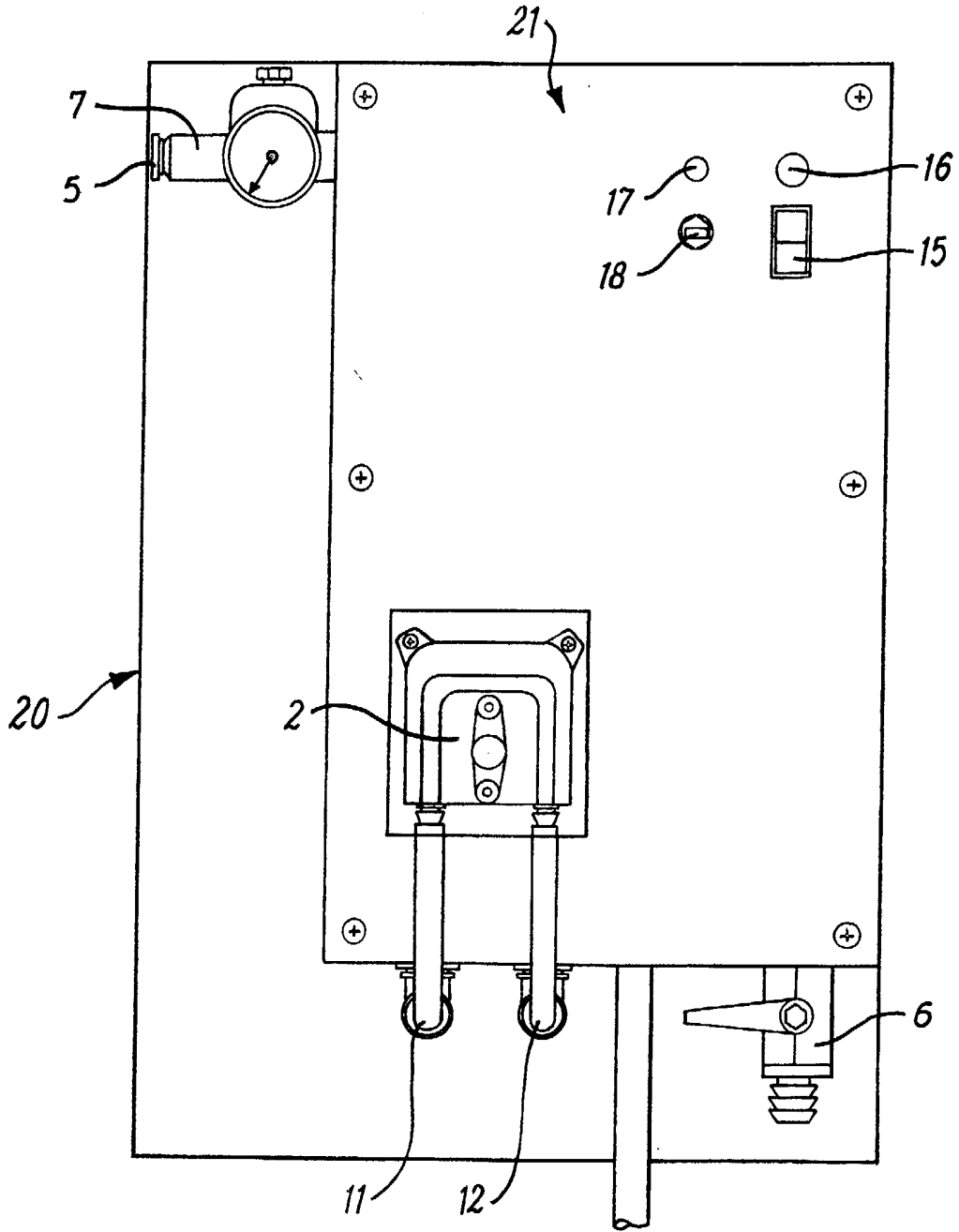
At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date but within the period prescribed by Rule 25(1) of the Patents Rules 1995.

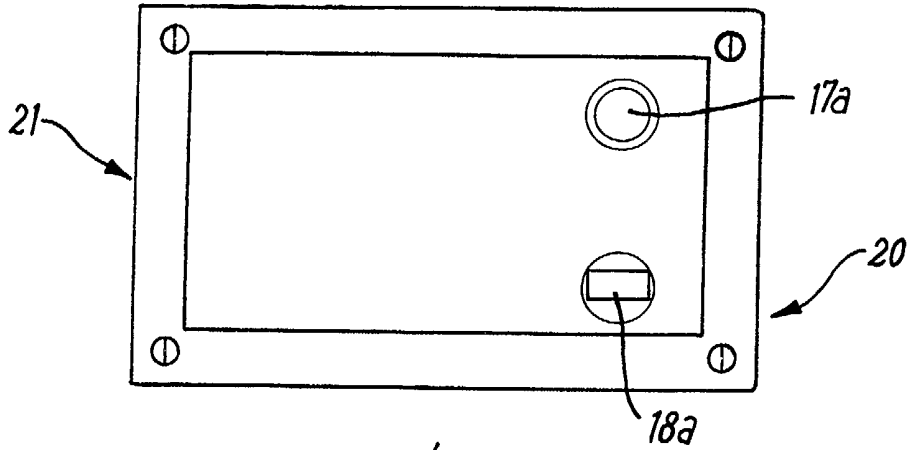


**Fuel**

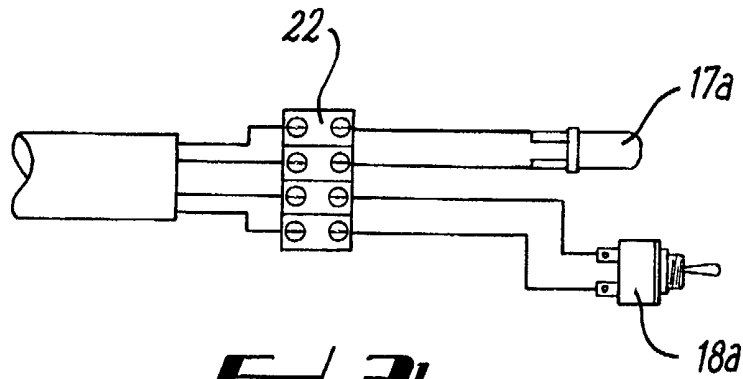
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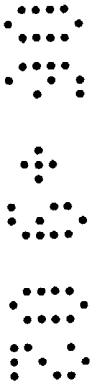
**Fig. 2**



**FIG. 3a**



**FIG. 3b**



A CLEANING SYSTEM AND METHOD OF CLEANING

The present invention relates to a cleaning system and to a method of cleaning. The system and method are intended particularly, but not exclusively, for cleaning beverage dispense lines in a beverage dispense system.

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Hygiene and good practice demands that beverage lines in a beverage dispense system are cleaned at regular intervals in order to maintain standards and prevent or inhibit the build up of deposits in the system. In general, the beverage lines would first be flushed with clean water before circulating a proprietary cleaner through the lines after which the lines would be flushed again to avoid the tainting of beverage passing through the lines subsequently with cleaner. This is a labourious and time consuming process as the proprietor of the dispense lines is required to refill and prime the system a number of times to complete a full cleaning procedure. An object of the invention is to overcome or mitigate these disadvantages.

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According to one aspect of the present invention, there is provided a cleaning system comprising means for conducting water from an inlet to an outlet, means for determining the rate of flow of water through the means for conducting, means for supplying cleaning solution to water flowing through the means for conducting at a rate determined by the rate of water flow in order in operation to supply either water or a mixture of

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water and cleaning solution.

According to another aspect of the invention, there is provided a method of cleaning including the steps of supplying water measuring the rate of supply of water to calculate the desired rate of supply of a cleaning solution, supplying the cleaning solution at the desired rate to the supplied water to enable successively water and a mixture of water to be supplied.

In a preferred embodiment of the invention the means for determining the rate of flow comprise a turbine from which electronic pulses are generated which may be counted to provide the rate. The means for conducting advantageously comprises a passage and preferably a pressure regulator is disposed in the passage to regulate the pressure of water therein. Means are also advantageously disposed in the means for conducting to prevent water being syphoned back towards the inlet. Advantageously this means comprises a double check valve. The means for supplying may comprise a self priming pump. The pump is controlled by a motor control in accordance with a predetermined program and in dependence upon signals received from the means for determining the rate of flow. The self priming pump is disposed to receive at its inlet cleaning solution from a cleaning solution supply and to supply cleaning solution at its output at the desired rate. The outlet is connected via a T connector to the means for conducting water. A non-return valve is preferably connected between the outlet and T connector to prevent water being syphoned back

into the pump and thereby into the cleaning solution supply. The motor control is mains or low voltage powered and an indicator is provided to indicate when the control is energised. Means are provided for switching the control between a first mode of operation in which only water is supplied and a second mode of operation in which a mixture of water and cleaning solution is supplied in the unit or via a remote control in the bar area.

In order that the invention may be more clearly understood, one embodiment thereof will now be described, by way of example with reference to the accompanying drawings, in which:-

Figure 1 is a diagram of a cleaning system according to the invention, Figure 2 is a diagram showing the physical arrangement of the parts of the system of figure 1, and

Figures 3a and b show a modification of the system shown in figure 1.

Referring to the drawings, the system is a semi-automatic cleaning system and comprises a turbine 1 and a self-priming pump 2 operative to control the quantity of cleaner supplied to the system under the programmed control of a motor control 3. The turbine 1 and motor control 3 can compensate for varying pressure and flow rates. The turbine 1 is mounted in a through passage indicated generally by reference numeral 4 which has an inlet 5 adapted for connection through a self-cutting

connector tap to a water supply and an outlet 6 adapted for connection to the beverage dispense cleaning ring main and thus the beverage dispense lines to be cleaned. A pressure regulator 7 is disposed downstream of the inlet followed by a double check valve 8. Downstream of the turbine 1 are disposed a 'T' branch connecting through which cleaner may be supplied to the line 4 and a ½" ball valve 10. In operation, the double check valve 8 prevents back syphoning and pressure regulator 7 enables the system pressure to be set. A suitable pressure is about 2 bar but other pressures may be used depending on the length of the beverage line and brewers specifications.

The self-priming pump 2 comprises an inlet 11, through which cleaner is supplied to the pump and an outlet 12 through which cleaner is supplied via a non-return valve 13 and the T connector 9 to the line 4. As indicated earlier, the system operates in accordance with a predetermined program through which the motor control 3 and in turn the turbine 1 and the pump 2 are controlled. The motor control 3 is connected to a 240V or low voltage power supply 14 through an on/off switch 15. An on/off indicator 16 is provided to show when the power is on and the system therefore energised. A dual colour system status indicator 17 and a cycle switch 18 are connected to the controller 3.

Referring to figure 2, the physical interrelationship of the parts of the system of figure 1 are shown. The system is mounted on a fabricated back



board indicated generally by the reference numeral 20. The electronic and most of the web component parts are mounted in a fabricated enclosure indicated generally by reference numeral 21. The power and status indicators 16 and 17 are disposed adjacent each other and the power and cycle switch 15 and 18 are disposed adjacent each other and beneath the indicators 16 and 17. The pressure regulator 7 is disposed outside the enclosure 21. The pump 2 is disposed towards the base of the enclosure 21 and the ball valve 6 outside the enclosure 21 at the base of the back board 20.

In operation the system is energised via the power switch 15. Once energised the power indicator 16 illuminates. The status indicator also illuminates green to indicate that the system is in the water flush mode. In that mode water enters the system via the pressure regulator 7, through which the system pressure is set as desired and flows through the double check valve 8, which prevents back syphoning, and then via the turbine 1, T connector 9 and open ball valve 10 to enter the beverage dispense ring main. The water flushes all beverage from the beverage dispense lines. Flushing continues for a predetermined time and once complete the cleaning cycle can then be activated. The cleaning cycle is activated by depressing the cycle switch 18. The status indicator switches to red to indicate that the system is now in cleaning cycle mode. Water enters the system as in the water flushing mode. The volume of water flowing through is

determined through the turbine 1 which produces pulses which are connected electronically. The motor control 3 program then calculates the quantity of cleaning solution required and activates the self-primer pump 2 to inject the required amount into the water flowing through line 4 via the non-return valve 13, which prevents water being syphoned back into the cleaning solution, and the 'T' branch connector 9. The correct mixture of cleaning solution in water is then fed via ball valve 10 into the beverage dispense system. Once cleaning cycle mode has been operated in accordance with the cleaning solution recommendations, the cleaning cycle mode is terminated by depressing the cycle switch 18 to return to the water flush mode the status indicator changing from red to green. The system is then flushed with water for a predetermined time to clear cleaning solution from the system.

If desired the system can be controlled remotely from a remote control unit. Such a modification is shown in figures 3a and 3b. In these figures, the remote control unit is referenced 20 and is shown in figure 3a. The unit 20 comprises a plastic enclosure 21 which may be mounted on the bar or at any other suitable position. A cycle switch 18a cycle indicator 17a (which respectively replace cycle switch 18 and cycle indicator 17) and terminal 22 are mounted in the enclosure. A four core cable connect the remote unit to the motor control 3.

It will be appreciated that the above embodiment has been described

by way of example only and that many variations are possible without departing from the scope of the invention.

CLAIMS

1. A cleaning system comprising means for conducting water from an inlet to an outlet, means for determining the rate of flow of water through the means for conducting, means for supplying cleaning solution to water flowing through the means for conducting at a rate determined by the rate of water flow in order in operation to supply either water or a mixture of water and cleaning solution.  
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2. A cleaning system as claimed in claim 1, in which the means for determining the rate of flow comprises a turbine from which electronic pulses are generated which may be counted to provide the rate.  
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3. A cleaning system as claimed in claim 1 or 2, in which the means for conducting comprises a passage.
4. A cleaning solution as claimed in any preceding claim, in which a pressure regulator is disposed in the means for conducting to regulate the pressure of liquid therein.  
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5. A cleaning solution as claimed in any preceding claim, in which means are provided in the means for conducting to prevent liquid being syphoned back towards the inlet.
6. A cleaning solution as claimed in claim 5, in which the means to prevent syphoning comprises a double check valve.  
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7. A cleaning solution as claimed in any preceding claim, in which the

means for supplying comprises a self priming pump.

5 8. A cleaning solution as claimed in claim 7, in which the self priming pump is disposed to receive at its inlet cleaning solution from a cleaning solution supply and to supply cleaning solution at its outlet at the desired rate.

9. A cleaning solution as claimed in claim 7 or 8, in which the pump is controlled by a motor control in accordance with a predetermined program and in dependence upon signals received from the means for determining the rate of flow.

10 10. A control solution as claimed in claim 8, in which the outlet is connected via a T connector to the means for conducting water.

11. A control solution as claimed in claim 10, in which a non-return valve is disposed between the outlet and T connector to prevent water being syphoned back in the pump and therefore into the cleaning solution supply.

12. A control solution as claimed in claim 9, in which the motor control is mains or low voltage powered and an indicator is provided to indicate when the control is energised.

13. A control solution as claimed in claim 9 or 12, in which means are provided for switching the control between a first mode of operation in which only water is supplied and a second mode of operation in which a mixture of water and cleaning solution is supplied.

14. A control solution substantially as hereinbefore described with reference to Figures 1 and 2 or to Figures 1 and 2 with the modification of Figures 3a and 3b of the accompanying drawings.
15. A method of cleaning including the steps of supplying water  
5 measuring the rate of supply of water to calculate the desired rate of supply of a cleaning solution, supplying the cleaning solution at the desired rate to the supplied water to enable successively water and a mixture of water to be supplied.
16. A method as claimed in claim 15, in which the means for supplying  
10 is controlled by a motor control in accordance with a predetermined program and in dependence upon signals received from means for determining the rate of supply.
17. A method as claimed in claim 16, in which the control is switched  
15 between a first mode of operation in which only water is supplied and a second mode of operation in which a mixture of water and cleaning solution is supplied.
18. A method of cleaning substantially as hereinbefore described with reference to Figures 1 and 2 or to Figures 1 and 2 with the modification of Figures 3a and 3b of the accompanying drawings.



INVESTOR IN PEOPLE

**Application No:** GB 0114556.4  
**Claims searched:** 1-18

**Examiner:** Rhodri Evans  
**Date of search:** 11 October 2002

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

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.T): F2N

Int CI (Ed.7): B08B (9/02)

Other: ONLINE: EPODOC, PAJ, WPI

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2260795 A (West) all figures and line 19 page 1 to line 10 page 2.	1,3,5,6, 15-17
X	GB 2242181 A (Whitbread) figure 1 and line 21 page 1 to line 7 page 2.	1-3,5-9, 12,15-17
X	GB 2216979 A (Bar and Cellar) figure 1 and line 34 page 1 to line 12 page 2.	1,3,5,6, 15-17
X	GB 2140121 A (Singleton) figure 1 and lines 46-124 page 2.	1,3,7-9, 13,15-17

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.