

**OPINION UNDER SECTION 74A**

Patent	GB 2379942 B
Proprietor(s)	Lisbeth Pedersen Sylvester; Nils Uwe Karstensen
Exclusive Licensee	
Requester	Keith Alan Hart
Observer(s)	
Date Opinion issued	08 November 2019

**The request**

1. The comptroller has been requested to issue an opinion as to whether UK Patent GB 2379942 B is invalid for either lack of novelty or lack of an inventive step according to Section 1(1)(a) and 1(1)(b) of the Act. The patent was filed on 24 September 2002, first published on 26 March 2003 and granted on 6 April 2005.
2. The requestor provided a single document as evidence of the prior art, GB 2091773 B, published 27 March 1985.
3. The request focuses on independent claim 1 and dependant claims 2 to 5 of the patent. There is no reference to the other granted claims 6 to 9, and therefore I shall limit my opinion to claims 1 to 5 only.

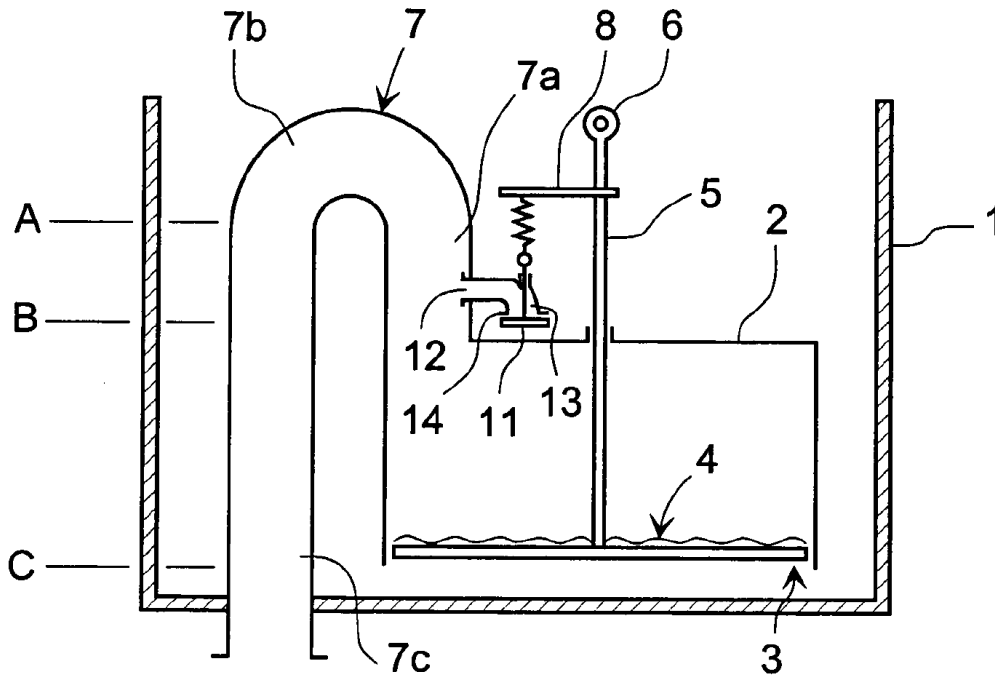
**Observations**

4. No observations were received.

**The Patent**

5. The invention is a means of adjusting the volume of water flushed from a syphon mechanism in a toilet cistern to save water. The means comprising a valve added to the mechanism, which may remain closed to provide up to full flush volume, or may open to produce at least a second reduced flush volume. The user controls the flush volume by how long they hold the flush actuating mechanism: quickly releasing this gives a reduced, short flush; keeping the mechanism engaged gives a full flush.

6. The system is shown in a simplified manner by figure 2 below. I note that the figure omits to show any mechanism for lifting the actuating rod 5 at point 6, but in use, various additional mechanical means might be used to provide the user with an actuator.



7. Cistern 1 is filled to level A, which is below the bend 7b in outlet pipe 7 that is connected between the top of a piston chamber 2 and the outlet of the cistern. At level A, water has filled the piston chamber via its open bottom 3 and has continued up into pipe section 7a. The water level A is defined by a water filling mechanism, not shown, such as a float valve. A flush is actuated by lifting rod 5 to lift piston 4 which lifts water up into pipe 7a, around bend 7b and down pipe 7c. As the exit of pipe 7c is below the cistern, this initiates syphoning of the water. For the maximum flush volume, the water continues to drain until the water level reaches the open bottom 3 of the piston chamber 2 corresponding to level C on the figure. When the water drops to level C, air is able to enter the piston chamber and outlet pipe 7 and this interrupts the syphoning action, stopping the flushing of the cistern. If, once flushing is started, the user activating mechanism is released, rod 5 and piston 4 both fall due to gravity. The speed of fall is increased by the piston comprising a flexible membrane atop a mesh frame; When dropping, the membrane is displaced from the frame to allow water to quickly pass through the piston and into the chamber.
8. The inventive valve arrangement is shown at parts 11 to 14 and 8. The valve is connected to the upward pipe section 7a with a valve body extending from opening 12 in pipe 7 to a bottom facing end 13 which has valve seat 14 receiving the movable valve body 11. The pipe end 13 is at water level B in the figure. The valve body 11 is connected to lifting rod 5 via an unlabelled resilient connection to a crossbar 8. When the lifting rod 5 is raised, the valve body is pulled up to seal the end 14 of the pipe, and thus close aperture 12. As the rod 5 drops, by the user releasing the actuating mechanism, the valve 11 will open the pipe end 14. When open, as the water drops to level B, air will enter the pipe 7 and interrupt the

syphoning action. If the rod is allowed to drop immediately once syphoning has begun, it is possible the water level will still be above level B when the valve opens and water will continue to drain until it reaches that level, thus defining a minimum flush volume. If the rod is instead kept raised for a time, keeping the valve shut, syphoning will continue, and the water level can drop below level B until either, the water gets to level A, or the rod is released so that the valve opens and causes the syphoning to immediately stop. Thus, a longer flush is obtained by the user holding the actuating mechanism; The flush volume increases, up to a maximum volume.

9. A more detailed embodiment is given by figures 3 and 4 which is suitable for retrofitting to existing 'single flush' syphon cisterns to convert them to a 'dual flush'. Figure 3 shows a preferred valve, acting substantially as that of the second figure. It shows valve seat 21 and moving valve body 81. The resilient connection 25 is made to the lower part of the valve body, rather than the upper, but still acts to pull the valve body shut when rod 5 is pulled upwards. Also shown is an extension pipe 17 having an adjustable length 29 to set level B and define the minimum flush volume.

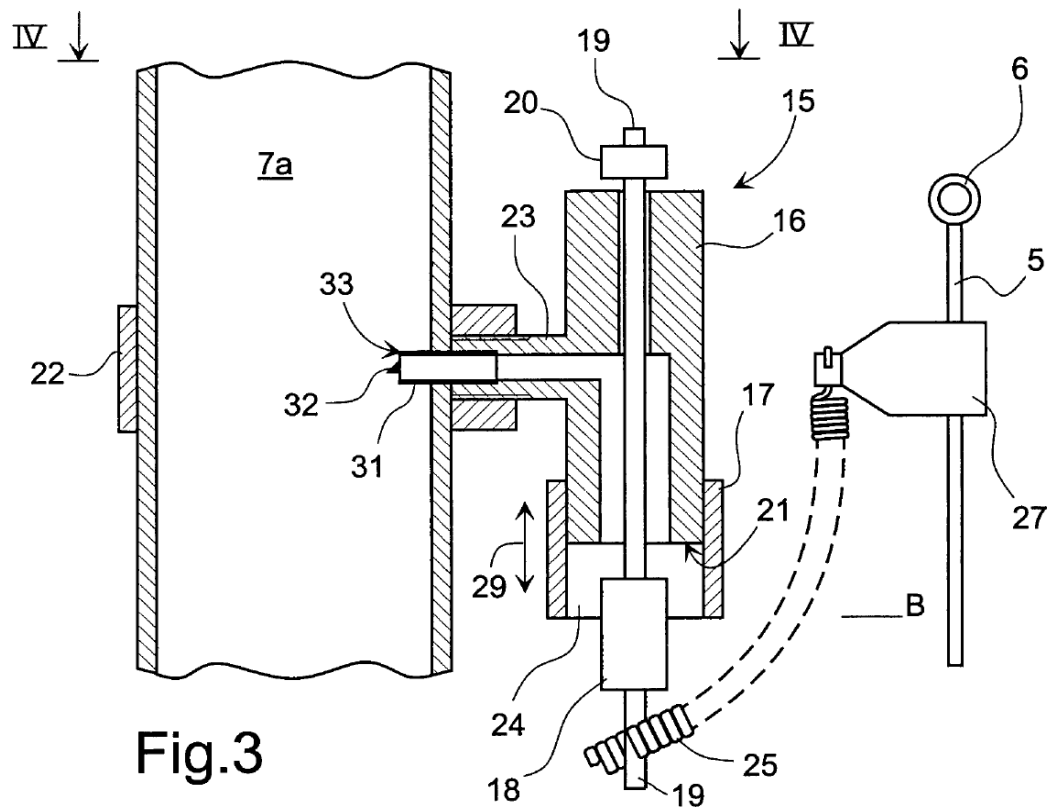


Figure 4 below shows how the valve may be tapped into a pre-existing pipe via bushing 31 with cutting teeth 32, and pipe clamp 22. Figure 4 is a plan view at the point marked IV in figure 3.

## Validity regarding Novelty and Inventive step – The Law

10. Section 1(1) of the Patents Act 1977 reads:

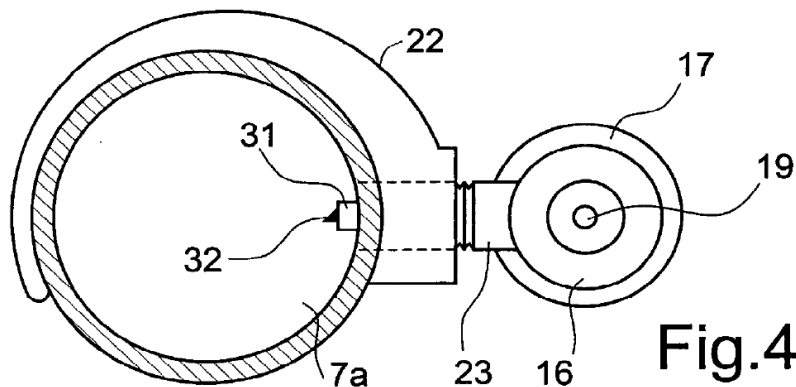
*A patent may be granted only for an invention in respect of the following conditions are satisfied, that is to say –*

- (a) the invention is new;*
- (b) it involves an inventive step...*

Sections 2(1), 2(2) and 2(3) of the Act relate to novelty and state:

*2(1) An invention shall be taken to be new if it does not form part of the state of the art.*

*2(2) The state of the art in the case of an invention shall be taken to comprise all matter (whether a product, a process, information about either, or anything else) which has at any time before the priority date of that invention been made available to the public (whether in the United Kingdom or elsewhere) by written or oral description, by use or in any other way.*



*2(3) The state of the art in the case of an invention to which an application for a patent or a patent relates shall be taken also to comprise matter contained in an application for another patent which was published on or after the priority date of that invention, if the following conditions are satisfied, that is to say -*

- (a) that matter was contained in the application for that other patent both as filed and as published; and*
- (b) the priority date of that matter is earlier than that of the invention.*

Section 3 of the Act relates to inventive step and states:

*3 An invention shall be taken to involve an inventive step if it is not obvious to a person skilled in the art, having regard to any matter which forms part of the state of the art by virtue only of section 2(2) above (and disregarding section 2(3) above).*

11. To determine whether or not an invention defined in a particular claim is inventive over the prior art, I will rely on the principles established in *Pozzoli SPA v BDMO SA [2007] EWCA Civ 588*, in which the well-known Windsurfing steps were reformulated as :

*(1)(a) Identify the notional “person skilled in the art”;*

*(1)(b) Identify the relevant common general knowledge of that person;*

*(2) Identify the inventive concept of the claim in question or if that cannot readily be done, construe it;*

*(3) Identify what, if any, differences exist between the matter cited as forming part of the “state of the art” and the inventive concept of the claim or the claim as construed;*

*(4) Viewed without any knowledge of the alleged invention as claimed, determine whether those differences constitute steps which would have been obvious to the person skilled in the art.*

## **Claim construction**

12. Before considering the novelty and inventive step issues raised in the request, I need to construe the claims of the patent – that is to say, I must interpret them in the light of the description and drawings as instructed by Section 125(1) :

*125(1) For the purposes of this Act an invention for a patent for which an application has been made or for which a patent has been granted shall, unless the context otherwise requires, be taken to be that specified in a claim of the specification of the application or patent, as the case may be, as interpreted by the description and any drawings contained in that specification, and the extent of the protection conferred by a patent or application for a patent shall be determined accordingly.*

In doing so, I must interpret the claims in context through the eyes of the person skilled in the art. Ultimately, the question is what the person skilled in the art would have understood the patentee to be using the language of the claims to mean. This approach has been confirmed in the recent decisions of the High Court in *Generics UK Ltd (t/a Mylan) v Yeda Research and Dev. Co. Ltd & Anor [2017] EWHC 2629 (Pat)* and the Court of Appeal in *Actavis Group & Ors v ICOS Corp & Eli Lilly & Co. [2017] EWCA Civ 1671*.

13. The patent claim set comprises independent claims 1 and 6, with dependant claims 2 to 5 and 7 to 8 respectively and an omnibus type claim 9. I am only concerned with claims 1 to 5 in this opinion. Claims 1 to 5 do not present major issues of construction, but I will comment on the scope of claim 1.

14. Claim 1 reads as below :

*1. A water saving device for arranging in a toilet with cistern of the kind provided with a flushing mechanism with siphonage and including a downwardly open chamber, which is provided upwards with an overflow duct in the shape of a pipe extending over the chamber and subsequently down via a bend along the side of the chamber and finally discharging into the toilet bowl, where a vertically displaceable piston is provided in the chamber, the piston substantially covering the horizontal cross-section of the chamber and capable of being moved manually by means of an actuating rod extending up through the top side of the chamber, and which in its initial position is resting at the lower opening of the chamber, **characterised** in*

*- that the device includes a valve adapted to be mounted at a hole in a side wall of the chamber or at the pipe under the bend, including a valve housing, a movable valve body and a connecting member for connecting the valve body with the actuating rod via a fitting in such a way that an upward displacement of the actuating rod may cause the valve body to block air access to the hole, and*

*- that the valve housing includes two mutually angular and mutually communicating fluid passage apertures together forming a passage through the valve, where one aperture is provided in a laterally projecting stub adapted for airtight fitting to the hole, and where the other aperture in the mounted state is provided in a downwardly directed fluid passage containing the valve body which can close the passage through the valve housing by abutting on an overlying valve seat.*

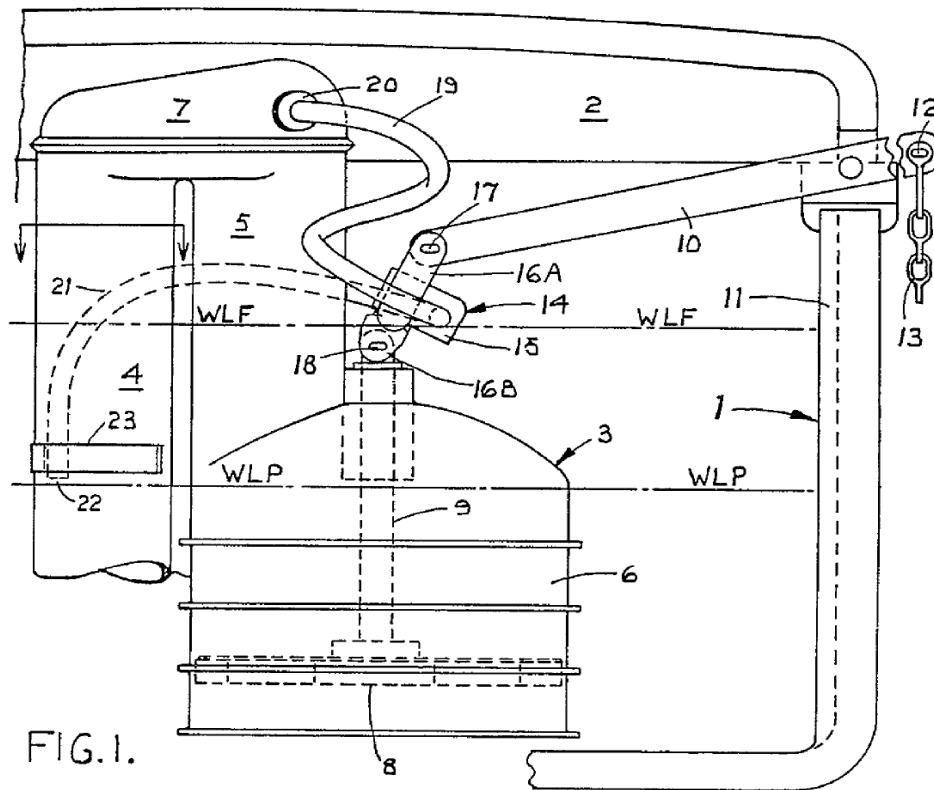
15. The device of claim 1 is merely suitable for use with the cistern; The claim does not include the cistern parts listed in lines 2 to 10.

16. The final part of claim 1 refers to 'lateral' and 'downwardly' directed passages, which are only relevant directions when the device is installed. These lines are understood to mean the valve body is shaped such that it is suitable to be orientated, in use, with a lateral stub and downward passage. Thus the valve must provide inlet and outlet apertures that are not in-line, instead there are angles so that there is effectively a bend. Whilst figure 4 shows a valve with a right-angle between the stub and passage, I do not consider the claim is limited to only a right angle.

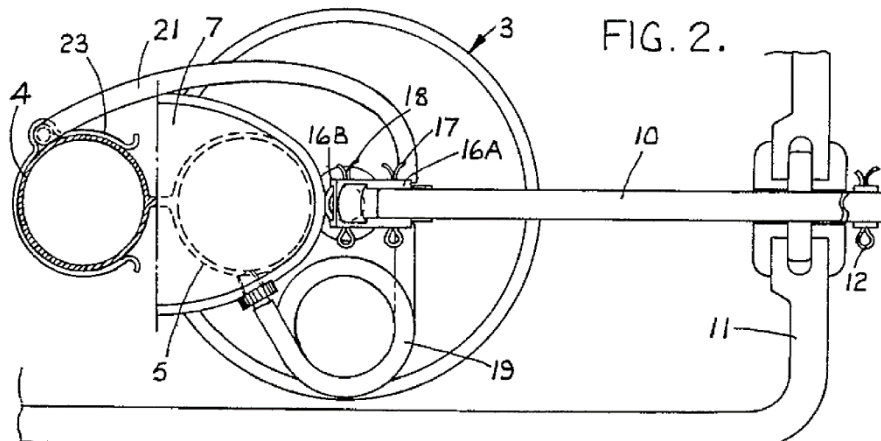
17. The final three lines state that the valve body is in the downward passage and moves to a closed position where it rests against a valve seat. The valve seat is said to be 'overlying', which I understand to mean the seat is at the end of the passage.

## The Prior Art - GB 2091773 B

18. The prior art also provides a valve based solution that could be retrofitted to the internal parts of a syphon flush cistern. The valve of the prior art acts to introduce air into the syphon passage to stop the syphon action, as does the patent. From the user's perspective, the prior art functions in substantially the same way, a reduced flush is provided if the flush actuator is quickly released once the syphoning has begun, a full flush if the actuator is continuously held.

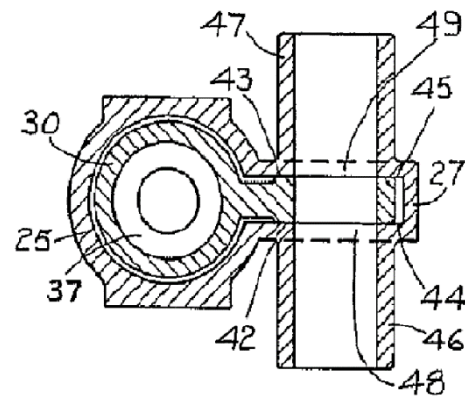
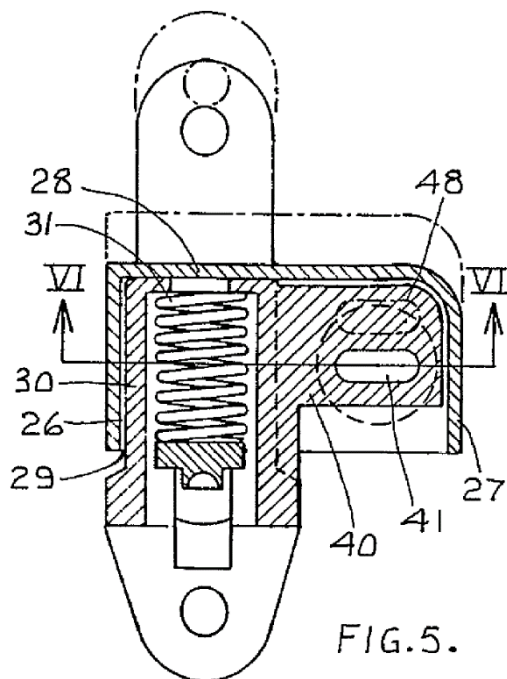


19. Figure 1 shows one preferred embodiment. Cistern 1 has a pull chain 13 acting via lever 10 to lift syphon plunger 8 via rod 9. The piston is inside the syphon chamber 3 which connects to the outlet pipe comprising first upward section 5, 180° bend 7 and final downward section 4 that exits below the cistern (not shown). The preferred



'conversion assembly' 14 acts as a mechanical link between the lever 10 and plunger rod 9 with pivot points 17 and 18 respectively. The assembly 14 houses a valve unit 15 that connects between two pipes 19 and 21 (dashed, I have added the label to this figure for clarity). Pipe 19 is connected to the outlet bend and pipe 21 is adjustably positioned lower down with an end 22 opening to correspond with a reduced water level marked WLP. Figure 2 is a plan view of the cistern of figure 1. It shows the pipes 19, 21 exiting either side of the assembly.

20. As the assembly 14 is between the lever 10 and rod 9, when a flush is started by moving lever 10, the tension increases on the assembly along a line between pivots 17 and 18. The valve unit 15 inside is arranged so that the assembly can extend an amount between the pivots, that motion causing the valve mechanism to move from an open to a closed state. When the flush lever is released and the plunger 8 and rod 9 drop back down, tension drops and the assembly retracts such that the valve moves from a closed to an open state. Spring 31 biases the assembly in the retracted, open valve state. Figure 5 shows detail of the valve unit 15 in side view with pipes connected perpendicular to the plane of the image aligned with pipe apertures 41 and valve aperture 48. When the valve is open, these apertures are aligned thus connecting pipes 19 and 21 together such that end 20 links with end 22. When the valve is closed, as figure 5 shows dashed, the apertures are misaligned so the passage between the pipes is blocked, and thus point 20 on the bend is sealed. Figure 6 shows a top view at the indicated cross-sectional position, with bosses 46



and 47 provided for connection to the pipes.

21. This prior art arrangement operates such that when the flush chain 13 is pulled, the plunger is raised starting the syphoning action and causing the valve to move to the closed state so that point 20 is closed. This allows the syphon to operate unimpeded, dropping the water level down from indicated WLF level. If the flush lever is held pulled, the valve remains closed and the syphon action will continue until the water level in the cistern reaches the bottom of the chamber 3 and air can enter. If instead the flush lever is quickly released, the syphon starting mechanism settles back down



and the valve opens as tension drops. The open valve connects point 20 to point 22, such that syphoning will only continue to level WLP, as air will then enter at point 22, pass up to point 20 and stop the syphon action. Thus, a quick release of the lever gives a reduced flush volume.

22. It is notable that the whole valve housing of the prior art moves in use along with the flush mechanism movement, facilitated in part by the use of the flexible pipes. This contrasts with the valve housing of the patent which is shown in a static position.

## **Analysis**

23. I will first consider if claim 1 is novel and has an inventive step in the light of the prior art document. Only if the claim fails either requirement will I consider claims 2 to 5.
24. The Requestor argues that there are several similarities between claim 1 and the prior art which lead to at least a lack of an inventive step. The similarities they identify are :
- i)* Both can convert a single flush syphon cistern into a dual flush syphon cistern, and retain the existing toilet actuating rod or operating handle;
  - ii)* Both can act to controllably allow air into the existing siphoning mechanism and do this using a valve mechanism that opens and closes an air hole;
  - iii)* Both can have the valve mechanism operating in conjunction with the existing flush operating mechanism.
25. I agree that these are all common features of how both the patent and the prior art work in use. However, of itself, that is not enough to come to a conclusion because claim 1 includes more details of the device, especially features of the valve housing and how the valve can be fixed to the syphon system and actuating mechanism. I find that there are a number of significant differences.
26. The valve housing in the prior art is not disclosed to be 'adapted to be mounted at a hole' using a 'stub adapted for airtight fitting'. As the prior art valve housing is directly linked as part of the flush actuating mechanism, there is also no disclosure of the connecting member and fitting which is used to connect the valve with the actuating rod. This reflects how the prior art valve housing is for use as a moving part of the flush mechanism, not for static mounting.
27. The prior art valve comprises a central portion that moves to miss-align a through-hole between the two passage apertures. This is not an overlying valve seat as the claim requires. Further the prior art valve is arranged so that the inlet/outlet passages and apertures are coaxial. I do not find anything that states they could instead be relatively angled, with a laterally projecting stub and downwardly directed fluid passage as the claim requires.
28. I conclude that claim 1 is novel over the prior art because some of the required features are not disclosed.

29. Considering inventive step, I shall now follow the four step approach.
30. (*Step one*). The skilled person will understand flush syphon toilets, how they are made and assembled and will have general plumbing skills.
31. (*Step two*). The inventive concept is adding a valve system to a 'single-flush' syphon flush toilet cistern to provide a dual-flush function, the system as described by the second 'characterising' part of claim 1.
32. (*Step three*). The differences between the inventive concept and the prior is evident from my novelty discussion.
33. (*Step four*). The reader is not directed to try to mount the prior art valve to a hole in the chamber or to the pipe of the syphon cistern and it would not be obvious to try.
34. I consider the skilled reader would understand that the pipe bosses shown are expected to be used by push-fitting a flexible pipe to the relatively rigid boss. They might understand that an end portion of a boss could possibly be pushed into a hole of a wall but this use would not be contemplated as the valve would then not be able to be used as a moving link of the flush mechanism. Further, I note that the boss of the valve is for connection to a pipe and nothing is said suggesting that it is also particularly adapted for fixing to a hole in a wall. Further, the skilled reader would not be motivated to modify the boss given it's suitability for the required task.
35. The skilled reader is further not told of any way to connect a valve housing, which is statically and directly mounted to a hole, to the flush mechanism, nor would this be an obvious modification of the arrangement shown in the prior art. This is because the prior art valve housing is a link in the flush mechanism; No extra connections or fitting are needed between the valve and actuating rod as they are directly connected.
36. Thus, it is not obvious for the skilled reader to take the prior art valve and arrange it such that it is adapted to be mounted to a hole in an airtight manner and provide a connecting member and fitting for connection of the valve to the actuating rod.
37. The valve of the prior art has a sliding arrangement of the central portion with the valve closing at the interface of that portion and the inner apertures of the inlet and outlet. The arrangement allows for the pull activation when the valve is arranged as a link in the mechanism. It would also not be obvious for the skilled reader to modify this valve to have a valve seat overlying the passage.
38. These differences between the inventive concept and prior art are not obvious and thus claim 1 has an inventive step.

## **Conclusion**

39. It is my opinion that claim 1 is novel and has an inventive step over the prior art document GB 2091773 B. It follows that claims 2 to 5 are also novel and inventive.

40. Claims 1 to 5 are thus valid over the prior art.

Gareth Lewis  
Examiner

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**NOTE**

*This opinion is not based on the outcome of fully litigated proceedings. Rather, it is based on whatever material the persons requesting the opinion and filing observations have chosen to put before the Office.*