

OPINION UNDER SECTION 74A

Patent	GB2436776
Proprietor(s)	Duncan James Parfitt
Exclusive Licensee	
Requester	Duncan James Parfitt
Observer(s)	Urquhart-Dykes & Lord LLP
Date Opinion issued	09 February 2015

The request

1. The comptroller has been requested by Mr Duncan Parfitt ("the Requester") to issue an opinion as to whether patent GB2436776 ("the Patent") is valid in light of documents and corresponding arguments presented in US Non-Final Office Action dated 19 November 2010 regarding the Requester's previously co-pending US application US11/883458. Mr Parfitt is the proprietor of the Patent.
2. An initial request was received from the Requester on 14 November 2014. The request was accompanied by a statement explaining his request, a copy of the US Office Action (and accompanying lists of references) and further submissions including details regarding the prosecution of the Patent and its GB priority application. The Requester was asked by the IPO to clarify that he was requesting an opinion on the validity of his patent. The Requester filed an amended statement on 3 December 2014 clarifying the basis of the opinion and including copies of seven documents referred to in the US Office Action.

Observations & Observations in reply

3. Observations were received on 12 January 2015 from Urquhart-Dykes & Lord LLP who had represented the Requester during prosecution of the Patent. They explained that UDL stopped representing the Requester in September 2008 before the grant of the Patent and were not involved in the prosecution of either the Patent or US11/883458 from that date. They stated that if the request for an opinion is deemed by the IPO to be a request for an opinion on the validity of the Patent with respect to the prior art listed by USPTO, then UDL denies that they are an interested party. UDL expressed a concern that the Requester's request for an opinion is with

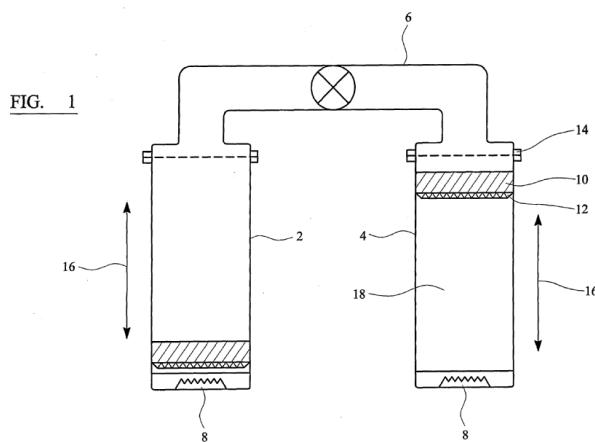
respect to the quality of legal services provided by UDL which would not be allowable under Section 74(A) of the Patents Act 1977. UDL did not provide any submissions on the validity of the Patent. Brief observations in reply were received from the Requester on 16 January 2014.

Allowance of the request

4. I am satisfied that the amended statement from the Requester clarifies that the Requester requests an opinion on the validity of the Patent with respect to prior art documents and arguments put forward in the US Office Action rather than for the reasons suggested by UDL. The US Office Action employs three documents to construct an inventive step argument against the independent claims of US11/883458 (which are the same as those of the Patent). Two of these documents were considered by the UK examiner during prosecution of the Patent. However, the third document is a new document not considered by the UK examiner. Therefore the question on which I have been asked to give an opinion is a new question and thus allowable.

The Patent

5. The Patent entitled "Power transfer" is derived from PCT application PCT/GB2006/000412 filed on 6 February 2006 and claiming priority from GB application GB0502396.5 dated 4 February 2005. The Patent was granted on 10 June 2009 and is still in force.



6. The Patent relates to a system for driving a turbine using the expansion and contraction of a fluid. Referring to the only figure of the Patent, reproduced above, two cylinders 2, 4 are interconnected by a conduit 6 containing a fluid, preferably water. A heating element 8 is positioned at the bottom of each cylinder and each is covered by a liquid, preferably again water. A piston 10, with accompanying condenser 12, is located in each cylinder defining an enclosure 18 below each piston and separating the two liquids. In use one of the heating elements is switched on and the water below the piston in the first cylinder 4 expands and changes from liquid to gas causing both piston 10 and condenser 12 to rise. When the piston reaches a control mechanism 14 the heating element is switched off and the

corresponding heating element in the opposite cylinder 2 is switched on. The condenser in the first cylinder is released from the piston and falls under gravity, assisting in converting vapour back to liquid and pulling the piston behind it. This causes water to be drawn through the conduit and assists in pulling up the piston in the opposite cylinder. It is envisaged that the system falls into a state of equilibrium, the two pistons rising and falling in complementary motion driving a turbine located in the conduit.

7. There are 15 claims including two independent claims 1 and 14 and omnibus claim 15. The two independent claims read:

1. A system for driving a turbine, the system comprising a conduit and a chamber, the conduit defining a fluid flow path within which said turbine is located, said conduit being in communication with an inlet to said chamber, the system further comprising a piston mounted in said chamber so as to define an enclosure within said chamber and means to move said piston in a first direction within said chamber causing expansion of said enclosure, and heating means for heating fluid within said enclosure so as to cause expansion of said fluid into said enclosure, and condensing means for condensing said fluid so as to cause contraction of said enclosure and corresponding movement of said piston in a second, opposite direction within said chamber, thereby creating a suction force at said inlet of said chamber and drawing fluid through said conduit and across said turbine.

14. A method of driving a turbine comprising the steps of providing a conduit and a chamber, the conduit defining a fluid flow path within which said turbine is located, said conduit being in communication with an inlet to said chamber, further providing a piston mounted in said chamber so as to define an enclosure within said chamber, further providing means to move said piston in a first direction within said chamber so as to enlarge said enclosure, heating the fluid within said enclosure so as to cause expansion of said fluid to fill said enclosure, and condensing said fluid by a condensing means passing through said enclosure so as to cause contraction of said fluid and corresponding movement of said piston in a second, opposite direction within said chamber, thereby creating a suction force at said inlet of said chamber and drawing fluid through said conduit and across said turbine.

8. I will consider the validity of the two independent claims. Only if I find them to be invalid will I consider the validity of the dependent claims. As is usual practice I will ignore omnibus claim 15.

Inventive Step – the law

9. The relevant provisions in relation to inventive step are section 1(1)(b) and section 3 of the Patents Act 1977, which read:

*1(1) A patent may be granted only for an invention in respect of which the following conditions are satisfied, that is to say –
(a) ...
(b) it involves an inventive step;*

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).

10. The Court of Appeal in *Windsurfing*¹ formulated a four-step approach for assessing whether an invention is obvious to a person skilled in the art. This approach was restated and elaborated upon by the Court of Appeal in *Pozzoli*.² Here, Jacob LJ reformulated the *Windsurfing* approach as follows:

- (1)(a) *Identify the notional “person skilled in the art”*
- (1)(b) *Identify the common general knowledge of that person;*
- (2) *Identify the inventive concept of the claim in question or if that cannot be readily 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, do those differences constitute steps that would have been obvious to the person skilled in the art or do they require any degree of invention?*

11. I will therefore use this *Windsurfing/Pozzoli* approach to assess whether the invention of the present application involves an inventive step.

Assessment

Steps (1)(a) and 1(b): Identify the notional “person skilled in the art” and the common general knowledge of that person

12. I consider the person skilled in the art to be a person (or team of persons) involved in the design and construction of hydraulic power transfer systems. The common general knowledge of that person would include an appreciation of the common components of such systems e.g. hydraulic cylinders and pistons, turbine components and hydraulic fluids.

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

13. I note the well known authority on claim construction which is *Kirin-Amgen and others v Hoechst Marion Roussel Limited and others* [2005] RPC 9. This requires that I put a purposive construction on the claim, interpret it in the light of the description and drawings as instructed by section 125(1) of the Act and take account of the Protocol to Article 69 of the EPC. Simply put, I must decide what a person skilled in the art would have understood the patentee to have used the language of the claim to mean. I will use this approach when required.
14. Independent claims 1 and 14 are equivalent system and method claims and can be

¹ *Windsurfing International Inc. v Tabur Marine (Great Britain) Ltd*, [1985] RPC 59

² *Pozzoli SPA v BDMO SA* [2007] EWCA Civ 588

considered together.

15. I consider the inventive concept to be: A conduit in communication with a chamber, the conduit containing a force-transmitting fluid and a turbine; a piston mounted in the chamber and separating a working fluid from the force-transmitting fluid and defining an enclosure in the chamber; means to move said piston in a first direction within said chamber causing expansion of the enclosure; heating means for heating the working fluid and causing expansion of the working fluid into the enclosure; and condensing means for condensing the working fluid and causing contraction of the working fluid and subsequently contraction of the enclosure via movement of the piston in a second, opposite direction, the contraction resulting in a suction force drawing force-transmitting fluid through the conduit and across the turbine.
16. It should be noted that although the embodiment described in the description with reference to the figure utilises two cylinders connected by a conduit, in their broadest sense claims 1 and 14 require just a single cylinder and a conduit. The skilled person would nevertheless appreciate that the preferred 'means to move said piston in a first direction within said chamber' in claims 1 and 14 is the suction force created by the opposite chamber.

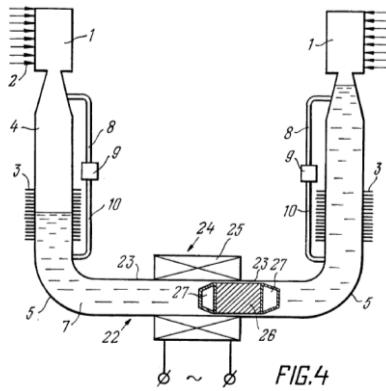
Step (3): Identify what, if any, differences exist between the matter cited as forming part of the "state of the art" and the inventive concept of the claim or claim as construed

17. The US Office Action cited the following three documents as forming part of the "state of the art":

D1: WO 96/21106 A1 (ATMANOV)

D2: US 3100965 A (BLACKBURN)

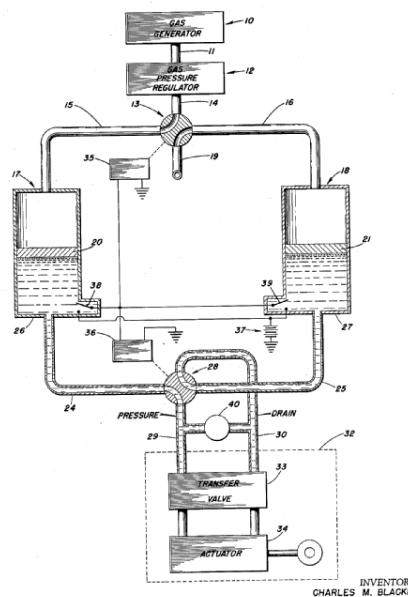
D3: DE 3613576 A1 (BACHTIARI)



18. D1 is written in Russian and an English language translation of the description was not readily available. However, I gained a reasonable understanding of the disclosure from the English language abstract and Figures (particularly Fig. 4 reproduced above) as well as the English language abstracts provided in the EPODOC and WPI patent databases. From these D1 appears to disclose a vapour-liquid power unit for use in the conversion of thermal energy to mechanical or

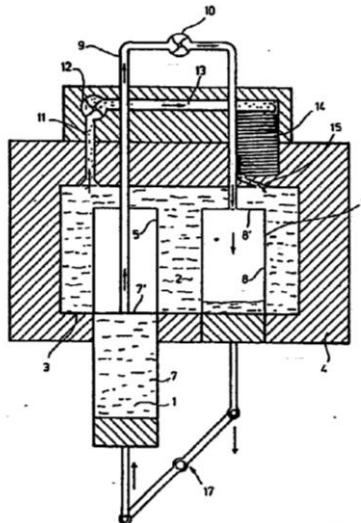
electrical output. An evaporator 1 is connected via duct 4 to a refrigeration unit 3 to which a discharge pipe 5 is connected, forming a U-shaped oscillation loop which is partially filled with liquid (the force-transmitting fluid). Air is introduced into the evaporator 1 and part of the duct 4, the air forming the working fluid. Heating and cooling of the working fluid appears to result in the oscillatory motion of the liquid pendulum which is converted to mechanical motion/electrical output in convertors such as a turbine.

19. Although it is not clear how the system works in detail, D1 appears to disclose the key features of the inventive concept except for the presence of a piston. Therefore the difference between the inventive concept of the present invention and the disclosure of D1 is a piston in the chamber separating the working fluid from the force-transmitting fluid.
20. D2 discloses a hydraulic power supply system (see single figure below). A generator 10 supplies hot gas alternately to two cylinders 17 and 18 with displaceable pistons 20, 21 which transfer the energy of the gas to hydraulic fluid located below each piston. The hydraulic fluid moves under pressure through line 29 to load 32 such as an electrical generator. The two cylinders are used in an alternating cycle ensuring a continuous flow of fluid to the load.



21. D2 therefore operates in a different manner to the invention although it does disclose a piston separating a working fluid from a force-transmitting fluid. The difference between the inventive concept of the present invention and the disclosure of D2 is condensing and heating means to cause contraction and expansion of the working fluid and subsequent movement of the piston. Further a turbine is not specifically mentioned.
22. D3 is a German language document for which an English translation is available. D3 discloses (see single figure below) an evaporative energy recycling system where two hollow pistons 7, 8 moving within cylinders 5, 6 are connected by a tube 9 containing a steam-driven element such as a turbine 10. The pistons are filled with a first liquid with a boiling point lower than the outside temperature. When the first

piston is located outside the main system as in the diagram the first liquid evaporates and the vapour travels through the tube 9 to the opposing piston which is surrounded by a lower-boiling point condensing liquid. The vapour in the second piston condenses to liquid forcing the second piston down and the first piston up via counter-balancing arm 17. The liquid in the second piston now evaporates and the cycle continues.



23. Although the system in D3 has two hollow pistons they are not used to define the enclosure i.e. to separate the working fluid from the force-transmitting fluid. Therefore the difference between the inventive concept of the present invention and the disclosure of D3 is a piston in the chamber separating the working fluid from the force-transmitting fluid.

Step (4): Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps that would have been obvious to the person skilled in the art or do they require any degree of invention.

24. It is useful to begin by summarizing the arguments presented by the examiner in the US Office Action. Here D1 is taken as the closest prior art and the examiner notes that it fails to disclose a turbine and piston. However, he also notes that D2 discloses a piston and D3 discloses a turbine. He notes that the invention in D2 operates in a similar manner to that in D1 except that D2 has a piston separating the liquid and vapour. The two variations, he explains are interchangeable since the vapour acts on the liquid surface in the same way as it acts on a piston surface. He argues in particular that adding a piston to D1 or removing a piston from D2 would not disrupt the operations of either invention. In summary, in his view, it would have been obvious to one of ordinary skill in the art to modify the invention in D1 with the piston taught by D2 and the turbine taught by D3 since all the claimed elements were known in the prior art and one skilled in the art could have combined the elements with no change in their respective functions with the combination yielding nothing more than predictable results.
25. In response to this I agree that D1 can be considered to be the closest prior art. However, as explained above D1 does disclose a turbine and therefore in my view the only missing feature from D1 is a piston that separates the working fluid from the force-transmitting fluid. I agree that D2 discloses a piston. D3 also discloses a piston

but it is not used to separate the working fluid from the force-transmitting fluid and therefore the disclosure in my view cannot be used in combination with D1 (or in any other way) to arrive at the inventive concept. Therefore D3 can be disregarded in this analysis.

26. The question for me to decide is whether it would be obvious for the skilled person to employ the piston disclosed in D2 in the system of D1 in a manner to arrive at the inventive concept. I note first of all that D1 and D2 are both in the general field of hydraulic power transfer systems. The pistons in D2 according to the specification "separate the activating gas from the hydraulic fluid and serve to transfer energy from the gas to the fluid without contamination of the fluid".
27. Although not defined explicitly in the claims of the Patent but apparent to the skilled person from the specification as a whole, a piston is of particular benefit to the invention of the Patent. The system is designed so that the conduit is situated above the containers. This means that gravity can be employed to keep the working fluid close to the heating mechanism before it evaporates. Moreover, gravity is also employed to assist in the downward movement of the condenser through the enclosure of one container pulling the piston behind it and pulling up the piston in the opposite container. This latter feature in particular according to the description improves the efficiency of the system, resulting in less reliance on the heating mechanism to keep the system in equilibrium. A piston is therefore of importance to keep the force-transmitting fluid above the working fluid against the action of gravity.
28. In D1 the conduit is situated below the containers. Pistons would be well known to the skilled person as a means of separating one fluid from another in a hydraulic power transfer system as demonstrated in D2. However, in D1 the skilled person would not be faced with the problem of how to keep the force-transmitting fluid above the working fluid. In D1 gravity is employed to keep the force-transmitting fluid in the U-shaped loop. If the skilled person wanted to ensure that the air and liquid were merely kept separate to prevent contamination then presumably alternative simpler measures such as a float could be employed. In D2 the piston is important in separating a gas under pressure from the hydraulic fluid. Although in a similar field, this is a different situation to that in D1 where presumably a less-pressurized vapour and liquid are involved. It does not seem likely that the skilled person would look to D2 to improve the system of D1 if indeed improvement were required.
29. Therefore I agree with the US examiner that in principle the piston of D2 could be added to the system of D1. However, as explained above there appears to be little incentive for him to do so. I am therefore of the view that it would not be obvious for the person skilled in the art to combine the teaching of D2 with that of D1 in a manner which would result in a power transfer system with the features of the claimed invention.
30. The US Office Action cited a further document and an additional four documents were listed in accompanying lists of references. Four of these five documents were referred to in the Requester's amended statement. These five documents were either employed to form inventive step arguments against dependent claims or were provided as examples of the prior art. None was cited against the independent claims and therefore I do not need to consider them further here.

Opinion

31. Therefore it is my opinion that the Patent is valid in light of prior art and corresponding arguments presented in the US Non-final Office Action related to application US11/883458. In particular I am of the opinion that the claims are inventive in light of the combined disclosures of cited documents D1, D2 and D3.

Susan Dewar
Examiner

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.