



## PATENTS ACT 1977

APPLICANT	Rotaheat Limited
ISSUE	Whether patent application GB1801474.6 complies with section 1(1)(b) of the Patents Act 1977
HEARING OFFICER	J Pullen

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### DECISION

#### Introduction

- 1 Patent application GB1801474.6 relating to a heat generator was filed on 30 January 2018 as a divisional from an earlier application GB1702277.3 filed on 10 February 2017. Both applications claim priority from two earlier applications GB1618275.0 and GB1602399.6 filed on 28 October 2016 and 10 February 2016 respectively. This application was published as GB2556267 on 23 May 2018.
- 2 In his initial combined search and examination report the examiner, Mr Jody Fellows, found the invention to lack an inventive step over what had been previously disclosed in GB2527012 also in the name of Rotaheat. There followed several rounds of correspondence between the examiner and the applicant without agreement being reached. The most recent amendments to the claims were filed on 3 February 2020 with a document illustrating tracked changes which were intended to be made but have not been. I will consider both the claims on file and the proposed amendments.
- 3 A hearing was offered in the examination report of 6 March 2020 and accepted in your letter dated 8 March 2020, where you requested the issue be decided on the papers. I confirm that in reaching my decision I have considered all information in the documents on file.

#### The application

- 4 The application relates to a heat generator which can be used to provide heat, generate hot water or as part of a water treatment/desalination system in which fluid is heated by the heat generated in conducting cylinder/disc by intersecting magnetic fields.
- 5 Figures 1 to 6 show a heat generator 10 which comprises a shaft 12 connected to a source of power, a fluid input 14 and fluid output 16. A first electrically conducting disc 18 is mounted rigidly on the shaft 12 and a pair of second fixed discs 22 are

mounted around the shaft but not coupled to it, close to and either side of the first disc 18; the planes of the second discs 22, 23 are parallel to the first disc 18.

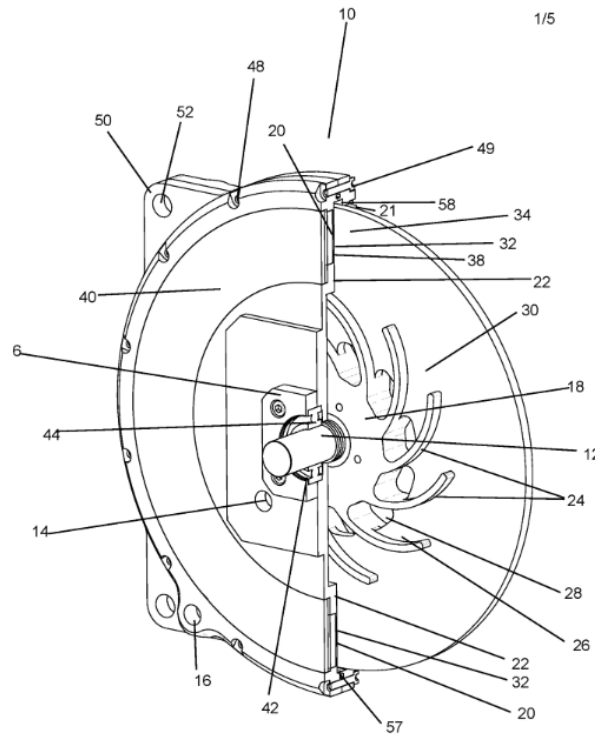


FIGURE 1

- 6 A plurality of runner vanes are 24 cast as part of the first disc 18 and are upstanding from the surface of the first disc on both sides thereof and forming a plurality paths 26 between the first and second discs 18 and 22 from close to the shaft 12 towards the magnets 20. The widths of said paths 26 increase from their inlets 28 close to the shaft to their outlets 30 close to the magnets 20.
- 7 The fluid input 14 to the heat generator passes through one of the pair of second discs and links with an inlet 28 causing water to flow the associated path 26. As disc 18 turns with the shaft 12, the water will be moved centrifugally outwards through the path 26. Each of the inlets 28 in turn passes by input 14 causing water to enter each of the paths 26. The water will flow out of outlets 30 into thin passages 32 passing between the magnets 20,21 and a vane free outer portion 34 of first disc 18.
- 8 A plurality of magnets 20, 21 are mounted in recesses 36 in the second fixed discs 22,23 either side of the first disc 18. The opposite poles of the magnets 20 on either side of the first disc 18 face one another through the first disc 18; the north poles of magnets 20 face the surface of disc 18, and the south poles of magnets 21 face the opposite side of disc 18. The north-south poles of magnets 20 and 21 are thus aligned parallel to the axis of the shaft 12 and orthogonally to the first disc 18. No advantages of this alignment or disadvantages of other alignments are given.

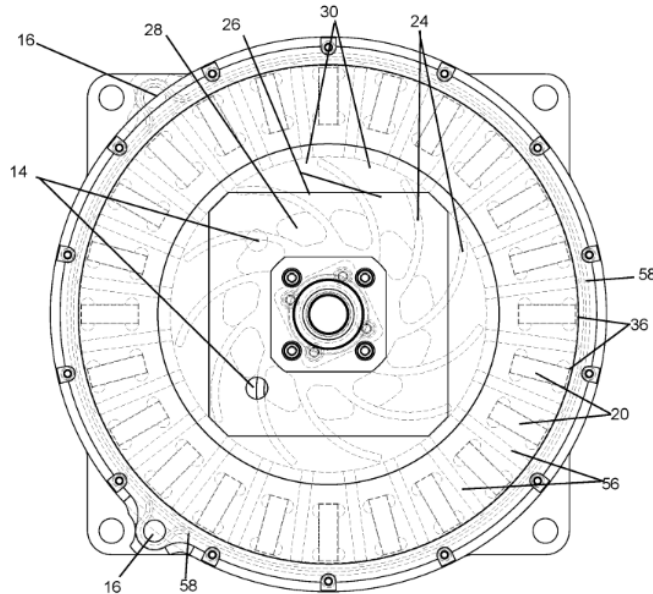


FIGURE 5

9 There is one claim which reads (underlining showing amendments intended to be filed with their letter of 3 February 2020 but only provided in manuscript):

1. A heat generator comprising:

a shaft;

a fluid input and fluid output,

an electrically conducting first disc rigidly fixed to the shaft and rotating when the shaft rotates;

a plurality of magnets with their magnetic fields intersecting the first disc mounted either side of the first disc on a pair of second fixed discs mounted around the shaft, but not coupled to it, with their magnetic fields intersecting the first disc, and with N poles of the magnets on one of the pairs of second discs facing one side of the first disc and S poles of the magnets on the other of the pair of second discs facing the other side of the first disc; and in which all the N-poles one side of the first disc face the S poles facing the other side of the first disc and vice versa:

a plurality of runner vanes upstanding from one or both sides of the first disc and forming a plurality of fluid paths between the first disc and the second discs from close to the shaft towards the magnets, the each path having an inlet close to the shaft and an outlet, the widths of said paths increasing from each of their inlets to each of their outlets;

a vane free portion of the first disc between the magnets on the pair of second fixed discs, said outlets of the fluid paths arranged to allow fluid to flow over the vane free portion of the first disc to exit the heat generator through the output.

### The law

10 The relevant section of the Act is s.1(1)(b), the most relevant provisions of which (with my emphasis added) are:

*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;*
- (c) ...;*
- (d) ...*

11 Section 3 of the Act then sets out how an inventive step is determined, and reads:

*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).*

12 Matter which ‘forms part of the state of the art by virtue only of section 2(2)’ is all matter which was made available to the public before the priority date of the application in question.

13 The test for determining whether the invention of an application includes an inventive step is the structured approach laid down by the Court of Appeal in *Windsurfing*<sup>1</sup> and restated, by that Court, in *Pozzoli*<sup>2</sup>. The test comprises the following steps:

*(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, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention?*

## **Assessment**

### **Step (1)(a): Identify the notional “person skilled in the art”**

14 In his report the examiner identifies the person skilled in the art as a person or team concerned with the design of heating devices operating on the principles of electromagnetic induction. The attorney has not disputed the examiners assessment of the skilled person.

### **Step (1)(b): Identify the relevant common general knowledge of that person**

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<sup>1</sup> *Windsurfing International Inc v Tabur Marine (Great Britain) Ltd* [1985] RPC 59

<sup>2</sup> *Pozzoli SPA v BDMO SA* [2007] EWCA Civ 588

- 15 This skilled person would know about various magnet arrangements and magnetic field topologies suitable for electromagnetic induction. The examiner provides prior art documents WO2002/087285 (ROSASTRO) and WO2006/058404 (DA SILVA) as evidence that it is known for rotary magnetic heaters to comprise permanent magnets oriented such that their N-S axes are aligned parallel to a rotating shaft. The examiner also provides prior art documents US2006/0086729 (LUNNEBORG) and US2009/0223948 (HESS) as evidence that it is known for rotary magnetic heaters to comprise two discs disposed either side of a central conductor, each comprising magnets arranged such that one disc has only N poles facing the conductor and the other disc has only S poles facing the conductor.

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

- 16 The examiner outlines the inventive concept of the claim as:

*A heat generator comprising an electrically conducting rotating disc having a plurality of runner vanes and rotating between two fixed discs each bearing magnets arranged with their N-S axes aligned parallel to the shaft on which the rotating disc is fixed, wherein a fluid is passed over a vane-free portion of the rotating disc and wherein the N poles of all the magnets on one of the fixed discs are facing the rotating disc and the S poles of all the magnets on the other fixed disc are facing the rotating disc.*

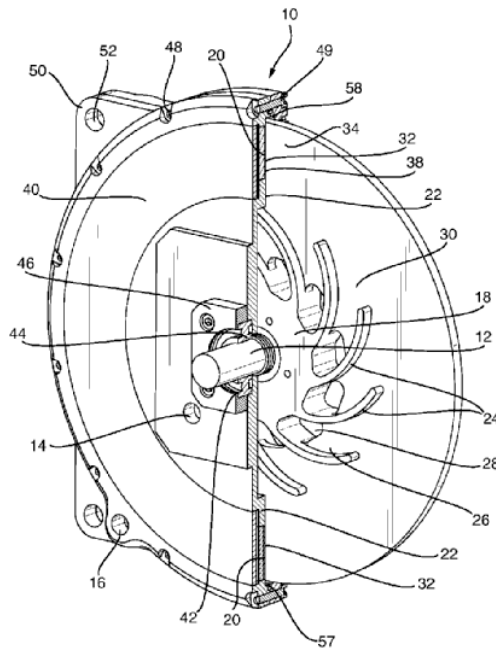
- 17 This includes the features underlined above; the inventive concept of the claim on file is:

*A heat generator comprising an electrically conducting rotating disc having a plurality of runner vanes and rotating between two fixed discs each bearing magnets arranged with their magnetic fields intersecting the first disc and with N poles of the magnets on one of the pairs of second discs facing one side of the first disc and S poles of the magnets on the other of the pair of second discs facing the other side of the first disc, wherein a fluid is passed over a vane-free portion of the rotating disc.*

**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 the claim as construed**

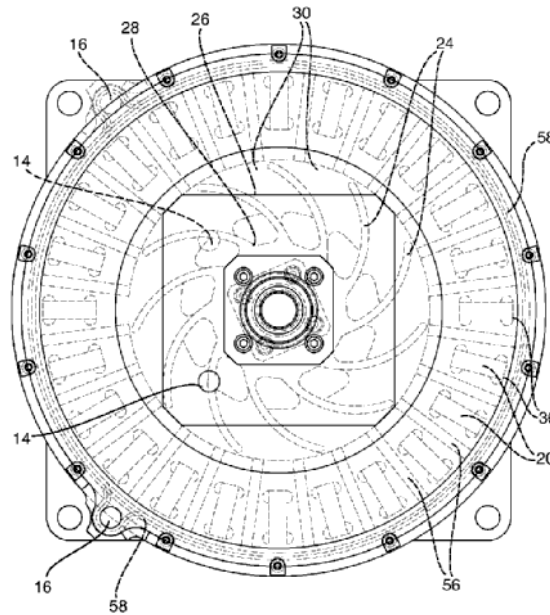
- 18 The examiner has cited GB 2527012 as forming part of the state of the art. This document discloses, in figures 1 to 6, a heat generator 10 which comprises a shaft 12 connected to a source of power, a fluid input 14 and fluid output 16. A first disc 18 comprising aluminium is mounted rigidly on the shaft 12 having a fluid path in the plane of the disc wherein heat generated in the first disc by induction as a result of rotating the magnetic field is transferred to fluid in the fluid path.

Fig. 1



- 19 A plurality of runner vanes are 24 cast as part of the first disc 18, upstanding up from the surface of the first disc on both sides thereof and forming a plurality paths 26 between the first and second discs 18 and 22 from close to the shaft 12 towards the magnets 20. The widths of said paths 26 increase from their inlets 28 close to the shaft to their outlets 30 close to the magnets 20.
- 20 The fluid input 14 to the heat generator passes through one of the pair of second discs and links with an inlet 28 causing water to flow the associated path 26. As disc 18 turns with the shaft 12, the water will be moved centrifugally outwards through the path 26. Each of the inlets 28 in turn passes by input 14 causing water to enter each of the paths 26. The water will flow out of outlets 30 into a thin passage 32 passing between the magnets and the vane free outer portion 34 of first disc 18.

Fig. 5



- 21 A plurality of magnets 20 parallel to the plane of the first disc 18 are mounted either side of the first disc 18 in recesses 36 towards the periphery of a pair of second fixed discs 22 which are mounted around the shaft but not coupled to it, close to and either side of the first disc 18; the planes of the second discs 22 are parallel to the first disc 18. The magnets are aligned with their NS axis lying radially to the pairs of second discs with one pole, for example South, pointing to the centre of the second disc. No advantages of this alignment or disadvantages of other alignments are given.
- 22 The difference between this and the application is that the magnets are arranged with their N-S axes parallel to the plane of the rotating disc, whereas in claim 1 of the present application their N-S axes are aligned parallel to the shaft such that the N poles of all the magnets on one of the fixed discs are facing the rotating disc and the S poles of all the magnets on the other fixed disc are facing the rotating disc.

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

- 23 Having identified the differences that exist between the state of the art and the invention as claimed, it is now for me to decide whether said differences would have been obvious to the person skilled in the art at the time of the invention or whether a certain degree of inventiveness was required on his part. In doing so, I must avoid looking at the cited prior-art under the influence of the present application, and should attempt to place myself in the shoes of the skilled person faced with the problem at hand. Putting it another way, I must beware of using hindsight or ex-post facto analysis to arrive at the invention.
- 24 The questions that need to be answered are:

- Would it occur to the skilled reader of GB 2527012 to align the magnets parallel to the shaft?
- And if so, and if the claims are amended to make the seemingly intended amendment, would it occur to them to arrange all the North poles of the magnets on one of the fixed discs to face the rotating disc and the South poles of all the magnets on the other fixed disc to face the rotating disc?

- 25 The examiner argues that the skilled person would require no inventive effort to arrive at the magnet arrangement currently recited by claim 1 when carrying out the teachings of GB2527012, not least since such magnet arrangements are already known in the prior art. They also note that even in the absence of such disclosures this magnet arrangement would nonetheless be obvious because the skilled person's awareness of electromagnetic induction and magnetic field topologies. They propose that when producing the rotary magnetic heater disclosed by GB2527012 they would naturally consider the possible alternatives for how the magnets could be arranged and how this would affect the heat generated in the rotating disc. There would be no barrier to implementing the particular magnet arrangement of claim 1 and doing so would require no inventive effort because it is one of a small number of possible alternatives consisting of the magnets being oriented parallel or perpendicular to the shaft, and either alternating or non-alternating in polarity.
- 26 The applicant on the other hand, argues that the claimed arrangement is not described in GB2527012 nor would it be immediately obvious to arrange the poles in this way in their letter of 16 August 2019. In their earlier letter of 25 June 2018, they argue that neither WO2002/087285 or WO2006/058404 when read in conjunction with GB2527012 will lead to the invention of the current claim 1 (as amended). In their most recent letter of 3 February 2020, they discuss the disclosures of US2006/0086729 and US2009/0223948 concluding that `729 says no more than the disclosure of the magnets in WO2002/087285 and that `948 seems impracticable, and it likely to be ignored by the skilled person in the field. They conclude this letter by inviting the examiner to make a formal decision that either the application lacks novelty over WO2002/087285 or it is novel and has inventive step. This all seems to miss the examiner's point.
- 27 The disclosure in GB2527012 does not provide any advantages of the magnet arrangement used or disadvantages of other arrangements. Likewise, the present application does not provide any advantages of the magnet arrangement used or disadvantages of other arrangements. In their arguments the applicant does not provide any evidence that the magnet arrangement in the present application would in some way be thought to be disadvantageous when reading the disclosure in GB2527012 when it is in fact not so. In the absence of such disclosure or evidence of prejudice it would occur to the skilled reader of GB2527012 to try other magnet arrangements when implementing the teachings therein. All possible arrangements would be obvious to try.

### **Conclusion**

- 28 I conclude that the invention as defined in independent claim 1 lacks an inventive step. The agent's letters make no comment about any potential saving amendments

and none would seem possible. I therefore refuse this application under section 18(3) of the Patents Act.

**Appeal**

29 Any appeal must be lodged within 28 days after the date of this decision.

**J Pullen**

Deputy Director, acting for the Comptroller