



## PATENTS ACT 1977

APPLICANT	Othman Bin Ahmad
ISSUE	Whether patent application GB1521173.3 complies with sections 1(1)(c) and 14(5)(b) and (c) of the Act
HEARING OFFICER	B Micklewright

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### DECISION

#### Introduction

- 1 Patent application GB1521173.3 was filed on 1 December 2015 and was published as GB2544977 A on 7 June 2017. The application is entitled “Perpetual motion heat engines”. The application is in the name of Othman Bin Ahmad, who is an unrepresented applicant.
- 2 The application has been searched and two examination reports have been prepared. The examiner has raised two separate issues.
- 3 The first issue is that it is not clear whether Mr Ahmad’s invention is a perpetual motion machine. If so, then the examiner is of the view that the application must be refused because such machines are incapable of industrial application. If not, then the examiner is of the view that use of the phrase “perpetual motion” throughout the application obscures the scope of the claimed invention.
- 4 The second issue is that there are, in addition to the above-mentioned ambiguity, a number of other problems with the claims which renders their scope unclear.
- 5 Mr Ahmad has submitted lengthy responses to the examination reports but has thus far strenuously resisted making any amendments which might have addressed the examiner’s objections. Rather he has maintained that the examiner’s objections are ill-founded. The examiner and Mr Ahmad have reached an impasse.
- 6 The matter came before me at a video-conference hearing on 26 June 2019. Mr Ahmad represented himself.
- 7 I confirm, that in reaching my decision, that I have considered all the correspondence on file.

## The invention

- 8 The application relates to a power system which might be used for a vehicle. The power system is based around a heat engine i.e. a device for producing motive power from heat, for example an internal combustion engine or a steam engine. An essential feature of the power system is a heat pump which cooperates with a high temperature heat reservoir and a low temperature heat reservoir. The power system has a number of modes of operation, amongst which are modes which make use of the heat pump to recover and store energy.
- 9 The application contains nine claims which have not been amended during the prosecution of the application. They are lengthy in nature. Claim 1 is the only independent claim and is reproduced below. The dependent claims may be viewed on the IPO's online patent information service IpSum<sup>1</sup>.

*1. A power system for vehicles and devices comprising of:*

*a plurality of heat engines (10) such as but not limited to steam engines, external combustion engines and internal combustion engines, which can use a plurality of fuel such as but not limited, to natural gas, coal, nuclear, wood, petrol, diesel, kerosene, vegetable oil and municipal solid waste,*

*a plurality of heat pumps (20), that can pump heat energy from a low temperature to a higher temperature of sufficient power handling comparable to the said heat engine (10),*

*a plurality of burners (3) for the plurality of fuel such as but not limited, to natural gas, coal, nuclear, wood, petrol, diesel, kerosene, vegetable oil and municipal solid waste, producing a plurality of flames (4),*

*a plurality of high temperature heat reservoirs (5) to store the heat from the said flames (4) of the said burners (3) and the said heat pumps (20)*

*a plurality of low temperature heat reservoirs (15) to extract heat energy from the said heat engines (10) and to send heat energy to the said heat pumps (20),*

*a plurality of heat engine inlet pipes (6) which can transfer heat energy from the said high temperature heat reservoirs (5) to the said heat engines (10) using various means and media such as but not limited to liquid, gas and metals,*

*a plurality of heat engine outlet pipes (12) that can transfer heat energy from the said heat engines (10) to the said low temperature heat reservoirs (15) using various means and media such as but not limited to liquid, gas and metals,*

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<sup>1</sup> <https://www.ipo.gov.uk/p-ipsum/Case/PublicationNumber/GB2544977>

*a plurality of heat pump inlet pipes (16) that transfer heat energy from the said low temperature heat reservoirs (15) to the heat pumps (20) using various means and media such as but not limited to liquid, gas and metals,*

*a plurality of heat pump outlet pipes (21) that transfer heat energy from the said heat pumps (20) to the said high temperature heat reservoirs (5) using various means and media such as but not limited to liquid, gas and metals,*

*a plurality of heat pump shafts (31) that allow mechanical energy to operate the said heat pumps (20) using various means such as but not limited to metal rods,*

*a plurality of engine shafts (55) that allow mechanical energy to be transferred to other devices using various means such as but not limited to metal rods,*

*a plurality of wheels (90),*

*a plurality of drive shafts (95) that transfer mechanical energy to the said wheels (90) using means such as but not limited to metal rods,*

*a plurality of gearboxes (60) which distribute manually or automatically, mechanical power efficiently and well matched from the sources which can be the said heat engines (10) or said wheels (10) to the loads which can be the said wheels (90) and said heat pumps (20) via their corresponding said engine shafts (55), heat pump shafts (31) and drive shafts (95), using means such as but not limited to manual gearbox, automatic gearbox, continuously variable transmission (CVT) and clutches,*

*a plurality of control signals (2) and*

*an engine management system (1) consisting of components and methods such as but not limited to computer systems, logic gates, mechanical switches and electro-mechanical switches, that controls the directions and amount of the mechanical and heat energies using the said control signals (2) sent to the said gearbox (60) and said burner (3) at the minimum but may include other devices, automatically or manually so that the operating modes such as but not limited to the following, can be selected:*

*i. normal mode wherein the said heat engine (10) operates normally as in a standalone heat engine, where the said burner (3) is set to the desired moving speed of the said wheels (90) via the said engine shaft 25 (55), gearbox (60) and drive shaft (95) while disconnecting the heat pump shaft (31); and*

*ii. kinetic energy recovery system (KERS) mode wherein the said burner (3) is off, heat engine inlet pipe (6) is disconnected, the said engine*

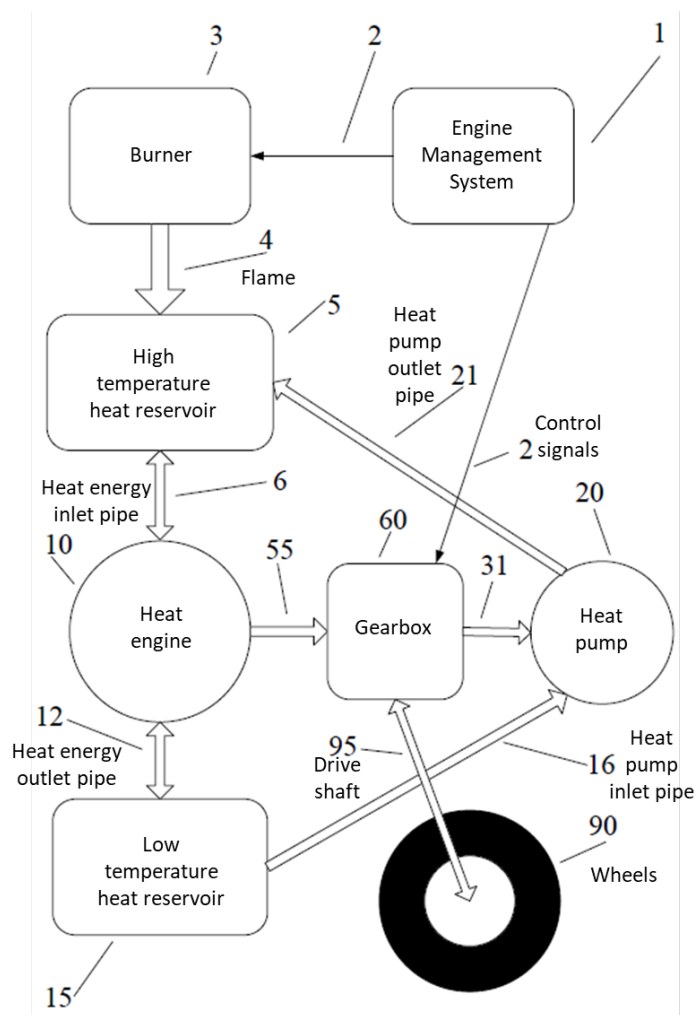
shaft (55) disengaged while the said drive shaft (95) and said heat pump shaft (31) are engaged so that the said heat pump (20) may be driven by wheels in the case of moving vehicles, to convert the mechanical energy back into heat energy to be stored in the said high temperature heat reservoir (5); and

iii. idling mode wherein the said burner (3) may be switched off, the said drive shaft (95) disengaged while the said engine shaft (55) and said heat pump shaft (31) are engaged; and

iv. idling storage mode which is similar to the said idling mode but the burner is switched on and set to the desired level either manually or automatically; and

v. heat storage mode, which is similar to the idling heat storage mode, except that the heat engine (10) is made to stop rotating by blocking the heat engine inlet pipe (6) by using various means.

10 This is a lengthy claim, and the following drawing from the application may aid understanding.



## **The law**

11 The Patents Act set out the requirements that must be fulfilled in order for a patent to be granted. The requirements at issue here are section 1(1), section 4(1) and section 14(5).

12 The relevant portion of section 1(1) of the Patents Act 1977 reads as follows:

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

*(a) ...*

*(b) ...*

*(c) it is capable of industrial application;*

*(d) ...*

13 The Act defines “industrial application” in Section 4(1):

*An invention shall be taken to be capable of industrial application if it can be made or used in any kind of industry, including agriculture.*

14 The relevant portions of section 14(5) of the Act are:

*The claim or claims shall -*

*(a) ...*

*(b) be clear and concise;*

*(c) be supported by the description;*

*(d) ...*

## **Arguments and analysis**

### Perpetual motion

15 It is settled practice that devices which operate in a manner contrary to well established physical laws are held to be incapable of industrial application because such devices cannot be made to operate in the way described. There are many previous hearing officers’ decisions that confirm this to be the case.

16 The phrase “perpetual motion” appears 61 times in the description and a further 7 times in the claims so the examiner was quite correct to consider whether Mr Ahmad is attempting to seek patent protection for a perpetual motion machine. Having reviewed the correspondence on file it seems to me that the examiner feels that Mr Ahmad is not actually alleging that his power system can run indefinitely without the input of energy. However, the examiner is of the view that the language used in the application, particularly the frequent use of the phrase “perpetual motion”, means

that this may not be clear to the skilled reader. Mr Ahmad's lengthy arguments in response to the examination reports have not persuaded the examiner otherwise.

- 17 At the hearing I sought clarity from Mr Ahmad about whether his invention is a perpetual motion machine, or not. I am grateful to Mr Ahmad for being so explicit on this point. He could not have been clearer; he categorically stated that his power system will not run for ever without input of energy.
- 18 I am quite prepared to take Mr Ahmad at his word when he says that invention will not run forever, but some further analysis is necessary. What matters is not so much what Mr Ahmad stated at the hearing but rather what his patent application teaches the skilled reader. Is his application on all fours with his comments at the hearing?
- 19 I must first make a brief comment to address a point raised a number of times at the hearing and in Mr Ahmad's written submissions to the examiner. It appears that Mr Ahmad takes issue with the way in the scientific community at large uses the phrase "perpetual motion". The term has a commonly accepted definition; it is a motion that continues indefinitely, without end. In like manner the phrase "perpetual motion machine" means a machine that can do work indefinitely without an energy source. Mr Ahmad's argument regarding what he sees as the misuse of these terms is subtle. In simple terms he considers that the phrase has incorrectly come to be intrinsically associated with perpetual (or free) energy generation, something which his says his device does not do. I will confess that I am struggling to follow Mr Ahmad's reasoning, but in any case it will serve no useful purpose to rehearse his arguments on this point here because it is simply not relevant that he would prefer that the scientific community used a particular definition. The question I must answer is whether the skilled reader would understand the invention to relate to a machine which contravenes the laws of physics, or not.
- 20 The title of Mr Ahmad's application is "Perpetual motion heat engines". The second paragraph of the application directs the reader to adopt the online Oxford English Dictionary's interpretation of the phrase "perpetual motion", i.e. "motion that goes on forever, a state of movement or activity that appears to be continuous and unceasing". Likewise the second paragraph on page 2 defines "perpetual motion" as "a machine that it constantly in motion", and the second paragraph on page 4 says much the same thing. Clearly, if I am to take Mr Ahmad at his word that his invention will not run forever then these portions of the description might present a problem.
- 21 On the other hand, there are portions of the application which clearly do support Mr Ahmad's contention that his system will not run forever. For instance, the fourth paragraph on page 2 says that his invention achieves practical heat engine perpetual motion and refers to the degree of perpetuity required. This at least hints that the motion does not continue indefinitely. Along similar lines the third paragraph on page 4 talks about recycling as much power as economically feasible and reducing losses as much as possible whilst acknowledging that 100% recycling is not possible. Clearer still is the third paragraph on page 8 which, when discussing the so-called "Idling (perpetual motion) mode" says:

*"Eventually the heat engine (10) will stop because of the inevitable losses due to friction, leaked gas and heat but all these can be controlled to the minimum*

*based on the economical requirement of the design of the entire engine system”*

- 22 Mr Ahmad helpfully elaborated on how his invention actually works at the hearing. He explained that in the idling mode (which he calls a perpetual motion mode) energy which might otherwise have been lost outside the system is recycled as much as is possible, which means that in this mode no additional energy is required to be input from the burners, but eventually the heat engine would slow down and stop due to losses from the system.
- 23 I must say that I remain a little unclear as to why Mr Ahmad chose to call his invention a “perpetual motion heat engine” and why he calls the idling mode a “perpetual motion mode” and I am certain that the skilled reader would likewise pause for a moment to scratch their hypothetical head. That said it is perfectly plain, when the application is read as a whole, that he is not asserting that his system will run perpetually, and nor can it. What I think Mr Ahmad is driving at is that his system, for all practical purposes, runs sufficiently long in the idling mode on recuperated energy that it does not require any further input of energy. That may be seconds, perhaps minutes, or maybe even longer, but it is not indefinite.
- 24 In conclusion, the invention is not a perpetual motion machine which contravenes the accepted laws of physics and therefore it does not fall foul of section 1(1)(c) of the Act.
- 25 The examiner’s view was that if, as I have already decided, the invention is not a perpetual motion machine then each and every instance of the phrase “perpetual motion” must be removed from the application because they cast doubt on the scope of the claims. I do not consider this to be necessary. Mr Ahmad’s use of the phrase “perpetual motion” when describing his invention is certainly infelicitous, and his application would plainly have been benefitted from a different choice of terminology, but I do not consider that, when read as a whole, it would genuinely mislead the skilled reader into believing that the claimed invention is a perpetual motion machine according to the conventional definition of the term.

#### Clarity and Support

- 26 The examiner’s pre-hearing report outlines ten clarity objections, though he makes it clear that these are the ten he considers to be the most important. Whilst we discussed each of these objections at the hearing I will focus in my decision on those that have the greatest impact on the scope of the claims, particularly claim 1, and therefore require the most attention.
- 27 The first point to consider is the portion of claim 1 which purports to define what the engine management system does. The claim says that the

*“...engine management system...controls...using...control signals...so that operating modes such as but not limited to the following can be selected:*

*i. normal mode...*

*ii. kinetic energy recovery system (KERS mode)...*

- iii. *idling mode...*
- iv. *idling storage mode...*
- v. *heat storage mode...*

The problem phrase here is “such as but not limited to”. This is a phrase oft used in patent applications, but which when used in claims usually introduces a degree of ambiguity which warrants objection under section 14(5)(b). Put simply the examiner’s objection is that it is not clear what the engine management system of the invention must do. The claim says that the engine management system can select operating modes; that much is clear. What is not so clear is what those operating modes must be. The claim suggests that the engine management system need not select the five listed modes but may instead select other operating modes. But what are those modes? If they are to be modes “such as” the five listed then one might conclude they have to be modes which are in some way similar to those modes. If so, similar in what way?

- 28 I questioned Mr Ahmad at the hearing as to what he considers to be the essential features of engine management system. Must it have to the capability to make the power system operate in each of the five modes defined in claim 1? Initially Mr Ahmad argued that his invention is the power system *per se*, not the modes of operation of that system, and that he was seeking a monopoly for a product. If that were really the case then this portion of the claim would seem to be entirely superfluous and potentially even more unclear. On exploring the issue further at the hearing, noting that each of the described embodiments requires the use of all five modes of operation, Mr Ahmad accepted that his claim ought to be limited, by suitable amendment, to a power system that can work in the five modes he has described. I note that the examiner has helpfully given Mr Ahmad some guidance as to how such an amendment might be effected, in his report of 19 February 2019.
- 29 The phrase “such as but not limited to” does not only appear in relation to the modes of operation of the engine management system. It appears a further 11 times in claim 1 and many more times throughout the dependent claims. Whilst we did not discuss these instances at the hearing the examiner has drawn this to the attention of Mr Ahmad in his examination reports and each case introduces a similar, if arguably less significant, lack of clarity. I sense, from my discussions with Mr Ahmad at the hearing and from his communications with the examiner, that he feels he will weaken his patent protection by addressing the point. I do not consider that to be the case at all. To take a simple example from claim 1, Mr Ahmad clearly does not wish to restrict his heat pump shaft (31) to any particular shape or material, and that is a perfectly reasonable position to take as it is not critical to his invention. But by including the phrase “such as but not limited to metal rods” has he actually limited his claim to shafts of a type of which a metal rod is an example? Therein is the lack of clarity which does nothing to strengthen his claim and perhaps even weakens it.
- 30 The second issue I discussed with Mr Ahmad at the hearing regards the frequent use of the word “plurality” in claim 1. It became clear during my discussions with Mr Ahmad that he was under the misapprehension that “plurality” means “one or more”. It is commonly accepted that it means “two or more” and that is how the skilled reader would interpret it. The power system of claim 1 is said to have a plurality of

heat engines, a plurality of heat pumps, a plurality of burners, a plurality of high temperature reservoirs and so on. The problem here is that there is nothing in the description which suggests there to be a plurality of these components in the power system. Mr Ahmad put it to me that the embodiments are just examples which illustrate the invention, and it would be quite possible to have a system that used, for example, two heat engines at the same time, pointing out that twin-engine vehicles do exist. However, there is no disclosure of such in the description. Furthermore, the described embodiments fall outside the scope of claim 1 since they only have one of each of the components, and the claim requires there to be at least two. There is evidently a support issue here which will need to be addressed; the claims are at odds with the description. The issue also occurs elsewhere in the claim set.

- 31 In relation to the dependent claims, there is one issue in particular which was discussed in more depth at the hearing. The examiner's pre-hearing report draws attention to the portion of claim 4, labelled "ii.", which relates to kinetic energy recovery system (KERS) mode. The brevity of the examiner's clarity objection is, I think, quite revealing. He simply does not understand what it means. I have sympathy with the examiner here. Having read and re-read this portion even with the benefit of Mr Ahmad's comments at the hearing I must confess that I am not much closer to fully understanding it. Broadly speaking I believe that it is about modifying the usual four strokes/cycles of the internal combustion engine to enable it to operate in a two-stroke mode so that it may be powered by compressed air. Mr Ahmad primarily has a four-cylinder engine in mind. The claim refers to Table 1, of which more will be said later, but which clearly relates to four cylinders, and the claim explicitly mentions cylinders 1,2,3 and 4. Whilst there are certainly a few grammatical issues which hinder understanding the main problem with the claim is the portion which reads "but a skilled person should be able to adapt to other engine cylinder configurations". At the hearing Mr Ahmad explained that he wanted his patent to provide protection for engines with other cylinder configurations, not just four-cylinder engines, and that was what he was trying to achieve through use of this phrase. I do, of course, appreciate his point; the number of cylinders in the engine is plainly not critical to his invention. But each claim must be clear and in my view claim 4 is not clear. Firstly, it is not clear whether the claim is limited to the four-cylinder situation or not. Secondly, it may be true that the skilled person could determine what modifications could possibly be made to the usual cycle of, for instance, a V12 engine in order to operate in a manner analogous to that set out in the claim in the case of a four-cylinder engine, but those modifications are not defined in the claim. Accordingly, the scope of the claim is unclear. To return, briefly, to Mr Ahmad's concern about the protection his patent would afford him, what he has perhaps not appreciated is that claim 1, which sets out the monopoly sought in its broadest form, is not limited to any particular cylinder configuration. An internal combustion engine having any number of cylinders therefore falls within the scope of that claim.
- 32 Claim 5 is similar to claim 4 in that it contains a reference to an adaptation that a skilled person should be able to make. This is equally as unclear as the corresponding portion of claim 4 and will require amendment.
- 33 Claim 4 refers to "Table 1" which appears on page 18 of the description. The examiner has objected that claim 4 is therefore an omnibus claim, and such claims

are no longer allowable under UK practice (except in rare circumstances). I am not sure I would regard claim 4 as an omnibus claim merely because it contains a reference to something in the description, but regardless it seems to me that the examiner and Mr Ahmad are at cross purposes. Mr Ahmad seems to think that the examiner requires him to replace the technical content of the table with an equivalent section of text, which he argues would be lengthy and complex. Actually what the examiner is asking is for the table to be reproduced in the claim in its original form, thus rendering the claim self-contained. It is perfectly acceptable to have tables in claims as paragraph 22 of Part 4 of Schedule 2 of the Patent Rules makes clear.

- 34 The examiner raised several further objections relating to the clarity of the claims. I did allow Mr Ahmad an opportunity at the hearing to address me on these points, but we did not discuss these at length. These issues relate to the use of the term “preferably” in claim 2, to the term “the alternator” in claim 2 which has no antecedent, to a limitation in claim 1 that the gearbox distributes power in a manner which is “efficiently and well matched”, and to an issue with the dependency of claim 9 on claim 2. These matters often cause clarity problems in claims and, when that is the case, examiners are right to object to them. In this instance, given the specific circumstances and contexts, I however consider these to be minor matters which if left unaddressed would not cause a skilled reader to misunderstand the scope of the invention.

### **Conclusion**

- 35 The claims are not seeking protection for a perpetual motion machine and as such are not objectionable under section 1(1)(c). However the application does not meet the requirements of section 14(5) since there are significant clarity and support issues in independent claim 1, and a number of further clarity issues in dependent claims, as I have found in this decision, in particular:
- The use of the term “such as but not limited to” in the claims, in particular in claim 1 in relation to the operating modes of the engine management system but also elsewhere in the claims, renders the claims unclear.
  - The use of the term “plurality” in claim 1 to define the number of heat engines, heat pumps, etc, causes the claim to be inconsistent with the description and therefore is unclear and lacks support.
  - The references in claims 4 and 5 that “a skilled person should be able to adapt to other engine cylinder configurations” render the scope of these claims unclear as any such adaptations are not defined in the claim.
- 36 Mr Ahmad has thus far been unwilling to make any amendments to his claims to overcome objections made under section 14(5). I trust that he will now understand that amendments are required in order to place his application in order for grant. The examiner has deferred a number of issues. In particular he has not updated the search, or reconsidered novelty and inventive step. Furthermore, he has only raised what he considered to be the most significant clarity issues. I therefore remit the case to the examiner to complete his investigations and then to issue a further examination report detailing the outstanding objections. If the claims are not amended in response to this report to address at least the three points I have listed

in the previous paragraph the application will be refused for failure to comply with the Patents Act.

### **Appeal**

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

### **B Micklewright**

Deputy Director, acting for the Comptroller