Intellectual Property Office

BL O/047/17

07 February 2017

PATENTS ACT 1977

APPLICANT	Mr Peter John Bayram
ISSUE	Whether GB 1209146.8 complies with sections 14(5) and 76(2)
HEARING OFFICER	B Micklewright

DECISION

Introduction

1 This decision relates to patent application GB 1209146.8 entitled "Control of a diesel engine's exhaust condition to improve catalytic convertor efficacy" in the name of Mr Peter John Bayram. The application was filed on 22 May 2012 with an earliest priority date of 23 May 2011. It was published on 5 December 2012 as GB 2491458 A. The examiner objected to the claims on the basis that they lacked clarity and support. These objections were maintained through several rounds of amendment with an additional objection to added matter being raised in latter rounds.

2 The section 20 compliance date of the application was originally set to expire on 23 November 2015. A first request to extend the compliance date under rule 108(2) and a second request under rule 108(3) were allowed. A request for a third extension to the compliance period filed on 16 May 2016 was refused and the application was passed to a hearing officer to consider whether the application was in order at the date that the compliance period expired.

3 Following a further examination report, a further extension of the compliance period was allowed under rule 107, with the extended section 20 date expiring on 14 November 2016. The applicant provided arguments and amendments in his responses of 14 and 17 October 2016 but the application was not found to be in order by the examiner and a final examination report was issued on 7 November 2016. The applicant did not respond to this examination report before the latest date of reply but filed a further Form 52 on 14 November 2016 requesting another two month extension to the compliance period. This request was refused and the application was referred to the hearing officer for a decision on the papers. In this decision I have taken into account all of Mr Bayram's arguments and submissions made in his correspondence.

4 Mr Bayram filed further arguments in letters dated 7 December 2016 and 16 January 2017, the latter including a further set of amended claims. I have taken into account relevant submissions detailed in these letters in reaching my decision. The

amendments made to the claims are very minor but in any case I can only consider these if I conclude that it is appropriate to exercise discretion to further extend the compliance period.

The invention

5 In a conventional diesel engine the temperature of the exhaust gases varies with the fuel injection rate which in turn affects the temperature of the catalytic convertor. Catalytic convertors perform less effectively when running cold, such as upon start-up. Although the exact scope of the invention is not clear from the claims, the invention relates to a means for throttling engine exhaust gases by passing them through a turbine. In the preferred embodiments, this turbine is downstream of the catalytic convertor. It is proposed that the turbine used in the invention generates a back pressure that increases combustion temperature and reduces in-take air mass flow to the engine, thus increasing exhaust gas and catalytic convertor temperatures, improving the combustion efficiency and the efficacy of the catalytic convertor.

6 Power is transmitted from the turbine back to the engine via the engine crankshaft whilst fuel is being injected into the engine. When fuel is not being injected, for example when a vehicle is braking, power is transmitted from the turbine via a motor generator to a battery or other energy storage means.

7 Claim 1 is the only independent claim and reads, in its latest form as filed on 14 October 2016:

> *1) Means for controlling the combustion efficiency of an internal combustion (i.c.) engine having a throttle controlled fuel supply comprising of one (1), or more, adiabatic engines in the i.c. engine's one (1), or more, exhaust systems, means for transmitting power between said adiabatic engines and the i.c. engine, means for varying the transmission of such power between said engines and means connecting such varying means to control means connected to one (1), or more, i.c. engine exhaust gas condition sensing means.*

The Law

8 The relevant law concerning added subject matter is governed by section 76(2) of the Patents Act 1977 (“the Act”) which states:

> *76(2) No amendment of an application for a patent shall be allowed under section 15A(6), 18(3) or 19(1) if it results in the application disclosing matter extending beyond that disclosed in the application as filed.*

9 Section 14(5) of the Act specifies requirements for claims, in particular that they be clear, concise and supported by the description, and states:

> *14(5) The claim or claims shall –*
> *(a) ...*
> *(b) be clear and concise;*
> *(c) be supported by the description;*
> *.....*

Analysis

Added subject matter

10 The examiner has objected that claim 1 as filed on 14 October 2016 contains matter extending beyond that which was contained in the application as filed. Claim 1 defines "*Means for controlling the combustion efficiency of an internal combustion (i.c.) engine*". The examiner contends that the application relates only to certain types of internal combustion engines and that to extend the invention to all types of internal combustion engines adds subject matter. I need to determine whether the skilled addressee would consider the application as filed to disclose, either explicitly or implicitly, a means for controlling the efficiency of all types of internal combustion engine.

11 Claim 1 of the application as filed relates to compression ignition internal combustion engines. In the original description, all of the preferred embodiments describe the invention in relation to a diesel engine. There is no formal statement of invention, however, page 1 of the description refers to features of the invention, all within the context of a diesel engine.

12 Page 2 lines 40-43 of the description states that, "*Since such throttling means increase less than wot combustion temperature the possibilities of combining compression ignition with glo-plug ignition and use of alternative fuels/mixes, e.g. diesel fuel mixed with ethanol or methanol, become more viable*". In my view the skilled person would understand from this that the invention may be applied to engines using diesel fuel or a mixed fuel comprising diesel and that the engines would be of the compression ignition type, either with or without glo-plug ignition.

13 Moreover the passage of text at page 1 line 50 to page 2 line 2, states that "*In this invention the fuel injection rate is controlled by inputs from the 'throttle' position sensor (TPS) and the throttling means by inputs from an exhaust O2 sensor, and or temperature sensor, to the engine's engine management processor/computer (ECU), opposite to the way in which the throttle of a petrol engine controls the intake airflow rate*". This indicates that the invention works in a particular way that is not compatible with the working mechanism of a petrol engine.

14 The only reference to non-compression engines is found at page 5 line 56 to page 6 line 2: "*It should be noted that these systems can also be applied to spark ignition four-stroke and Wankel rotary engines (whose relatively high exhaust gas temperatures can be made use of by the exhaust turbines*".

15 In summary, the application as filed explicitly refers to compression ignition engines, Wankel rotary engines and four-stroke spark ignition engines. It does not refer to any other types of internal combustion engines.

16 It might be argued that the skilled person upon reading the application would realise that the invention could be applied to other internal combustion engines, for example a two-stroke spark ignition. However, it is not enough that the disclosure should make it obvious to the skilled reader that the invention may be applied to other types of combustion engine. In deciding whether or not there is added matter, I should be concerned with what is disclosed, not what might have been disclosed and not that which the skilled reader might think could be substituted. I do not believe the skilled person would have understood the application as filed to have disclosed application

of the invention to all types of internal combustion engines. I therefore conclude that the claim to "*a means for controlling efficiency of an internal combustion (i.c.) engine*" adds matter.

17 The examiner also argued that since there is insufficient support for "a means for controlling the combustion efficiency of an internal combustion engine", there is not sufficient information for the skilled person to carry out the invention over its full breadth. As I have found that "a means for controlling the combustion efficiency of an internal combustion engine" constitutes added matter, there is no need for me to decide this matter.

Clarity and support

18 Section 14(5) of the Act states that claims must be clear and supported. In order to achieve this the claims and description should be in agreement with regard to the essential features of the invention. There are four key issues made by the examiner in relation to clarity and support:

(i) that the expression "adiabatic engine" in unclear;

(ii) that the catalytic convertor is an essential feature of the invention and should therefore be included in claim 1;

(iii) that the throttling of exhaust gases is an essential feature of the invention and should therefore be included in claim 1; and

(iv) that the power-accumulating-discharging means is an essential feature of the invention and should therefore be included in claim 1.

I will deal with each of these points in turn.

19 (i) The examiner considered the expression "adiabatic engine" in claim 1 to be unclear, broad and speculative. "Adiabatic engine" does not appear to be a term that is well known in the art. It is expected that the skilled person would understand an "engine" to be a piece of equipment that converts one form of power into mechanical energy; and "adiabatic" to describe a process where there is no transfer of heat. The bulk of the description does not use the term "adiabatic engine" but instead refers to a "turbine". In fact, the first mention of an adiabatic engine in the description appears in the final paragraph where it is explained that "*an adiabatic expansion cooling engine is an engine powered by gas flow, where as an adiabatic compression heating engine is an engine that heats gas flow*". I do not consider the expression "adiabatic engine" to be clear but, given the only reference to the expression in the description quoted above, I consider that the skilled person would construe the term "adiabatic engine" to mean an engine powered by gas flow.

20 The only embodiment of an engine powered by gas flow disclosed in the specification is a turbine. Given my construction of the term read in the light of the description, I do not believe the description supports any such engines, except for turbines.

21 There may be an argument that the application does not disclose sufficient information to enable a skilled person to carry out the invention across its full breadth

with regard to the expression “adiabatic engine”, similar to the argument made by the examiner in relation to the claim being broadened to include all internal combustion engines. This argument has not however been developed during the examination process and, given that I have found that the expression lacks clarity and support, I need consider it no further here.

22 (ii) The examiner contends that a catalytic convertor is an essential feature of the invention and consequently must be detailed in claim 1. The examiner has construed claim 1 to define:

> *“A means for controlling the combustion efficiency of an internal combustion (i.c.) engine having a throttle controlled fuel supply, the internal combustion engine comprising at least one adiabatic engine in the i.c. engine’s exhaust system, means for transmitting power between the adiabatic engine and the i.c. engine, means for varying the transmission of power between the adiabatic engine and the i.c. engine and means connecting the means for varying the transmission of power to control means, the control means being connected to at least one i.c. engine exhaust gas condition sensing means”.*

I agree with this construction.

23 The description, states on page 1 paragraph 1:

> “*This invention concerns means for varying the variable oxygen (O2) content and or temperature of the exhaust gases of both normally aspirated and turbocharged diesel engines to increase the combustion efficiency and the efficacy of catalytic convertors by throttling means that generate a useful power output, can harvest a vehicle’s kinetic energy and provides means for returning such energy back to the engine*”.

24 Page 1 paragraph 3 goes on to say (emphasis mine):

> *“*In this invention *the exhaust gases of a normally aspirated diesel engine are throttled by an adiabatic expansion cooling turbine downstream* of the exhaust system’s catalytic convertor *at less than wide-open-throttle (wot) fuel injection rates such that the thereby generated exhaust back-pressure reduces the scavenging of the hot exhaust gases when the exhaust valves are open, which increases combustion temperatures and reduces in-take air mass flow such that both such effects increase exhaust gas and* catalytic convertor *temperatures”;*

and later:

> *“However, the exhaust gas and* catalytic convertor *temperatures of a turbocharged diesel engine can also be, indirectly, controlled”.*

25 Page 1 of the description signposts the catalytic convertor as being an essential feature of the invention. Clearly, in order for the efficacy of a catalytic convertor to be increased, a catalytic convertor must be present in the system. All the three illustrated embodiments of the invention have a catalytic convertor upstream of the adiabatic expansion cooling turbine.

26 The applicant has argued in his letter of 14 October 2016 that the catalytic convertor is a subsidiary, not an essential feature of the invention. However, I am not convinced by his argument that in the English language the use of the word “and”

between two subjects indicates that the first subject is the primary and the second is subsidiary.

27 I therefore conclude that the catalytic convertor is an essential feature of the invention and should be included in claim 1 in order to provide consistency, and consequently clarity and support.

28 (iii) The examiner and the applicant disagreed over the clarity and construction of the expression “throttle controlled fuel supply” used in claim 1. The applicant’s arguments are not entirely clear but in my view the key point is whether the expression could be construed as referring to the throttling of exhaust gases. The applicant does not appear to argue this point and I agree with the examiner that the term does not relate to this element of the invention but rather relates in some way to the fuel supply. There is therefore, according to my reading of claim 1, no reference to the throttling of the engine's exhaust gases (the presence of the “adiabatic engine”, which I have found in itself lacks clarity and support, does not in my view necessarily result in the throttling of exhaust gases). The excerpts from page 1 of the description noted in paragraphs 23 and 24 above indicate that it in order to increase combustion efficiency in an engine it is a requirement of the invention that the exhaust gases are throttled. This view is borne out by the fact that all of the embodiments of the invention show throttle valves (reference numerals 7(fig. 1), 14 (fig. 2) and 24 (fig. 3)) to control the flow of exhaust gas through the turbine. It therefore appears from the description that the throttling of exhaust gases is an essential feature of the invention. Hence I find that there is inconsistency between the claims and description with regards to the essential features of the invention, leading to a lack of clarity and support.

29 (iv) The examiner also raises an objection to there being inconsistency between the claims and description with respect to the “power accumulating-discharging means”, introduced in claim 5. The examiner believes that the "power accumulating-discharging means needs to be included in claim 1 as an essential feature of the invention, in order to be consistent with the introductory paragraph of the description. The features of the invention described on page 1 of the application do not explicitly refer to a power accumulating-discharging means. The first paragraph does refer to "harvesting a vehicle's kinetic energy" and the third paragraph to "varying the braking of the turbine's power output absorbing means". This indicates that power is transferred but not necessarily accumulated. Therefore, I do not think that it would be clear to the skilled person that the “power accumulating-discharging means” is an essential feature of the invention.

30 Having considered points (i) to (iv) it is evident that the claims are not fully consistent with the description and therefore lack clarity and support.

Extension of the compliance date

31 The applicant's request to extend the compliance period by 2 months, filed on 14 November 2016, was refused by the Office. Mr Bayram wrote on 7 December to complain that his request hadn’t been accepted. In his letter, he outlined that the reason that he had requested the extension was to allow him time to consider his response to the examination report of 7 November 2016. Mr Bayram also protests that he has not received an examination report outlining a reasoned response to the

amendments he filed on 14 October. As such, he has not had the opportunity to respond to address such a reasoned response.

32 I have read the examination report issued by the examiner on 7 November 2016 and found it to provide a clear and comprehensive summary of the outstanding objections.

33 As the single as-of-right extension to the compliance period has been exhausted, this most recent request for extension requires the Comptroller' discretion. The Act puts in place strict time limits for the life time of a patent application process to provide certainty for third parties. Mr Bayram was given two weeks to respond to the final examination report issued on 7 November. This would appear to be a perfectly sufficient period of time in which to compile a response. Moreover, the applicant has had numerous opportunities to progress this case during the prosecution of this application. I therefore conclude that it was correct for the Office to refuse the further discretionary extension. A consequence of this decision is that the claims filed with the applicant's letter of 16 January 2017 cannot be considered.

Conclusion

34 I have found that the claims include added subject matter, lack clarity and are not supported by the description. Since the period for putting this application in order has expired, amendment is not possible. I therefore refuse this application.

Appeal

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

B Micklewright

Deputy Director, acting for the Comptroller