Intellectual Property Office

BL O/570/16

05 December 2016

PATENTS ACT 1977

APPLICANT	Jon Otegui Van Leeuw
ISSUE	Whether GB 1202856.9 Complies with Sections 1(1)(a), 1(1)(b), 14(3) & 14(5) & 76 of The Patent Act 1977
HEARING OFFICER	Dr C L Davies

DECISION

Introduction

1 Patent Application GB 1202856.9 was filed in the name Jon Otegui Van Leeuw on 17th February 2012. It was published as GB 2499455.

2 The Examiner has raised a number of issues throughout the examination culminating in the issuance of a final examination report on 9th March 2016 which set out objections under Section 76 to added subject matter, Section 14(3) to use of Trade Marks, Section 14(5) to Clarity and Support of the Claims, Section 1(1)(a) to Novelty and Section 1(1)(b) Inventive Step. In the letter accompanying the examination report the Examiner offered Mr Van Leeuw an opportunity to request a hearing.

3 Mr Van Leeuw has taken that opportunity and a hearing was arranged for 12th October 2016. Mr Van Leeuw represented himself and I was assisted by Mr Nigel Hanley. The hearing was also attended by the Examiner, Thomas Britland and an observer David McCalden.

A Preliminary Matter – The Reply to the Examination Report

4 The Examiner set a date of reply of 9th May for responding to the examination report meaning that the latest reply would need to be received by the office by 9th July if Mr Van Leeuw was to take advantage of the two months as of right extension.

5 As the application was also approaching its compliance date under Section 20 of the Act the IPO issued on 29th June 2016, a WR1 letter formally warning the applicant that the application would be discontinued on or shortly after 17th August as no reply has been received at that date.

6 Mr Van Leeuw responded to the Office on 15th August 2016 by email. This was outside the extended response time for the examination report but within the date set

out in the WR1. Mr Van Leeuw then subsequently filed a Form 52 extending the compliance date until 17th October 2016.

7 Therefore I must make an initial decision as to whether to allow further processing on this application. In his email, received on 15th August 2016, Mr Leeuw explained that the delay had been due to a “high work accumulation” and further reinforced this point at the hearing.

8 There is no doubt in my mind that Mr Leeuw meant to continue with this application, Furthermore, his subsequent actions have clearly been jogged by the WR1 letter. Given the circumstances I am prepared to allow the response of 15th August to stand and with it the acceptance that the application is still live until 17th October 2016.

The Compliance Period

9 The objections raised by the Examiner cover a number of complex issues that will require detailed analysis. As such I made it clear at the hearing that I would not be issuing a decision on the day. I further explained that it was unlikely for me to issue my decision before the compliance date of 17th October.

10 This has a material effect on what happens next in handling this application. Should I find in favour of Mr Van Leeuw then he would need to be in a position where he could make amendments to the application. He could only do this if was afforded a further opportunity to extend the compliance date by a further two months by filing a further Form 52 and fee, which he would have to do by Monday 17th October.

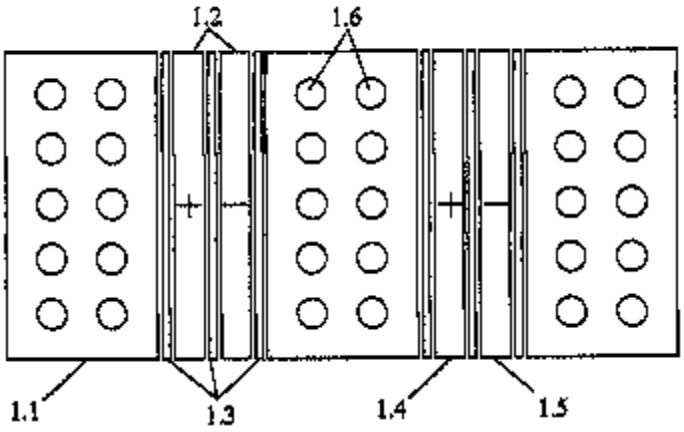
11 Given the nature of the objections, I allowed Mr Van Leeuw an opportunity to extend the compliance date accordingly, which would take it to 17th December 2016.

12 At the time of completing this decision, I can confirm that Mr Van Leeuw has formally extended the compliance date.

The Application

13 The application is directed to a structural laminate material comprising multiple metallic film layers (1.2). The material is bound together with adhesives (1.3) laminated between layers of thermoset resin (1.1) which may include may include optional reinforcing fibres (1.6) to improve the strength of the laminate. The film layers are configured as a positive pole (1.4) and negative pole (1.5) which allow them to act as a capacitor to store charge. The resulting construction finds a particular use in the aerospace industry.

Figure 1:



The Claims

14 This decision is based on the claim set filed on 22nd February 2016. They comprise of 4 claims, claim 1 being the only independent claim:

1 *An aerospace body structure which comprises an energy storage composite laminate or sandwich material structure, and which comprises layers of metallic material, preferably aluminium alloy, on which the electrical energy is stored, and which are sandwiched between layers of an insulating adhesive polymer resin, preferably epoxy, which are preferably reinforced by embedded fibres of a rigid material, preferably glass, such that said composite material is used simultaneously for structural and energy storage application in aerospace vehicle structures, including aircraft and spacecraft structures, such that said body structure is comprised in structural components which comprise skin and/or sheet panels which are preferably made of Glass Aluminium Reinforced Epoxy (GLARE) aerospace material.*

2 *An aerospace body structure, preferably a vehicle body or static body structure according to claim 1, which is comprised in railcar body structures, motorcycle body structures, racing car body structures, structural components of building structures, naval structures, ship structures, shaft structures, internal combustion engine structures, reciprocating structures and turbomachinery structures.*

3 *An aerospace body structure according to claim 1 to 2, in which said adhesive polymer resin of claim 1 is reinforced by embedding rigid fibres in it, which are made of carbon, glass, a metal or an alloy.*

4 *An aerospace body structure according to claims 1 to 3, in which said metallic foils of claim 1 is made of a metal or alloy, such as copper, aluminium, tin or aluminium alloy.*

Claim Construction

15 Before I can consider the objections raised by the Examiner and Mr Van Leeuw's comments on them I must first construe the claims. This is an essential step as only once it has been completed can each of the objections be dealt with effectively.

"Preferably"

16 It is well established that the use of the term "preferably" casts doubt on the scope of the claim and is inherently vague and introduces ambiguity into the claim, which as a consequence makes it impossible to discern the full scope of the claim. Take for example the phrase "comprises layers of metallic material, preferably aluminium alloy". Does this mean the foils in the current application are metallic or are they aluminium and would that encompass other metals such as tin referred to in claim 4. Clearly, any metal will fall within the scope of the claim since that is what the claim covers.

Nominal Claim 1

17 For the purposes of construing the claims I have little option other than to take the broader meaning where it appears in the claims. This has the effect of making a nominal claim 1 read as follows:

> *An aerospace body structure which comprises an energy storage composite laminate or sandwich material structure, and which comprises layers of metallic material, on which the electrical energy is stored, and which are sandwiched between layers of an insulating adhesive polymer resin, such that said composite material is used simultaneously for structural and energy storage application in aerospace vehicle structures, including aircraft and spacecraft structures, such that said body structure is comprised in structural components which comprise skin and/or sheet panels.*

"Aerospace body structure"

18 The claim starts with the term "aerospace body structure" and it is important to understand what this encompasses. The specification at Page 20 refers to it being used for "aircraft fuselage sections, wing structures, empennage structures (the tail fin of an aircraft) and space vehicle structures". The specification also highlights separately and distinctly a number of other vehicle types including racing cars, railroad cars and ships amongst others.

19 Given this I think it fair to say that the aerospace body structure of this application is restricted to a vehicle that is capable of flight. I base this on the view that aerospace is defined, for example on Wikipedia[1] as:

> *"Aerospace is the human effort in science, engineering and business to fly in the atmosphere of Earth and surrounding space. Aerospace organisations research, design, manufacture, operate, or maintain aircraft and/or spacecraft.*

[1] https://en.wikipedia.org/wiki/Aerospace

Aerospace activity is very diverse, with a multitude of commercial, industrial and military"

20 Wikipedia further provides definitions of Aerospace engineering and Aeronautical engineering[2] as:

> **Aerospace engineering** is the primary field of engineering concerned with the development of aircraft and spacecraft. It is divided into two major and overlapping branches: **aeronautical engineering** and astronautical engineering.
>
> **Aeronautical engineering** was the original term for the field. As flight technology advanced to include craft operating in outer space, the broader term "aerospace engineering" has largely replaced it in common usage. Aerospace engineering, particularly the astronautics branch, is often colloquially referred to as "rocket science".[1]

21 From these definitions, and I believe from general understanding, I consider that an aerospace vehicle is one that is capable of flight either in an atmosphere and/or in space. In my opinion this also accords with the wording used on page 20 of the description

"Composite laminate or sandwich material"

22 On the face of it these terms would appear to have a similar meaning though I accept that, practically they may differ in exact meaning. In his application Mr Van Leeuw has provided a number of methods of construction of the material and associated figures 12-27.

23 The first method is described at page 11 line 18 with reference to Fig 24. Additional features are explained from Page 12 through to Page 13 with reference to Figs 25 & 26. In each instance a composite is formed by adding alternate layers of adhesive and component layers and passing them through an autoclave to cure them and form a "multifunctional composite layer".

24 A second method is described on page 14 with reference to Fig 9 and comprises laying the various layers of required material over a mandrel with adhesive between the layers.

25 In either method the end result is a multi-layered material with each layer adhering to another. As a consequence I intend to treat the term "composite laminate or sandwich material" as meaning a multi-layered material created by gluing the layers together.

"Used simultaneously for structural and energy storage application in an aerospace vehicle"

26 This does not create any real difficulty. I consider that this means the material is of a strength that it can be used to form a structural component in an aerospace vehicle. The specification at Page 20 refers to it being used for "aircraft fuselage sections,

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[2] https://en.wikipedia.org/wiki/Aerospace_engineering

wing structures, empennage structures and space vehicle structures". As Mr Van Leeuw made clear at the hearing the material is both strong and light making it ideal for aerospace uses. Indeed, the claim in the last clause of the clause makes clear that it can comprise a skin or panel.

27 By construction it also has a second use in that it can store energy on the metallic foils within it.

28 As a consequence, I consider the material to be structural and to have a function associated with it in that respect whilst at the same time being able to store electrical energy.

Added Subject Matter

29 The Examiner has raised an objection that the current claims add subject matter to the application contrary to Section 76 of the Act. Section 76(2) of the Act states:

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.

30 Claim 1 of the application as originally filed states:

A structural laminate material comprising a laminate which comprises multiple metallic film layers which are laminated together with optionally fibre layers embedded in an adhesive thereby forming a capacitor.

31 The Examiner's objection is that the current claim adds matter by not referring to the laminate material forming a capacitor as it uses the term "energy storage application". In his opinion this broadens the claim.

32 On this issue I agree with the Examiner. The absence of the word "capacitor" does in my opinion extend the disclosure. Specifically, the original application discloses a material comprising two metallic electrodes separated by a dielectric. These can only function as a capacitor and that much is clear from the application which refers exclusively to a capacitor throughout.

Section 14(3) - Trade Marks in the Specification and the Claims

33 The Examiner has also objected to the use of a Trade Mark, GLARE^{RTM} in the specification and the claims. Section 14(3) of the Act states:

The specification of an application shall disclose the invention in a manner which is clear enough and complete enough for the invention to be performed by a person skilled in the art.

34 Trade Marks are an indication of the origin of goods rather than a composition or content and on that account cannot be used to properly describe an article. Office Practice as set out in the Manual of Patent Practice at paragraph 14.100 is to ensure that it is accompanied by wording indicating that it is a Registered Trade Mark. Suggested forms of acknowledgment are the use of the abbreviation (RTM) or the symbol ®. As a consequence Mr Van Leeuw will need to amend his specification on Page 2 to ensure GLARE^{RTM} is duly recognised.

35 The question of the use of Trade Marks in claims comes under Section 14(5) of the Act and whether it is clear what is meant given they are indicators of origin rather than composition which is particularly relevant in this case. As such Trade Marks should not be used in a claim as it is likely to render the scope of the claim unclear.

36 Office practice is to allow some discretion in referencing Trade Marks in claims but only when they are unavoidable and do not introduce ambiguity into a claim. A search on Wikipedia reveals an entry for “Glass Laminate Aluminium Reinforced Epoxy(GLARE)”[3].

37 To me it is clear that the Trade Mark is effectively the acronym of the material and in this instance I will exercise my discretion provided that the reference to GLARE is accompanied by the full explanation of the acronym GLARE as “Glass Laminate Reinforced Aluminium Epoxy”.

Section 14(5) – Clarity of the Claims

38 The examiner has also objected under Section 14(5) of the Act that the claims are not clear or supported by the description. Section 14(5) of the act states

The claim or claims shall -
(a) define the matter for which the applicant seeks protection;
(b) be clear and concise;
(c) be supported by the description; and
(d) relate to one invention or to a group of inventions which are so linked as to form a single inventive concept.

39 I have already discussed the issue of the use of the term “preferably” in the claims. I reiterate the point here that this introduces an element of ambiguity into claim 1 and as such it must be removed.

40 I have also touched upon the issue of added subject matter concerning the lack of the word capacitor in the claims as they stand. The only option supported by the description is that the material operates as a capacitor. Clearly the absence of the term from the claims would mean that the claim is unsupported.

41 Claim 2 refers to a number of alternatives which cannot be said to be aerospace vehicles”. These include references as diverse as “racing cars” and “internal combustion engines”. None of these listed in claim 2 fall within the scope of claim 1 and hence the claim is unclear. Furthermore, the absence of any real information in the description would also lead to the conclusion that the claim may not be fully supported.

[3] https://en.wikipedia.org/wiki/GLARE

Novelty

42 Novelty is considered in Sections 1 and 2 of the Act:

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) the invention is new;
*(b**) it involves an inventive step;***
(c) it is capable of industrial application;
(d) the grant of a patent for it is not excluded by subsections (2) and (3) or section 4A below; and references in this Act to a patentable invention shall be construed accordingly.

43 Section 2 of the Act defines Novelty:

An invention shall be taken to be new if it does not form part of the state of the art.

44 In his examination report of 9th March the Examiner relied on five documents that he considered impugned the novelty of the claims under consideration:

JP H05229348	ONO
DE 10 2006 029462	GOMBERT
US 6981671	BARON
US 2006/0120020	DOWGIALLO
US 2009/0014596	PEARSON

45 Mr Van Leeuw did not provide any skeleton arguments ahead of the hearing. At the hearing, I afforded him an opportunity to consider each of these documents and to offer his views on how they may or may not affect the novelty of his application.

46 Since he did not have any prepared notes, he found it difficult to highlight the differences between his application and the documents cited by the Examiner.

47 It falls upon me as the Hearing Officer to consider each of these documents against the nominal claim and come to a decision on novelty.

48 ONO is directed to a floor plate or shell of an electric vehicle. The floor plate is a laminated material that includes a number of layers between and external face (2a) and an internal face (2b). Located between these two layers is a laminated capacitor formed from alternating layers of conductive thin film (4) such as aluminium foil and an insulating material or dielectric (5) made from synthetic resins such as polythene, polypropylene and polycarbonate. Power from the capacitor can be used via the leads (7) to power the engine of the vehicle. The capacitor can be charged under braking and released under such conditions as stepped application of the accelerator pedal. Its use as a floor plate would indicate that it serves both a structural and an energy storage function.

49 ONO possesses all the features of the nominal claim set out above with one exception – it does not appear to disclose an aerospace vehicle. Consequently, it does not appear to affect the novelty of the application.

50 It is my understanding that GOMBERT shows a multilayer capacitor panel (MehrSchichtkondensatoren) or double layer panel (Doppelschichtkondensatoren) being used to store electric energy. These panels are described as polymer capacitors. As can be seen in Fig 1 these capacitor panels form part of the external structure of the vehicle. In the example of Fig 1 the specification says that his is the bonnet covering the engine compartment. The specification at paragraph 0002 and later on at paragraph 0025 shows that these panels can be used in aircraft.

51 I have given this some careful consideration and believe that GOMBERT shows that the nominal claim 1 lacks novelty.

52 The citation of BARON is of fundamental importance to the novelty of the application. As can be seen from the specification it clearly relates to an energy storage device in the form of a capacitor that can be disposed throughout the structural surfaces of the aircraft. I note also that the specification makes it clear from Column 1 Line 52 – Column 2 Line 15 that the capacitors are located on conventional aircraft surfaces such as the wing or tail surfaces. The Capacitors can easily be integrated into the airframe and can also be integrated into composite materials of the aircraft.

53 Mr Van Leeuw pointed out that the material being used in BARON appeared to be a woven fabric and hence not the same as his application. Whilst this is certainly true of the specific embodiment, it does not take into account the disclosures at column 5 and column 8. At line 38-47 of Column 5 it is made clear that any capacitor needs to withstand the shear and bending forces at various points in an aircraft frame and to do this there are two types of capacitor are possible for use in such an environment, a cylindrical capacitor and more importantly for this application, a parallel plate capacitor.

54 At column 8 line 12-37 the author discusses how to form a parallel plate capacitor and refers to a laminated structural system of metal and dielectric material where the metal used is aluminium. They then refer to structural precedents of laminating aluminium to impregnated Kevlar^{RTM} whilst under tension. This material appears to be known as “Arall^{RTM}” which though not known for its structural uses is often selected for toughness. BARON then goes on to suggest laminating the aluminium to Kapton^{RTM}, which would need to be reinforced with fibres to maintain a structural integrity. I consider that this discussion identifies a multi-layered capacitor for use in an aerospace vehicle and as such shows the nominal claim 1 to lack novelty.

55 DOWGIALLO concerns a high performance multi-layered capacitor comprising alternating layers of conductor and dielectric. As the examiner has pointed out in his report, paragraph 0083 makes it clear that the capacitor can be used in a manner that serves both a mechanical and an energy storage function such as in a wing or fuselage amongst others. On this basis I conclude that it meets the requirements of the nominal claim 1.

56 The final citation is that of PEARSON which is directed to a parawing capacitor to be used in an endurance aircraft. This is perhaps best understood by looking at Fig 9 which shows how the wing is constructed as a solid laminate capacitor with layers of solar cells (174, 172), metal foils, (170, 173) and a dielectric (176) between the two metal foils. As this is part of the wing it clearly has a structural function and therefore it too would show the nominal claim 1 to be anticipated.

57 In summary, I find that the nominal claim 1 lacks novelty in the light of GOMBERT, BARON, DOWGIALLO and PEARSON.

Inventive Step

58 In case I am wrong about the novelty of the nominal claim I must also consider whether it involves an inventive step. Section 1(1) of the Patents Act 1977 ("the Act") states:

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) the invention is new;
*(b**) it involves an inventive step;***
(c) it is capable of industrial application;
(d) the grant of a patent for it is not excluded by subsections (2) and (3) or section 4A below; and references in this Act to a patentable invention shall be construed accordingly.

59 Section 3 of the Act states:

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).

60 In *Windsurfing International Inc. v Tabur Marine (Great Britain) Ltd*[3], the Court of Appeal 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 SPA v BDMO SA*[4] where 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 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?

Step 1(a) – The "person skilled in the art"

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[4] *Windsurfing International Inc. v Tabur Marine (Great Britain) Ltd*, [1985] RPC 49 [9] *Pozzoli SPA v BDMO SA* [2007] EWCA Civ 588

61 In this particular application identifying the skilled man raises some difficulties given that the application is directed to two very specific fields of technology, namely aerospace and capacitor construction.

62 However, it is well-known principle in patent law that the skilled person can be a team of people who work together. It goes without saying that Identifying that team is not always an easy task.

63 From the teachings in case law it is necessary to consider the art in which the problem lay. On that basis the problem the applicant seeks to solve is one of manufacturing a capacitor panel for use in an aerospace vehicle.

64 There are clearly two partners in this endeavour, the capacitor engineer and the aerospace engineer. Viewed from the point of the aerospace engineer, they would know that capacitor panels are not uncommon in the aerospace industry and would seek the assistance of the capacitor engineer. Viewed from the other party, the capacitor engineer would know that one use for a panel capacitor is in the aerospace industry and would seek advice from them on how to construct it. On this basis I think it right that the skilled person is a nominal team comprising both a capacitor engineer and an aerospace engineer.

Step 1(b) – The "common general knowledge"

65 What then is their common general knowledge? I believe the aerospace engineer would be familiar with aspects of designing and constructing aerospace vehicles and be aware of the materials they could use. The capacitor engineer would bring his skills in designing flat panel capacitors and the materials they use for the charge storing plates and the dielectrics.

Step 2 – "Identify the inventive concept"

66 What then is the inventive concept of the claim? Based on the nominal claim set out earlier in this decision I believe it is a multi-layered capacitor that can be used as both an energy storage device and as a structural component in an aerospace vehicle.

Step 3 – "Identify the Differences between the State of the Art and the inventive Concept"

67 The next question is to consider the matter cited as forming the "state of the art". I have already discussed the citations attributed to BARON, GOMPERT, DOWGIALLO and PEARSON. All make it clear that the use of capacitors in aircraft (an aerospace vehicle) is well known. They also to my mind indicate that it is known that they can form a structural component, eg a wing or other part of an aerospace vehicle such as an aircraft.

68 The Examiner has also indicated a further four documents that he consider exemplify the state of the art:

US 2001/0022718	APPELT
US 7864505	O'BRIEN
US 2005/242997	DUNN

69 I do not propose to go into these documents in detail suffice to say that each shows in varying degrees of detail the construction of a laminated capacitor having metallic sheets separated by various dielectrics.

70 From this I must determine what the differences are between the claimed invention as represented by the nominal claim and the matter cited as forming part of "the state of the art". In my view, there does not appear to be any differences.

Step 4 – Do the differences require any degree of invention by the skilled person?

71 I have been unable to identify any differences between the inventive concept of the claims and the state of the art. It follows that the nominal claim is considered to be obvious to the skilled person.

72 If there is anything that is different it may lay in the materials being used which would affect the inventiveness of the claims 3 and 4.

73 Claim 3 refers to reinforcing the adhesive polymer layer with rigid fibres made of carbon, glass, a metal or an alloy. The specification in BARON refers to KAPTON^{RTM} and Kevlar^{RTM}. BARON also refers to the potential use of ARALL^{RTM} which has since been superceded by GLARE$^{RTM.}$ Both are considered as fibre reinforced laminate materials[5]. The skilled man would as a result and given their knowledge of materials, require no inventive ingenuity to use rigid fibres to provide the required reinforcement.

74 Turning to Claim 4, aluminium is clearly well known in the manufacture of capacitors. On this basis though the specifications in some instance refer to aluminium I do not see it as being inventive.

Conclusion

75 I have come to the view that the claims of the application:

a) Lack novelty or an inventive step contrary to Section 1(1)a and 1(1)(b) of the Act.

b) Incorporate added subject matter contrary to Section 76 of the Act

c) Are not clear contrary to section 14(5)(b) of the Act

d) The Trade Mark GLARE^{RTM} used in the claims is not permissible in its current form.

Furthermore,

e) That the Trade Mark GLARE^{RTM} in the specification is not acknowledged contrary to Section 14(3) of the Act.

[5] http://www.sciencedirect.com/science/article/pii/S0261306911001671

Possible Amendments

76 I have carefully considered whether there are any amendments that can be made to the claims that would result in a grantable patent. In respect of this application that would mean that the amendments avoid the issue of added matter, are clear and concise and avoid any issues with any Trade Marks. It goes without saying that they should be novel and inventive.

77 In this regard I afford the applicant an opportunity to amend and I remit the application back to the Examiner for further consideration.

78 I would remind Mr Van Leeuw that he needs to submit amendments for consideration by the Examiner to further process this application towards possible grant. Should the amendments not place the application in order by the extended compliance date17th December 2016 then the application will be refused for failing to comply with section 18(3).

Appeal

79 Any appeal must be lodged within 28 days

Dr C L Davies

Deputy Director, acting for the Comptroller