Intellectual Property Office

BL O/406/15

27 August 2015

PATENTS ACT 1977

APPLICANT Graphenex UK Limited

ISSUE Whether patent application GB1313353.3 complies with Section 14(5) of the Patents Act 1977

HEARING OFFICER Peter Slater

DECISION

Introduction

1 Patent application GB1313353.3 ('the application') is entitled 'Hexagonal supercapacitor'. It was filed on 26 July 2013. It was subsequently published as GB2502904 on 11 December 2013. The application makes no claim to an earlier priority date. The compliance period ends on 26 January 2018.

2 During several rounds of correspondence between the examiner (Mr Thomas Britland) and the applicant, the examiner maintained the view that the claims are unclear and not sufficiently supported by the description. The applicant disagrees.

3 With the position unresolved, the applicant asked to be heard and a hearing was arranged for Tuesday 30 June 2015. In a letter dated 26 June 2015, the applicant requested that the hearing go ahead in his absence. Hence this decision has been established on the basis of the papers currently on file.

The application

4 The invention relates generally to the construction of so-called *"Supercapacitors"*, a well known type of electrochemical capacitor characterised by their high capacity, their rapid charging/discharging rates and their use of electrodes with a very high specific surface area. Their electrodes are commonly made from nano-composite materials such as activated carbon, graphite, graphene or carbon nanotubes.

5 The specification discloses an arrangement of a hexagonal supercapacitor and an array of interconnected hexagonal supercapacitors which may be provided with cooling channels therebetween. Each hexagonal supercapacitor being provided with threaded inserts (3, in Figure 1) to be used with threaded conductive links (4, in Figure 1) to allow the electrical interconnection of the individual hexagonal supercapacitors.

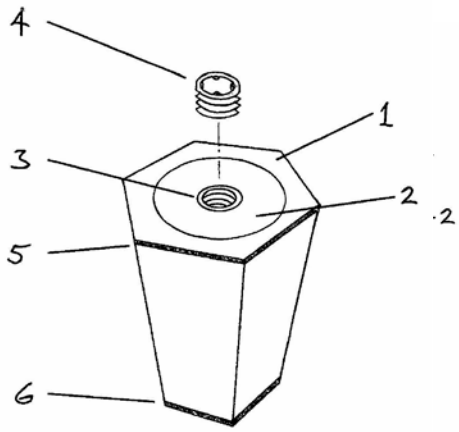

Fig 1

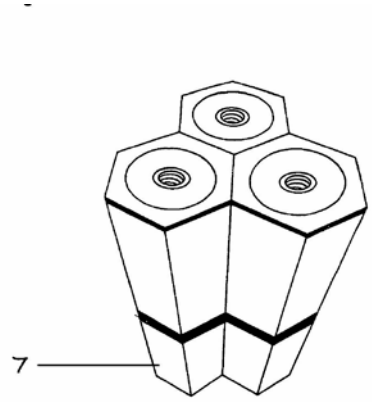

Fig 2

6 The laterally interconnected hexagonal supercapacitors may also be stacked vertically (see Figure 2, reproduced above).

7 The application states that an array of hexagonal supercapacitors requires less storage space than a similar arrangement of cylindrical supercapacitors (see Fig 3 from the application reproduced below).

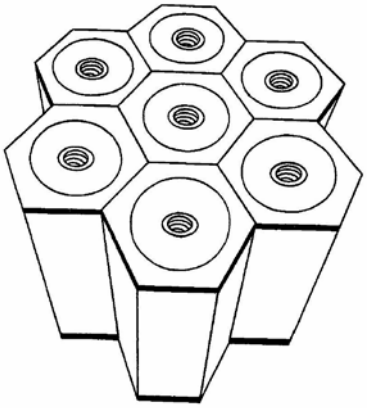

Fig 3

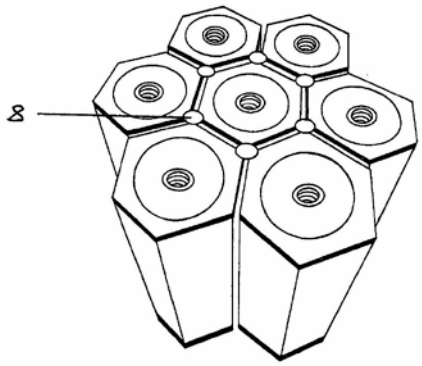

Fig 4

8 Additionally, the description of the invention states that using an array of hexagonal capacitors allows cooling channels (referred to as “zig zag cooling channels, 8”) to be formed between the rigid outer cases of adjacent hexagonal supercapacitors (see Fig 4 from the application reproduced above).

9 The eleven claims provided on the filing date of the application have not been amended during the examination process. There is one independent claim, which reads:

> *1. The present invention proposes to rely upon maximizing all of the internal surface areas of the device which includes all of the internal faces of the*

hexagonal case as well as the internal faces of the insulated end caps with a combination of one or more Nano composite materials, electrically conducting binders arranged in one or more configurations and a dielectric or dielectrics within the case of Hexagonal Supercapacitors to provide a practical, safe and efficient method of storing large amounts of electrical energy the likes of which would be comparable with the stored energy of a conventional chemical battery, the invention would also provide a large energy storing device or devices when connected together which can be charged and discharged in excess of 500,000 times without any deterioration in performance, the performance of the device is further enhanced by incorporating a carefully controlled zigzag cooling system which maintains an optimum temperature of the Hexagonal Supercapacitors in order to maximise its large storage capacity.

The law

10 The sections of the Patents Act 1977 ('the Act') considered in this decision are set out below. The relevant parts have been highlighted in bold.

11 Section 14 of the Act sets out the requirements that need to be met by a patent application. Section 14(5) relates to the claims and reads:

Section 14(5)

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.

Argument and analysis

12 The examiner's objections are as set out in his examination reports of 12 September 2013 and March 2014, and are usefully summarised in his pre-hearing report of 24 March 2014. The applicant's arguments are contained in his response of 23 September 2013 and 10 March 2014 respectively.

13 Whilst I do not intend to repeat the examiners objections or the applicants arguments here in their entirety, I nevertheless think it is useful to include the summary set out in the pre-hearing report of 24th March 2014 as follows:

"Summary of the objections

Clarity and Support

I consider that the claims are not clear and lack support. Claim 1 does not comprise a list of essential technical features of a hexagonal supercapacitor but instead it states that the invention "proposes to rely upon" maximising the internal surface area of a device such that a series of purported advantages can be obtained. Claim 1 also lacks clarity in how the device of the invention

is formed in such a way as to achieve the stated advantages (e.g. discharging and recharging in excess of 500,000 times without degradation). It is also unclear whether claim 1 is meant to define a single supercapacitor or an array of supercapacitors which provides a zigzag cooling path. The dependent claims also contain results achieved by the invention with no reference to the technical features which are required to achieve the result (e.g. "would have the means of storing and retaining very large amounts of electrical energy within a very small space of time" as in claim 6). Some dependent claims also contain wording issues regarding the scope of said claims which need to be clarified (e.g. "where the arrangement is coaxial" as in claims 5, and previously highlighted issues with claims 8 & 10).

Claim 1 also lacks support for how the internal surfaces are maximised or how the invention achieves the advantageous results. There is no information provided regarding how the "nano composites", "conducting binders" and "dielectrics" are arranged. Claim 3 is also not supported by the description.

Summary of applicant's arguments

Your first response, dated 23 September 2013, argued against the points made in my first examination report of 11 September 2013. You said that the invention was clear and supported as any "Scientist or Electrical Engineer of Consultant level" could understand the concept, principles and features of the invention. You further stated that the claims containing results achieved by the invention without the necessary technical features were also allowable. You said that the meaning of claim 8 is clear regardless of the wording present. You finally stated that claim 10 referred to all methods listed in the claims.

The above represents merely a summary of the relevant objections and arguments considered thus far and is not complete. This report is intended to be considered along with all the relevant examination reports, letters and email correspondence."

14 Whilst I have some sympathy with the applicant who is obviously someone of considerable knowledge in his field, having considered the documents before me in some detail, I would have to say that I agree with the examiner. The invention as currently defined in claim 1 is unclear as there is no indication of how the combination of "nano-composites", "dielectrics" and "binders" are to be put together to achieve the invention. A person skilled in the art would not be able to work the invention as currently defined as the meaning of the claim is ambiguous even when taken in light of the description.

15 There are also significant issues of clarity throughout the claims which need to be rectified before the application can proceed further. As the examiner quite rightly points out, the claims must be drafted in terms of the technical features of the invention and should not contain any statements relating, for example, to commercial advantages or other non-technical matters. Statements of purpose or advantage should wherever possible be removed as they tend to cast doubt upon the scope of the claims. For example, the statement in claim 1 which says that the hexagonal supercapacitors would "*provide a practical, safe and efficient method of storing large amounts of electrical energy the likes of which would be comparable with the stored*

energy of a conventional chemical battery, the invention would also provide a large energy storing device or devices when connected together which can be charged and discharged in excess of 500,000 times without any deterioration in performance" is unclear as it contains numerous references to the advantages associated with the invention and no indication of the technical features required to achieve those advantages. Furthermore, it relies for its definition on a comparison with a *"conventional chemical battery"* without ever having defined what is meant by this term and contains undefined relative terms such as "large" which should be avoided.

16 The dependent claims also contain results achieved by the invention with no reference to the technical features which are required to achieve those results, for example, the statement in claim 6 which says that the supercapacitor *"would have the means of storing and retaining very large amounts of electrical energy within a very small space of time"* is as equally unclear as that in claim 1.

17 I would say that I have no problem with the applicant's use of such terms as "supercapacitor" or "nano-composite" material as these would appear to be terms of art. However, wherever possible, the purpose of the invention, its associated applications and advantages over the prior-art should be confined to the description.

18 Furthermore, I would regard claim 3 as a good example of a claim which includes features which are not supported by the description. The wording of the claim refers to over voltage and over temperature protection circuits which are not mentioned in the body of the description and hence the claim is invalid for lack of support. The easiest way to rectify this specific issue would be to make mention of these features in the description.

19 I am conscious, that I am not here to re-examine the application but to determine whether the examiner's objections are well founded which they are. The deficiencies I have highlighted above serve to justify my conclusion but are not intended to be an exhaustive list of those issues which need to be addressed by the applicant before the application can proceed further. If the applicant is to pursue his application he will have to revisit the previous examination reports and address the objections appropriately. In so doing, I would encourage the applicant to take up the examiner's offer of a telephone discussion as this may be the best way to proceed.

Conclusion

20 I have found that the claims as currently worded are not clear and are not adequately supported by the description and therefore do not comply with Section 14(5)(b) and (c) of the Patents Act 1977.

21 Given that the applicant has yet to make a *bona fide* attempt to amend the application to address the examiner's objections, seems reluctant to do so, and has failed to take up the examiner's offer of a telephone discussion, I am minded to refuse the application.

22 However, I would have to say that there is ample subject matter which could form the basis of a patentable invention should the applicant be willing to address the examiners objections. Indeed, there is clearly sufficient disclosure in the specification and the accompanying drawings to draft a claim to a hexagonal supercapacitor or

preferably an array of hexagonal supercapacitors arranged as in figures 1-4 of the specification as filed and the corresponding paragraphs of the description at the foot of page 2 and top of page 3 headed “Detailed description”.

23 I will therefore give the applicant a further two months from the date of this decision to file amendments to address the examiner’s objections, should he take me up on this offer, then I will remit the application to the examiner for further consideration. If the applicant fails to do so, I will deem the application to have been refused under 18(3) for failure to comply with the requirements of section 14(5) of the Act.

Appeal

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

P R Slater

Deputy Director, acting for the Comptroller