

the mass–energy equivalence formula $E=mc^2$) which then make up the claims. The description does not discuss any apparatus which would be used to put the invention into effect, nor equivalent steps of a methodology or technical problems which these formulas seek to address.

- 6 There are five claims which respectively define a method of calculating potential energy in substances, a method of calculating potential energy in light, a method of creating timeless condition, a method of creating reverse time for substances and a method of creating reverse time for light. In each claim there then follows an equation which is said to show the method and a definition of the variables; nothing more. The formula in claim 1 reads as follows:

$$E = \sum_{k=1}^T m_1 c_1 (1 - T_k/T)^2 \quad (1 \leq K \leq T)$$

- 7 In this equation E is defined as the potential energy in a substance, T is time the substance passes under no gravity, m_1 is mass (at its initial value), c_1 is velocity of light (at its initial value) and T_k is time the substance has passed under no gravity. The formula in each of the remaining claims is different but I do not believe this to be material to the questions before me so I have not reproduced them here.

The law

- 8 Section 1(1) set out conditions which an application must meet in order for a patent to be granted as follows (emphasis added):

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.

- 9 In seeking to argue that the application is capable of industrial application the applicant quotes large parts of section 4 of the Manual of Patent Practice including the summary of the Decision of the Supreme Court in *Human Genome Sciences v Eli Lilly*¹. In this decision the Supreme Court summarized the approach to be followed when considering whether an invention is capable of industrial application in a set of fifteen points. The general principles set out in the first four points apply to any application. These points are as follows:

i) The patent must disclose “a practical application” and “some profitable use” for the claimed substance, so that the ensuing monopoly “can be expected [to lead to] some ... commercial benefit”;

¹ Human Genome Sciences v Eli Lilly [2011] UKSC 51, [2012] RPC 6

ii) A “concrete benefit”, namely the invention’s “use ... in industrial practice” must be “derivable directly from the description”, coupled with common general knowledge;

iii) A merely “speculative” use will not suffice, so “a vague and speculative indication of possible objectives that might or might not be achievable” will not do;

iv) A patent and common general knowledge must enable the skilled person “to reproduce” or “exploit” the claimed invention without “undue burden”, or having to carry out “a research programme”;

- 10 Following on from section 1(1)(d), section 1(2) declares that certain things are not inventions for the purposes of the Act, as follows (emphasis added):

It is hereby declared that the following (among other things) are not inventions for the purposes of this Act, that is to say, anything which consists of -

(a) a discovery, a scientific theory or mathematical method;

(b) a literary, dramatic, musical or artistic work or any other aesthetic creation whatsoever;

(c) a scheme, rule or method for performing a mental act, playing a game or doing business, or a program for a computer;

(d) the presentation of information;

but the foregoing provision shall prevent anything from being treated as an invention for the purpose of this Act only to the extent that a patent or application for a patent relates to that thing as such.

- 11 The provision of section 1(2) has been the subject of regular consideration by the UK courts. The assessment of patentability under section 1(2) is governed by the judgment of the Court of Appeal in *Aerotel*², as further interpreted by its judgment in *Symbian*³. In *Aerotel*, the court reviewed the case law on the interpretation of section 1(2) and approved a four-step test for the assessment of “excluded matter”. Those steps are:

i. properly construe the claim;

ii. identify the actual/alleged contribution;

iii. ask whether the identified contribution falls solely within the excluded subject matter;

iv. check whether the actual or alleged contribution is actually technical in nature.

- 12 In its judgment in *Symbian* the Court made clear that the *Aerotel* test is not intended to provide a departure from the previous requirement set out in case law, namely that the invention must provide a “technical contribution” if it is not to fall within excluded matter. Thus in deciding whether the invention is excluded as a program for a computer as such I must ask whether it makes a technical contribution (though it does not matter whether I do that at step 3 or step 4).

² *Aerotel Ltd v Telco Holdings Ltd and Macrossan’s Application* [2006] EWCA Civ 1371, [2007] RPC 7

³ *Symbian Ltd’s Application* [2008] EWCA Civ 1066, [2009] RPC 1

Arguments and analysis

- 13 I will first consider whether the invention is excluded as a scientific theory or mathematical method by following the four-step approach as laid down in *Aerotel*:

Properly construe the claim

- 14 The examiner construes claims 1 and 2 as defining a method of calculating energy of a substance or light respectively based on theoretical equations. He states that claim 3 defines a method of creating a timeless condition by calculating energy of a substance or light and that claims 4 and 5 define a method of creating reverse time for substances or light (also based on theoretical equations).
- 15 The applicant objects to these characterisations but does not provide an alternative construction of the claims.
- 16 I construe the claims as defining methods of calculating potential energy, creating a timeless condition and creating reverse time with reference to mathematical formulas.

Identify the actual or alleged contribution

- 17 In this case it is the alleged contribution as no search has been performed. At paragraph 43 of *Aerotel*, the Court of Appeal rightly recognised this step as being more problematical as it involves an exercise of judgment *“probably involving the problem said to be solved, how the invention works, what its advantages are.”* The Court also said that the formulation of the contribution involves looking at the substance of the invention and not the form.
- 18 The examiner concludes that the contribution of claims 1 and 2 is *“no more than performing this calculation to obtain a theoretical value of energy”*. They also conclude that the contribution in claims 3, 4 and 5 relate to *“...completely abstract concepts and can only be considered as scientific theories”*.
- 19 The applicant disagrees, insisting that their invention relates to a practical application of the mathematical function and not merely a mathematical method or scientific theory. The applicant goes on to draw upon dictionary definitions of selected terms used in the objection to assert the examiner is wrong. Again, the applicant does not propose an alternative contribution but asserts that the contributions are to methods of calculating potential energy, creating a timeless condition and creating reverse time.
- 20 Whilst the form of each of the claims is to an alleged application of the respective formula (being methods of calculating potential energy, creating a timeless condition and creating reverse time) the specification does not elaborate on the problem said to be solved, how the invention works and what its advantages are. Instead it details the derivation of the formulas in each claim. Therefore, I conclude that the alleged contribution provided by each of claims 1 to 5 lies in using the mathematical formulas in an undisclosed way to achieve theoretical results.

Ask whether the identified contribution falls solely within the excluded matter/ Check whether the contribution is actually technical in nature

- 21 The examiner considers that claims 1 and 2 relate to no more than a scientific theory for calculating energy and claims 3 to 5 are completely abstract concepts which can only be considered as scientific theories.
- 22 As above the applicant disagrees because they view the contribution as being to methods of calculating potential energy, creating a timeless condition and creating reverse time and not merely the mathematical method nor scientific theory.
- 23 It follows from my considerations above that the contribution of each claim lies in the use of mathematical formula in an undisclosed way to achieve a theoretical result that this falls solely within the excluded matter as a scientific theory and/or mathematical method.
- 24 There is nothing in the application to suggest that the contribution is technical in nature. I therefore conclude that the invention defined in each of the claims is excluded as a scientific theory and/or mathematical method as such under section 1(2)(a).

Industrial Application

- 25 For completeness I will now consider the question of whether or not the application is capable of industrial application.
- 26 The examiner objects that the claims are not capable of industrial application as they only define a mathematical equation or calculation to obtain a theoretical value.
- 27 Again the applicant disagrees asserting that the application is capable of industrial application insisting that as the claims are directed to methods of calculating potential energy, creating timeless condition and creating reverse time they are not merely the mathematical method nor scientific theory. In support of this assertion section 4 of the Manual of Patent Practice is heavily quoted, with sections underlined, which the applicant uses to support their conclusions.
- 28 In order to decide this point I have considered the first four points set out in *Human Genome Sciences v Eli Lilly* given above. As I say above the specification does not elaborate on the problem said to be solved, how the invention works and what its advantages are. The definition in the claims that the formulae are intended to be used to calculate potential energy, create timeless condition and create reverse time are therefore at best “a vague and speculative indication of possible objectives that might or might not be achievable” as the specification and common general knowledge do not enable the skilled person “to reproduce” or “exploit” the claimed invention without “undue burden”. I therefore conclude that the invention does not meet the requirement of section 1(1)(c) of being capable of industrial application.

Conclusion

- 29 I find that the invention claimed is excluded under section 1(2)(a) of the Act as it relates to a scientific theory or mathematical method as such. I also find that the invention is not capable of industrial application as required by section 1(1)(c) .
- 30 Having reviewed the specification I do not consider that any saving amendment is possible. I therefore refuse the application under section 18(3).

Appeal

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

J Pullen

Deputy Director, acting for the Comptroller