

PATENTS ACT 1977

APPLICANT Forensic Science Service Limited

ISSUE Whether patent application GB 0818032.5 complies
with section 1(2)

HEARING OFFICER J Pullen

DECISION

Introduction

1. International patent application PCT/GB2007/001125 was filed on 28 March 2007 with a declared priority date of 3 April 2006 in the name of Forensic Science Service Limited. It was published as WO 2007/113490 A1, entered the GB national phase as patent application GB 0818032.5 and was then republished as GB2450443 A.
2. There were several rounds of correspondence between the examiner and the applicant's representative. Although objections to the lack of inventiveness of the claims had been overcome, the examiner maintained throughout the examination process that the claimed invention was excluded from patentability in that it relates to a mental act, a mathematical model and a program for a computer as such. No agreement could be reached and the matter came before me at a hearing on 5 January 2012 at which the applicant was represented by Mr Neil Pawlyn of the firm Urquhart-Dykes & Lord LLP. Also present were the examiner, Mr Philip Mountjoy and my assistant, Mrs Nicola Payne.

The application

3. The application relates to a method of analysing samples containing mixed source DNA. The applicant has developed a software product, PENDULUM, which analyses DNA profiles from mixed sources to establish mixing proportions for the sources and establish likely genotypes for the source. Such information is useful in a variety of legal and law enforcement applications.
4. The claims I was asked to consider at hearing were filed on 8 August 2011. There are 24 claims in total, of which claim 1 is the only independent claim. It reads:

A method of analysing mixed source DNA samples, the method including:

- (i) analysing a DNA containing sample to provide a value set, the value set relating to one of more allele identities as the characteristic of the DNA for one or more loci of DNA;
- (ii) obtaining from the analysis of the DNA containing sample an observed result, the observed result relating to the value set provided by the analysis;
- (iii) randomly selecting a value set, thereby obtaining a selected value set, the selected value set relating to one of more allele identities for one or more loci of DNA and generating an expected result from that selected value set;
- (iv) comparing the observed result and the expected result and quantifying the difference there between;
- (v) considering the selected value set to be the optimal match for the value set for the DNA of the DNA containing sample;
- (vi) randomly selecting a different value set, thereby obtaining another selected values set and generating another expected result from that another selected value set;
- (vii) comparing the observed result with the another expected result and quantifying the difference there between;
- (viii) replacing the existing value set considered to be the optimal match with the different selected value set of step vi) if a criteria is met, the criteria being that the difference between the observed result and the another result is less than for the existing optimal match;
- (ix) repeating steps vi), vii) and viii) at least 10 times;

the last optimal match being taken to be the optimal match for the value set for the DNA of the DNA containing sample.

It is on this version of claim 1 that I have based my decision.

The law

5. The examiner has raised objection under sections 1(1)(d) and 1(2)(a) and (c) of the Patents Act 1977 that the invention is not patentable because it relates to a mathematical model, a mental act and a program for a computer as such; the relevant provisions of this section of the Act are shown below:

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)...
- (b)...
- (c)...
- (d) the grant of a patent for it is not excluded by subsections (2) and (3) or section 4A below.

1(2) 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, scientific theory or mathematical method;
- (b) ...
- (c) a scheme, rule or method for performing a mental act, playing a game or doing business, or a program for a computer;
- (d) ...

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

6. The Court of Appeal in its judgment in *Aerotel/Macrossan*¹ made it clear that whether an invention covers patentable subject matter is a question of law which should be decided during prosecution of the patent application. It is not a question on which applicants are entitled to the benefit of the doubt. The requirements for patentability set out in section 1(1) should be considered using a “four step approach”, set out as follows:

- 1) properly construe the claim;*
- 2) identify the actual contribution;*
- 3) ask whether it falls solely within the excluded subject matter;*
- 4) check whether the actual or alleged contribution is actually technical in nature.*

7. The Court held that this approach was consistent with previous decisions, and was a re-formulation in a different order of the *Fujitsu*² and *Merrill Lynch*³ tests. In the case of *Symbian*⁴ the Court of Appeal confirmed that the intention of this approach is to be equivalent to the prior case law test of “technical contribution”. It is this approach that I am bound to use when assessing the present application. There was no disagreement from Mr Pawlyn on the use of this approach.

¹ *Aerotel Ltd v Telco Holdings Ltd & Ors* Rev 1 [2007] RPC 7

² *Fujitsu Limited's Application* [1997] RPC 608

³ *Merrill Lynch's Application* (1989)[1989] RPC 561

⁴ *Symbian Ltd's Application* [2008] EWCA Civ 1006, [2009] RPC 1

Arguments and analysis

1) Properly construe the claim

8. There has been little disagreement about the construction of the claim. I am in broad agreement with the construction of claim 1 offered by Mr Pawlyn at the hearing. This can be summarised as:

A method of analysing mixed source DNA containing samples starting with an actual physical analysis step which results in an output indicative of the content of the sample. The sample can come from two or more persons and the mixing proportions can vary. In order to more clearly understand the output and decide what DNA is actually included in the sample and in what proportions the output of the analysis is subjected to a further iterative analysis which involves creating simulated outputs where the contributory factors are known and comparing these to the actual output to see if they match. Each time a better match is acquired this is assumed to be the best match. The method continues until the optimum explanation of the output is acquired.

2) Identify the actual contribution

9. I must now identify the contribution the invention makes to the art. It is this step of the process which has caused the most disagreement. The examiner has contended throughout the examination process that the contribution lies in an improvement made to the PENDULUM computer program and that the actual contribution of the invention includes steps which only relate to excluded subject matter.
10. Mr Pawlyn contends that the examiner's analysis of the contribution is too narrow and focuses on what is new rather than the contribution as whole. During the hearing Mr Pawlyn summarised the contribution as being

'An improved method for analysing a mixed source DNA containing sample, to resolve the sample into its component parts by physically analysing the sample and then comparing the physical analysis to simulations where the component parts are known so that you reveal what is in the sample.'

11. In contrast to the examiner, Mr Pawlyn contends that the physical analysis step "tethers" the method to the real world and clearly should be included as part of the overall contribution. Mr Pawlyn referred to the previous Office decisions which discuss "tethering" is discussed, namely Waters Investment Ltd's Application⁵, WesternGeco Limited's Application⁶ and Forensic Science Service Limited's Application⁷ (Forensic A).

⁵ Waters Investment Ltd's Application BL/O/146/07

⁶ WesternGeco Limited's Application BL/O/135/07

⁷ Forensic Science Service Limited's Application BL/O/117/10

12. It is at this point I feel it would be helpful to turn to these previous decisions along with Forensic Science Service Limited's Application⁸ (Forensic B).
13. Waters is presented in detail at paragraph 1.17.2 of the Office's Manual of Patent Practice⁹. Its main claim is related to a method of analysing the characteristics of samples which were subject to chromatographic and spectrometric analysis techniques. Physical analysis steps were included in the method followed by a particular sequence of data analysis techniques. The hearing officer found that although the claimed method included steps that could be excluded from patentability, when viewed as a whole the inventors had contributed a better way of analysing the samples using chromatographic and spectrographic techniques in order to identify significant events in a mass of complex data more easily and thus the contribution did not reside solely in excluded matter.
14. WesternGeco relates to a method of processing seismic or other geophysical data. The contribution was seen to reside in the precise method of processing the geophysical data. Claim 1 was considered to be excluded from patentability as it related solely to a mathematical method. The specified functions and parameters were not considered to have significance beyond the mere abstract manipulation of data. The relevance of this decision resides in the patentability of dependant claim 14. Claim 14 included the additional step of determining one of more parameters relating to physical properties of the earth's interior surface from the processed geophysical data. The inclusion of this step was considered to alter the patentability of the claim as the contribution could no longer be said to fall wholly within the excluded field of a mathematical method.
15. Forensic A relates to a method of modelling a process of analysing DNA in a biological sample and subsequently optimising various parameters of the process. The hearing officer found the claim to be allowable as the contribution included steps that did not fall within the excluded matter categories. The contribution was seen to be an improved chemical process for considering a DNA containing sample, which happens to include as a key component a computer model to derive certain parameters for optimising the chemical process. In this case it is paramount to note that the results of the data processing steps are fed back into the actual chemical processing. The method allows the chemical process to be optimised which results in an improved DNA analysis.
16. In Forensic B the claim related to a method of searching a computer database to find a match for one or more DNA profiles obtained via physical analysis of a sample. Whilst the hearing officer considered Waters in deciding this case he did not feel it was helpful in deciding whether the invention of claim 1 was excluded. In making his decision he stated "I have to consider the present invention on its own terms in order to identify what the inventor has really added to human knowledge and to determine whether the contribution lies solely in the excluded fields." He went on to contrast the two cases deciding that whereas in Waters the physical analysis and the data processing are steps in the analysis of

⁸ Forensic Science Service Limited's Application BL/O/386/11

⁹ <http://www.ipo.gov.uk/practice-sec-001.pdf>

the sample so as to achieve the result, in Forensic B although the search profile is generated by analysing a DNA containing sample the claim as a whole is not about physical analysis of the sample, rather the whole claim relates to determining whether there is a match between the analysed sample and a sample stored in a database. The contribution in Forensic B was therefore concluded to lie in the field of data processing and thus fall solely within the excluded fields.

17. Unlike Waters the invention as claimed does not provide a better physical analysis, and unlike Forensic A the information gained from the subsequent computerised analysis of results of the physical analysis is not in any way fed back into the original physical analysis step.
18. Having considered these previous decisions I now need to decide where the contribution lies in the present case. Before I turn to the actual contribution in this instance it is I believe useful to reiterate that in Aerotel/Macrossan, the Court of Appeal sought to provide guidance on how the actual contribution should be identified. It noted that :

“It is an exercise in judgment probably involving the problem said to be solved, how the invention works, what its advantages are. What has the inventor really added to human knowledge perhaps best sums up the exercise. The formulation involves looking at substance not form-which is surely what the legislator intended ”
19. It would appear to me that the problem to be solved is the resolution of the output of the physical analysis step of a mixed source DNA sample. One stated aim of the invention is to ‘provide an alternative approach which reduces the computational burden to acceptable levels’. The invention does this by using ‘a different approach to solving large combinatorial optimisation problems’ instead of just working through all of the possibilities and ‘rather than exhaustively examine all genotype combinations, an heuristic approach, potentially using Monte Carlo techniques, is taken to find the best combination of contributor profiles.’ .
20. As set out in the specification one advantage is the reduced computational burden. I accept this and consequently that the invention most likely reduces the time and cost of producing an optimal analysis. But that is all that the invention has really contributed to human knowledge. The invention utilises the same mixed DNA source sample and will produce the same results as the methods currently known in the prior art. If both the method of the invention and an existing method were performed side-by-side, the method set out in the application would provide the output data first but it would be the same data as that which is eventually produced by the prior art method. Hence the contribution here as a matter of substance lies solely in how the data is produced, notwithstanding that the invention as claimed has been amended to be ‘tethered’ to use in a real world application.

3) Ask whether it falls solely within the excluded subject matter

21. The third step in the Aerotel/Macrossan approach is to decide whether that contribution resides solely in excluded matter. The contribution I have identified lies entirely in the field of data processing and is thus excluded from patentability as it is a computer program as such.

22. As I have found that the invention is excluded as a computer program, I do not need to consider the mental act or mathematical model objections. However, given the recent judgement handed down in Haliburton¹⁰ regarding the correct scope of the mental act exclusion in the 1977 Act I feel it would be pertinent to briefly discuss this matter.

23. Mr Pawlyn was keen to point out that the method is implemented by a computer as human intervention would introduce selection bias into the method which for the veracity of the results needs to be avoided and computational burden. Following the judgement handed down in Halliburton the correct scope of the mental act exclusion is the narrow one. The purpose of the exclusion is to make sure that patent claims cannot be performed by purely mental means and nothing more. I am happy that the present contribution is not a mental act and therefore cannot be excluded as such.

4) Check whether the actual or alleged contribution is actually technical in nature

24. I have found that the contribution lies wholly in the field of data processing and I cannot find a technical contribution. In this case the inclusion in the claim of a step which attempts to 'tether' the invention to a real world use does little more than change the form of the claim rather than its substance. The claimed invention is therefore excluded from patentability.

Proposed amendment

25. At the hearing Mr Pawlyn requested that if I was minded to refuse the claims as they stand then I consider a clarifying amendment to step x) claim 1. This amendment which is supported at page 5 paragraph 2 reads:

(x) the last optimal match being taken to be the optimal match for the value set for the DNA of the DNA containing sample, thereby detailing one of more alleles for one or more contributors, to the mixed source DNA containing sample, at one of more loci.

26. Mr Pawlyn stated that the purpose of this statement was to announce rather than infer the result of the analysis thereby further tethering the method to a real result. I do not feel this amendment alters the contribution of the claim and therefore does not take the claims outside the excluded matter fields. An amendment of this form would not save the claim.

¹⁰ Haliburton's Applications [2011] EWHC 2508 (Pat)

Conclusion

27. I find that the application is excluded under section 1(2) as relating to a computer program. I also find that there are no possible amendments to allow the application to progress to grant and therefore refuse it.

Appeal

28. Under the Practice Direction to Part 52 of the Civil Procedure Rules, any appeal must be lodged within 28 days.

J Pullen

Deputy Director acting for the Comptroller