Intellectual Property Office

BL O/627/20

14 December 2020

PATENTS ACT 1977

APPLICANT	Oxford Instruments Industrial Products Limited
ISSUE	Whether patent application GB 1603980.2 complies with section 1(1)(b)
HEARING OFFICER	Dr C L Davies

DECISION

Introduction

1 Patent application GB 1603980.2 ("the application") entitled "NMR Sample analysis" was filed in the name of Oxford Instruments Industrial Products Limited on 5 September 2014, with an earliest declared priority date of 6 September 2013. It was published as GB 2533244 A on 15 June 2016.

2 Following a number of rounds of correspondence between the examiner and the applicant's attorney, the examiner remains of the view that the claimed invention does not involve an inventive step.

3 With the position unresolved the agent has, in their letter of the 7 September 2020, requested a decision to be made based on the papers on file. In a subsequent letter, dated 16 November 2020 the agent filed an auxiliary request that the Hearing Officer give consideration to an alternative claim-set (claims 1-21) be considered in the event that the claims already on file are found to be non-inventive. Claim 1 of the auxiliary claim set has been amended to include current claims 22 and 23.

4 The issue of inventive step before me was set out in the examiner's pre-hearing report of 14 September 2020. There are no other outstanding issues.

The invention

The application relates to analysis of animal tissue samples, and more specifically to the use of a so-called 'benchtop' NMR spectrometer to identify the nature of a tissue sample taken from a meat product for human consumption in order to confirm, or otherwise, the species of the animal from which the product originates.

The claims

5 The claim-set which I will now consider is those filed with attorney's letter dated 27 November 2019. There are 23 claims and 1 independent claim, claim 1, which reads as follows:

> *1) A method for identifying animal tissue using a NMR spectrometer having a permanent magnet with a magnetic field strength at a sample holder of the spectrometer between 1.0 and 2.5 Tesla comprising:*
>
> *(i) placing animal tissue in contact with a solvent so as to dissolve triglyceride molecules from the animal tissue into the solvent to obtain a sample;*
>
> *(ii) placing the sample into the sample holder of the NMR spectrometer;*
>
> *(iii) applying a radio frequency (RF) pulse sequence to the sample and detecting a free induction decay (FID) signal, using the NMR spectrometer;*
>
> *(iv) converting the detected FID signal into frequency space to obtain a frequency spectrum comprising a triglyceride signature, and;*
>
> *(v) analysing the triglyceride signature and outputting characteristic data for the animal tissue, wherein said characteristic data indicates the identity of the animal tissue.*

The issues to be decided

6 The issue for me to decide is whether the invention involves an inventive step as required by section 1(1)(b) of the Patents Act 1977.

The law

7 The examiner has raised an objection under section 1(1)(b) of the Patents Act 1977 that the invention does not involve an inventive step. The relevant provisions of the Act are shown below:

> ***Section 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.*

and

Section 3

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).

8 The examiner and the applicant agree that the structured approach first set out in *Windsurfing*[1] and reformulated as the Windsurfing/Pozzoli test in *Pozzoli*[2] should be followed in assessing inventive step. The Windsurfing/Pozzoli approach reads as follows:

(1)(a) Identify the notional "person skilled in the art"

(1)(b) Identify the relevant common general knowledge of that person;

(2) Identify the inventive concept of the claim in question or if that cannot readily be 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 the claim as construed;

(4) Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention?

9 According to section 125(1) of the Act, the claims are interpreted as they would be understood by the skilled person in light of the description and any drawings in the application as filed:

For the purposes of this Act an invention for a patent for which an application has been made or for which a patent has been granted shall, unless the context otherwise requires, be taken to be that specified in a claim of the specification of the application or patent, as the case may be, as interpreted by the description and any drawings contained in that specification, and the extent of the protection conferred by a patent or application for a patent shall be determined accordingly.

10 I must interpret the claims in the light of the description and drawings. It is well established that this is done through the eyes of the person skilled in the art, thus determining what the skilled person would understand the patentee to be using the language of the claim to mean.

[1] Windsurfing International Inc. v Tabur Marine (Great Britain) Ltd, [1985] RPC 59
[2] Pozzoli SPA v BDMO SA [2007] EWCA Civ 588

Argument and analysis

11 The examiner maintains that claims 1-20 are obvious in view of:

J. Agric. Food Chem., Vol. 55, No. 24, 1 Nov. 2007, S. Rezzi et al, "Classification of Gilthead Sea Bream (Sparus aurata) from 1H NMR Lipid Profiling Combined with Principal Component and Linear Discriminant Analysis", pp. 9963-9968.

(Hereinafter referred to as 'Rezzi').

12 I note from the papers on file that the arguments relating to whether the invention involves an inventive step revolve around claim 1, and so in the following analysis, I will also focus on this claim, following the Windsurfing/Pozzoli test as set out above. I note also that the examiner has considered the inventiveness of claims 2-20 and that he has not raised any objections in respect of claims 21-23.

Step 1(a) and 1(b) – Identify the notional person skilled in the art and their relevant common general knowledge.

13 The examiner, in his letter of 14 September 2020, re-stated the person skilled in the art as being *"…an analyst working in connection with the food industry and concerned with quality assurance (perhaps for a producer or supplier, or for a public health body). He may or may not have a good working knowledge of NMR; if not, it is well established that he may consult an expert in NMR, or that the skilled person may be a team, which in this case would comprise a person skilled in NMR."*

14 In the same letter, the examiner went on to say *"…the skilled person would be aware of the state of the art in low-field NMR, and familiar with the capabilities and limitations of low-field instruments. Because he is working in a commercial or public body context, his bias is not towards ultimate performance, but rather towards using an instrument that is cost-effective to buy and run, and easy to operate, provided that it is capable of giving data that is good enough for the job."*

15 The applicant in their letter of 7 September 2020 stated that *"the skilled person may be assumed to be an NMR specialist accustomed to operating high-field NMR spectrometers, such as that used in Rezzi, and entirely deprived of inventive ingenuity."*

16 The applicant in the same letter went on to say *"The skilled person does not go about seeking to replicate complex technical procedures using new apparatus without any explicit motivation being provided in the art, and without an expectation of success. Instead, the skilled person is primarily concerned about carrying out their experimental duties in a manner that is consistent with prevailing wisdom and suitably rigorous for obtaining the desired result. In the present case, the skilled person, having reviewed Rezzi, is primarily concerned about classifying or otherwise identifying animal tissue from NMR data."*

17 There is common ground in both the examiner and applicant's interpretations of the skilled person but also some crucial differences. Both definitions consider the skilled person to include a skilled operator of a 'high-field' NMR spectrometer at least on aggregate taking the examiner's team-based definition. In practice, such

spectrometers are very expensive and require a high level of skill to operate and their use is largely limited to personnel operating at a high skill/academic level, usually in research, whether in an industrial or a university setting.

18 After careful consideration, I would define the skilled person as an analytical chemist working in the area of nutrition analysis of food products. Such a person would be aware of common analytical methods used in determining the components of food products including mass spectrometry, chromatography, spectroscopy (infrared) and nuclear magnetic resonance spectroscopy (NMR). The skilled person would be able to operate, analyse and interpret the results obtained from, such methods and would be aware of and have specialist knowledge of, any advantages and disadvantages associated with using each analytical method.

Step 2 – Identify the inventive concept of the claim in question, or if that cannot readily be done construe it.

19 Reviewing the file, the closest I've been able to identify a clear statement of the inventive concept is in the examiner's letter dated 14th September 2020, where he has stated that: *"The invention, as specified in claim 1, is a method for identifying animal tissue by analysing the triglyceride signature in NMR spectra recorded from a tissue sample. The NMR spectrometer is of a type having a permanent magnet providing a field strength between 1.0 and 2.5 T. There is no disagreement between the agent and myself over the inventive concept."*

20 This step therefore does not appear to be in dispute.

21 The claimed invention is restricted to an NMR spectrometer with a low (1.0 - 2.5T) field magnet. Steps (i)-(iv) of claim 1 define steps which are conventional to the operation of any NMR spectrometer, and I note that the specification discusses how a triglyceride signature comprises a spectrum with peaks indicative of fatty acids within the triglycerides. Step (v) is also conventional insofar as an analysis of results is always required, albeit the details of this will be dependent on the characteristics of the spectrum produced.

22 In my opinion, the inventive concept is therefore no more or less than using an NMR spectrometer having a permanent magnet providing a field strength between 1.0 and 2.5T to perform analysis of animal tissue sample and then analysing the fatty acid/triglyceride signature in the NMR spectrum recorded from the tissue sample.

Step 3 – Identify the differences between the state of the art and the inventive concept.

23 The examiner has objected that claims 1-20 are not inventive having regard to Rezzi as identified in paragraph 11 above.

24 Rezzi discloses the use of a conventional (at the priority date) high-field/resolution NMR spectrometer to analyse tissue samples of fish from samples of farmed and wild Gilthead sea bream, by analysing spectra of lipids extracted from fish muscle in the tissue samples.

25 Lipids and triglycerides are fats. The current application at page 2 lines 15-22 mentions that fats are predominantly stored in animals as triglycerides. Triglyceride molecules consist of a glycerol molecule bonded to three fatty acid molecules via esterification. The presence of triglycerides with fatty acids of different saturations varies between different species of animals. The current application at page 1 lines 18-21 specifies that the use of the term meat and animal are used interchangeably; both intended to refer to the flesh of non-human animal including mammals, fish, birds, reptiles, molluscs, crustaceans etc.

26 Whilst Rezzi doesn't refer specifically to triglycerides, it does disclose NMR spectra characteristic of lipids (a type of fatty acid) extracted from the sample by solvents. I consider that a skilled person in the field would regard this as equivalent to the process defined in the current invention where the triglyceride content is identified via a spectrum characteristic of fatty acids. I note that Figure 1 of Rezzi shows a high-resolution proton NMR spectrum of Gilthead sea bream lipid extract where peaks are attributable to constituents including lipids/fatty acids.

27 As observed and expected, the peaks are better resolved in Rezzi since they are obtained using a high-resolution NMR spectrometer, while in the current application, the peaks produced by the low-field NMR spectrometer are less well-defined. In this regard, I have taken into consideration the applicant's observations in their letter of 7 September 2020

28 This difference in the spectra output by the two methods inevitably requires that the results from one cannot be used directly to predict the results from the other, and hence any calibration of results cannot be transferred between them. Nevertheless, in terms of 'analyzing a triglyceride signature and outputting characteristic data for the animal tissue' as defined by claim 1, in my opinion the methods are equivalent.

29 The examiner, in his report of 26 June 2020 states his belief that: *"…it is common ground that the difference between your invention and what is disclosed in this document is the choice of instrument: Rezzi discloses high-field NMR measurements whereas your method uses a low-field instrument."*

30 I have been unable to identify an explicit statement from the agent contradicting this, and so I am content to accept that this is agreed; the difference between the inventive concept and the nearest prior art is that the current application is limited to an NMR spectrometer using permanent magnets with a field strength of between 1.0-2.5 Tesla.

31 The applicant has consistently made the point, most clearly in their letter of 23 March 2020, that the spectra obtained using a high-field spectrometer give more clearly-defined peaks than those obtained by a bench-top spectrometer. They also observe in the same letter that '[t]he former [high field spectrum] is visually and mathematically straightforward, the latter [low field spectrum] is not.' Nevertheless, the invention itself demonstrates that the bench-top equipment provides sufficiently clear results to allow sample identification to the level of detail required.

Step 4 - Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention?

32 The examiner in his letter of 14 September 2020 suggests that the skilled person would be motivated to seek out lower-cost ways of achieving the analysis and would naturally seek to test low-field machines to establish if they can achieve the desired results.

33 The applicant in their letter of 7 September 2020 responds that: *"… the skilled person who is experienced in high-field NMR would have no knowledge of what the low field NMR spectrum would look like other than an expectation that the above-mentioned problems would prevent any useful result from being produced that could be used to identify the animal tissue. Even if the skilled person were looking at using a low-field device, it would not be immediately clear what the skilled person were looking at because the spectrum is so dissimilar from that obtained at high field. Indeed, the spectral signature that enabled the skilled person to identify the animal tissue at high field would appear lost entirely at low field."* As I summarise in my own words: the skilled person would assume that a low field spectrometer would be incapable of providing sufficiently distinct results to allow the level of analysis sought – essentially that there would be technical prejudice against benchtop machines.

34 To assess whether a skilled person would make a change, I must consider both whether the change is an obvious option, and the advantages accruing from that change.

35 I am not persuaded by the examiner's argument that the skilled person would seek to employ a benchtop spectrometer on cost grounds. The skilled person is a technical expert and would instead seek to obtain the best results possible with little thought to the economics of the process employed.

36 From Rezzi, the skilled person learns that a spectrum indicative of the fatty acids making up the triglycerides in a tissue sample can be characteristic of the animal from which that sample was taken, and that such a result can, at high field strength, contain sufficient detail to differentiate between farmed and wild examples of a single species.

37 I have defined the skilled person as having access to knowledge of a variety of analytical techniques, and it seems to me that they would understand that a benchtop spectrometer would be capable of producing a spectrum characteristic of the fatty acids (and hence triglycerides) in a sample, albeit that such a spectrum would differ from that obtained by a high-field spectrometer. They would also understand that the low-field spectrum would offer greater challenges in interpretation than the high-field spectrum. But given that the latter enables farmed and wild populations *of a single species* to be differentiated, I consider that the skilled person would understand that a result usable for species-level identification might be obtained using a benchtop NMR. I also note that the agent acknowledges that it would be '…ultimately within the capability of the skilled person' to do so. But it also appears reasonable to argue that they may not be motivated to investigate this possibility, given that it appears likely to involve greater analytical effort and produce an inferior result relative to using the high-field NMR spectrometer.

38 This presents a problem. On the one hand the skilled person would readily appreciate that the claimed invention is possible. On the other hand, they would not

be motivated to pursue such a method. These observations appear at first sight to be contradictory.

39 Here, I turn to the Manual of Patent Practice (MoPP) for guidance. At paragraph 3.82, the current Office approach is outlined with reference to European Patent Office Boards of Appeal decision T119/82. In particular, paragraph 16 of this decision states (emphasis added):

> *The argument that alternative routes should be considered to be the less obvious the odder, or perhaps even the more disadvantageous, they are, cannot be sustained. The rhetorical question why the skilled man should have contemplated such detour at all, would equally apply, if someone tried to patent the least attractive further analogy processes for the making of a known compound. Obviousness is not only at hand when the skilled man would have seen all the advantages of acting in a certain manner but also when he could clearly see why he should not act in the suggested manner in view of its predictable disadvantages or absence of improvement, provided he was indeed correct in his assessment of all the consequences*

40 MoPP 3.82 provides the following guidance based on this:

> *Where a variation from published matter proposed by the applicant has no advantages, or is even disadvantageous, although it can be argued that the resulting inferior procedure is not obvious in the sense that no skilled person would regard it as obvious to do something inferior, the application should nevertheless, if the variation is one whose possibility a skilled person would appreciate, be refused on the ground that there is no inventive step.*

41 In the current case, the proposed method is one which a skilled person would recognise as having identifiable technical disadvantages over the known method as exemplified by Rezzi, and this is the primary disincentive to carrying out the method in question. The applicant asserts a number of advantages, primarily that a bench-top NMR spectrometer is cheaper both to purchase and to run and requires less skill to operate than a prior art high-field spectrometer etc. It is the applicant's contention that these advantages unexpectedly outweigh the technical disadvantages, and hence that the claimed invention is not obvious.

42 This is fore-square with the situation outlined in MoPP 3.82 – the possibility of using an inferior method is obvious, albeit that the disadvantages are clear and discourage its adoption. The advantages identified by the applicant are all non-technical in nature, being in the form of cost savings or administrative convenience. They can therefore not represent an inventive step outweighing the clear technical disadvantages of employing a benchtop machine. The alleged invention of claim 1 is technically inferior to the prior art, and hence cannot be regarded as having an inventive step based on this reasoning.

Summary

43 Having carefully looked through the submissions on file, I cannot see any advantages that are not obvious. Reduced cost, easier to operate, quicker through put etc might be advantages but they are obvious advantages. The fact that the

method of claim 1 is an inferior process in itself ("low-field "benchtop" NMR spectrometers were invented in the 1960s and have been widely used for several decades", as recognised by the applicant in their letter of 7 September 2020), means that there is no invention in claim 1. The applicant has indicated also in the same letter that there is a general bias in the industry towards using ever higher magnetic field strengths, and reasons why a skilled person would not want to revert to using a low-resolution benchtop NMR spectrometer. However, in my opinion, the skilled person necessarily would do so if they needed to do so and with an expectation of success, albeit it might take a bit of work to calibrate and set up the low-resolution NMR spectrometer.

44 It therefore cannot be inventive to adopt a technically inferior method as set out in the present claim 1, where there are no non-obvious advantages or improvements to do so. On this basis, I find claim 1 to lack an inventive step.

45 Claims 2-20 have been rejected by the examiner as offering no inventive step over claim 1. In the absence of any arguments in favour of accepting any of these claims individually I must presume that the applicant is content for these claims to stand or fall with claim 1.

46 I therefore find that claims 1-20 lack an inventive step over the identified prior art.

Outstanding issues

47 Other than inventive step, I note that there are no further issues outstanding on this application.

Auxiliary claims

48 I have found that claims 1-20 for which a decision on the papers was requested lack an inventive step. A further auxiliary set of claims were lodged with the applicant's letter dated 16 November 2020 for the Hearing Officer to consider if necessary.

49 I note these claims incorporate matter from current claims 22 & 23, which were not objected to by the examiner in his earlier examination reports, including the more recent report of 26 August 2020. *Prima facie*, therefore, there does not appears to be any issue for the Hearing Officer to decide in respect of these claims, the applicant and examiner being in agreement regarding this combination of features. I am hereby referring this application back to the examiner to complete the examination process.

Conclusion

50 I have found that the invention defined in independent claim 1 (and dependent claims 2-20) lacks an inventive step. The application with this current claim-set doesn't comply with section 1(1)(b) of The Patents Act 1977.

51 However, the applicant has provided an auxiliary claim set (claims 1-21) as indicated above. I therefore remit the application back to the examiner for completion of the examination process on the basis of the auxiliary claim set.

Appeal

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

C . L. Davies

Deputy Director, acting for the Comptroller