

**PATENTS ACT 1977**

**IN THE MATTER OF**

Patent Application 9204959.2

in the name of Fujitsu Ltd.

**DECISION**

Application 9204959 was filed on the 6<sup>th</sup> March 1992. During the course of examination the examiner objected that the invention claimed could not be patented because it was no more than a scheme, rule or method for performing a mental act or a program for a computer and was therefore excluded by section 1(1)(d) and 1(2). The applicant contested the objection and in the absence of agreement the matter came before me at a hearing on the 6<sup>th</sup> June 1995 when the applicant was represented by counsel, Mr David Young QC, instructed by Haseltine Lake & Co., and by Mr J K Godsill of Haseltine Lake.

The application is concerned with a method and apparatus for modelling a synthetic crystal structure for use in designing inorganic materials and involves a computer programmed so that an operator can select an atom, a lattice vector and a crystal face in each of two crystal structures displayed by the computer. The computer then converts data representing the physical layouts of the two crystal structures into data representing the physical layout of the crystal structure that would be obtained by combining the original two structures in such a way that the two selected atoms are superposed, the two selected lattice vectors are superposed and the two selected crystal faces are superposed. The resulting data is then displayed to give a picture of the resulting combined structure.

Mr Young did not dwell at the hearing on any specific claims but rather directed his arguments to the substance of the subject matter disclosed and to the claims at large. However, since I must look to the claims for the purposes of deciding whether the invention is excluded by section 1(2), it is convenient to set out the main claims as these stood when the hearing was appointed, which is as follows :

"1. A method of processing first and second images representing first and second crystal structures to produce a third image representing the structure of a synthetic crystal structure, the first and second images being stored as respective first and second sets of data items, the first set of data items representing, in a first coordinate system, the plurality of atoms and lattices in the first crystal structure, and the second set of data items representing, in a second coordinate system, the plurality of atoms and lattices in the second crystal structure, which method comprises the steps of:

using the computing means for selecting a pair of crystal faces, one from each of the first and second crystal structures, having respective mutually similar arrangements of atoms, and, for each crystal face of the selected pair, selecting an atom and a linear array of atoms in the face;

using the computing means to transform the second set of data items to produce a third set of data items representing, in the said first coordinate system, the respective atoms of the second crystal structure arranged so that the selected atom of the second crystal structure can be superposed on the selected atom of the first crystal structure and so that atoms of the selected linear array of the second crystal structure can be superposed respectively on those of the selected linear array of the first crystal structure, and so that the selected crystal faces then coincide in a common plane, the remaining atoms of the second crystal structure being located to one side of that plane whilst the remaining atoms of the first crystal structure are located to the opposite side of that plane;

using the computing means to combine the first and third sets of data items together to produce the third image as a representation of a crystalline combination of the said first and second crystal structures;

and using display means of the computing means to display the resulting third image in a form by which the physical properties of the crystalline combination can be studied.

9. A method of manufacturing a structure which is a crystalline combination of two crystal structures, the method comprising an investigation of the effects of combining the two crystal structures using a method according to any one of the preceding claims.

10. A computer apparatus for creating a computer image of a synthetic crystal structure formed of a first crystal structure having a plurality of atoms and lattices and a second crystal

structure having a plurality of atoms and lattices, said apparatus comprising:

computer storage means for storing computer images including first and second images representing the first and second crystal structures in the form, respectively, of a first data set, in which the first image is represented in a first coordinate system, and the second data set, in which the second image is represented in a second coordinate system;

selection means for selecting from the storage means the first data set corresponding to said first crystal structure and the second data set corresponding to said second crystal structure;

specifying means, coupled to said selecting means, for specifying a first atom, a first lattice and a first crystal face of said first crystal structure, said first crystal face including said first atom and said first lattice, and for specifying a second atom, a second lattice and a second crystal face of said second crystal structure, said second crystal face including said second atom and said second lattice;

transformation means for transforming said second crystal structure system represented by said second coordinate system into that represented by said first coordinate system so that an assembling condition is satisfied, said assembling condition being defined as a condition in which said second atom, said second lattice and said crystal face of said second crystal structure are respectively superposed on said first atom, said first lattice and said first crystal face of said first crystal structure; and

computer display means for displaying the resulting computer image of the transformed second crystal structure alongside said first crystal structure selected by said selection means, so that a computer image of a synthetic crystal structure formed of said first and second crystal structures and represented in the first coordinate system is formed."

At the hearing Mr Young began with the law which he believed I should apply and referred me to *Gale's Application [1991] RPC 305* where Nicholls LJ said at line 5 on page 323 :

".. it is of the utmost importance that the interpretation given to section 1 of the Act .... and the interpretation given to Article 52 of the [EPC] ... should be the same. ... When interpreting the Act an English court should have due regard to decisions of the Board of Appeal and take them into account, although the English court is not bound by them."

From this Mr Young argued that since the test applied in a number of cases decided by the European Patent Office Technical Board of Appeal, *eg in Vicom Systems Inc T208/84 [1987] EPOR 74*, is whether or not the invention involved a "technical contribution", this was also the test that I should apply. Although I agree with Mr Young that in substance this is indeed the case, I note from the passage from *Gale's Application* quoted above that the primary authority is that of the English court. Thus, I conclude that the law that I must apply stems from *Merrill Lynch's Application [1989] RPC at page 569* where Fox LJ said :-

"The position seems to me to be this. *Genentech* decides that the reasoning of Falconer J is wrong. On the other hand, it seems to me to be clear, for the reasons indicated by Dillon L J, that it cannot be permissible to patent an item excluded by Section 1(2) under the guise of an article which contains that item - that is to say, in the case of a computer program, the patenting of a conventional computer containing that program. Something further is necessary. The nature of that addition is, I think, to be found in the *Vicom* case where it is stated: "Decisive is what technical contribution the invention makes to the known art". There must, I think, be some technical advance on the prior art in the form of a new result (eg., a substantial increase in processing speed as in *Vicom*)."

Although Fox LJ's statement in *Merrill Lynch* is I think strictly *obiter*, because the Court rejected the application as an excluded method for doing business and not as a program for a computer, I nevertheless regard myself as bound by what is a clear, unambiguous and unanimously supported statement of the principles which the Court believes should be adopted in relation to computer programs and I shall therefore consider this issue first.

In the case in suit, Mr Young did not seek to argue that the apparatus disclosed is anything other than an entirely conventional computer with a program and since I believe that, as a matter of fact, this is indeed the case, it follows from *Merrill Lynch* that I must look at the invention claimed as a whole and regardless of any of its individual features, such as the program, and decide whether that invention involves a technical advance. And in the light of Fox LJ's reference to "guise", and indeed in the light of a remark by Nicholls LJ in *Gale's Application* where he said :

"I approach the ... issue ... on the footing that it is convenient and right to strip away, as a confusing irrelevance, the fact that the claim is for "hardware"."

I think I must look to the substance of the invention rather than its precise form as set out in any particular claim, in essentially the same way as did Mr Young.

As to what constitutes a technical advance, it is I think clear from the passage I have quoted above from *Merrill Lynch* that there is no real difference between a "technical advance" and a "technical contribution", which is the expression used in *Vicom*. Mr Young argued that a "technical contribution" can be defined as 'something of a technical character, having some practical and technical impact, as opposed to some mere thought process'. While I am not convinced that this provides a complete definition, I would not dispute that it provides a workable description of what might constitute a technical contribution or advance.

On this basis, Mr Young argued that *Vicom* is essentially similar to the present application, in particular in relation to the claims in suit as they now stand. *Vicom* involved digital filters which used a mathematical algorithm and the application was originally rejected as relating to no more than a mathematical method. On appeal to the European Patent Office Technical Board of Appeal the application was amended so as to relate to image processing using the mathematical algorithm. In allowing the amended application, the Board indicated that even if the idea underlying an invention may be considered to reside in a mathematical method, a claim directed to a technical process in which the method is used, which in *Vicom* was a technical process involving image processing, does not seek protection for the mathematical method as such. In its decision, the Board said :

"... claims which can be considered as being directed to a computer set up to operate in accordance with a specified program (whether by means of hardware or software) for controlling or carrying out a technical process cannot be regarded as relating to a computer program as such and thus are not objectionable under Article 52(2)(c) and (3) EPC."

Mr Young argued that *Merrill Lynch*, and also *Gale's Application*, concerned wholly non-

technical matters, namely buying and selling stocks and shares and calculating square roots respectively. Similarly, *Wang Laboratories Inc's Application [1991] RPC 463* involved a method for performing a mental act because all it was doing was to store information for an expert system. *Wang* also included claims to a computer shell system which was no more than a computer program. In contrast, the present application, like *Vicom*, involved image processing to determine a new compound or product in the form of an image of that compound or product. In Mr Young's submission, this clearly provided a technical contribution.

In this connection, Mr Young also referred to me another (unpublished) decision of the European Patent Office Board of Appeal in *IBM/Rotating displayed objects T59/93*. This case involved controlling the rotation of a displayed object through the use of a mouse or other equivalent means which is used to mark a point on the displayed object and a position to which that point is to be rotated. The Board held that this was of a technical nature and that no objection arose under Article 52(2) or (3). Mr Young argued that by analogy, the present invention was of a technical nature and not merely a program for a computer as such.

At the hearing I indicated that I saw a possible distinction between *Vicom*, and indeed the *IBM* case referred to above, and the present application. In this connection I referred to a decision of the European Patent Office Board of Appeal in *IBM/ Homophone checker T65/86 1990 EPOR 181* where the Board indicated that the method claimed in the *Vicom* case was patentable :

"... even though it could be carried out by known hardware suitably programmed, because it makes a contribution in a field not excluded from patentability, namely a more efficient restoration or enhancement of the technical quality of an image."  
(my emphasis)

As I understand it, the numbers which are mathematically processed in *Vicom* do not merely determine the intellectual content of the images which are displayed, but are also the technical means which cause the display to operate at a technical level. Thus in *Vicom*, manipulating the numbers in the manner described affects the technical quality of the image.

So in *Vicom*, the invention concerned the technical representation or technical control of what is displayed and not the information content of what is displayed. Similarly, in *IBM/Rotating displayed objects*, the invention concerned the way in which images, any images, were rotated on the display and thus also concerned the technical control of the display. By contrast, the present case solely concerns the information content of what is displayed and any possible technical contribution can only come about through what that information represents. Consequently, it seemed to me that one question I have to address is whether the fact that the representation is of a technical artefact, viz a crystal structure, is sufficient to confer a technical character on the whole invention or whether the invention is no more than a computer programmed to display particular information in a technically conventional way.

When I put this to Mr Young, he argued that this was perhaps too meticulous an analysis of the claims. In his view, one must look not only at the contribution provided by the claimed matter, but also at that provided by what is described in the specification. On the basis that the broad question to be asked is "what contribution does it make to the art?", Mr Young argued that it was clear that in this case the answer was that the contribution was of a technical and practical nature and that accordingly, the invention claimed was patentable.

Having said that, Mr Young did accept my suggestion that this approach in fact posed two questions, viz "What is the art?" and "What is the contribution to that art?". Mr Young took the view that the art is the manufacture of compounds and that, since this is clearly technical, it therefore follows that the contribution to the art is a technical contribution. In this connection Mr Young referred me to line 10 of the first page of the specification which reads:

"In the manufacture of new inorganic materials, .... , it is known to use a modelling process to study in advance the physical attributes of the new substance."

With respect to Mr Young, I do not believe this is right. Firstly, I note that the passage in the present specification to which he referred me has been amended in the course of examination and as originally filed read :

"In a design of inorganic materials, ..."

Indeed, all the references to manufacture in the present specification have been added during the course of examination. This may be a small point but in my view it is of significance for present purposes because it demonstrates that any manufacture which is involved can only be the natural, perfectly conventional, follow-up to a design process because otherwise the addition of references to it in the specification would involve added matter contrary to section 76. Thus, though the design processes involved could be used as a precursor to conventional manufacture, as indeed is set out in the present claim 9, they need not necessarily be so used. Moreover, the process of manufacture is in my view incidental in any event because it is wholly immaterial to that process whether the structure to be manufactured is designed by the prior art processes or by using the present invention. The use or otherwise of the present invention has no technical effect on any process of manufacture so the two stages, of design and manufacture, are quite independent and seem to me to be a mere collocation rather than a true combination. As a result, I can see no technical advance in the form of a new result stemming from any manufacture.

Beyond this, Mr Godsill suggested three other technical contributions or results in the present case. The first was that the invention produced a digital image of a new entity. Mr Godsill argued that given that an electrical signal representing a digital image was held to be technical in *Vicom*, the display in the present case is also a technical result. However, as I have already indicated above, I think that the invention in *Vicom* concerned the control of a display at a technical level whereas the present case concerns only the information content of the displayed images. The mere display of a digital image in my view does not of itself involve a technical advance or contribution.

Second, Mr Godsill submitted that the image displayed is of a technical entity and third, that the display of a technical entity was adapted to be useful to technical experts for ascertaining physical properties of the structure displayed. In essence, this brings me back to the question I posed above which is whether the fact that what is displayed is a technical artefact, viz a crystal structure, is sufficient to confer a technical character on the whole invention on the facts in this case. In this respect however, the opening page of the specification points out



that it is known to model inorganic chemicals using plastic models of structural elements assembled by hand by an operator and it is I think against that background that the substance of the present invention is seen in its proper context. In the absence of any disclosure to the contrary, the display must be taken to be wholly conventional at the technical level so the present invention amounts to no more than the provision of a technically conventional computer programmed to combine the contents of two displays of crystal structures in a particular way to produce a display of a third, composite crystal structure. In fact of course, all that the display is arranged to do is to substitute elements of one structure in another, thus mimicking what has previously been done manually with plastic models. Thus, what is disclosed is in substance a conventional computer system programmed to display pictures of crystal structures. While crystal structures undoubtedly do lie in a technical field as both Mr Young and Mr Godsill argued, the pictures displayed are simple substitutions derived by taking part of one picture and superposing it on another picture and it seems to me that this process is not of a technical nature but is no more than a purely intellectual process of substitution. Even on the basis of Mr Young's proposed definition of a 'technical contribution as being 'something of a technical character, having some practical and technical impact, as opposed to some mere thought process', it seems clear to me that the impact of the present invention is essentially of an intellectual and not a technical nature. I do not dispute that a designer could use the pictures displayed in the process of designing a new compound as Mr Godsill argued but it still seems to me that the substance of the invention disclosed is simply a conventional computer programmed to display the same images as were previously produced using plastic models and in my view this does not involve a technical advance of the kind which I am required to find.

Thus, while I have considerable sympathy with the view that the present application concerns matter of a kind which should be susceptible of patent protection, I have reluctantly reached the view that I am compelled by the authorities by which I am bound to find that the present application relates to excluded matter. Specifically, for the reasons I have given, I do not believe that it involves a "technical advance" of the kind required by the judgment in *Merrill Lynch*. Consequently, I believe I am bound by the judgment in *Merrill Lynch* to find that the invention amounts to no more than a program for a computer and is therefore excluded by section 1(2)(c).

On the issue of the exclusion for methods for performing a mental act, though I have found that the substance of the invention is essentially intellectual, the fact that the invention is claimed in terms of steps performed by a computer might be thought to be good reason to dismiss out of hand an objection that the invention should be excluded as being nothing more than a method for performing a mental act. Indeed, this seems to have been the attitude of the European Patent Office Technical Appeal Board in *IBM/Rotating displayed objects* referred to above which was referred to by Mr Young and where the Board said :

"Method claim 1 is to be understood as defining, by the steps it comprises, the functional features, in operation, of an interactive draw graphic system, normally implemented by a program-controlled computer, its operator being the user.

It goes without saying that these features, ... , can no longer be regarded as a method for performing, or involving (as user instructions), mental acts."

However, as I indicated above, *IBM/Rotating displayed objects* differs from the present case on the facts in that it is concerned with the technical control of a display whereas the present case is not. Moreover, the examiner in the present case had also based his argument on the judgment in *Wang Laboratories Inc's Application [1991] RPC 463*, where at pages 472 and 473 Aldous J said:

"The fact that the scheme, rule or method is part of a computer program and is therefore converted into steps which are suitable for use by a person operating the computer does not matter. ... The method remains a method for performing a mental act, whether a computer is used or not. .. The method may well be different when a computer is used, but to my mind it still remains a method for performing a mental act, whether or not the computer program adopts steps that would not ordinarily be used by the human mind."

I take this to mean that in deciding whether a method is a method for performing a mental act, it is not relevant whether the steps of the method are performed by a computer, or are the same as or different from those which would normally have been performed by a human

being. Thus, it would seem to follow that methods which could in principle be performed in the human mind are to be excluded from patentability even if performed by a computer. Though it was I think suggested that this proposition must be limited to the context applying in *Vicom* which was an expert system and thus lay in a wholly non-technical field, I do not believe that this is right. I see nothing in the passage quoted above, or in its context in the judgment, which suggests that it is anything other than a general proposition which applies to all methods for performing mental acts. The question then is whether the method performed by the present invention is in principle something that could be done by the human mind. If it is then I believe that I am bound to find that it is excluded.

Mr Young however argued that both *Wang* and *Merrill Lynch* were refused because they lay in non-technical fields whereas the present application does not. In particular he argued that if the application of the result of the data processing involved is some contribution in a technical field, then it is more than a mental act as such and accordingly, should not be excluded. And in the present case, he argued that there was such a contribution in a technical field.

I am not convinced by this reasoning which seems to me to confuse two separate points. The essential question I must address is whether or not the invention is anything more than a method for performing a mental act as such and it is clear to me that the Act excludes all methods for performing mental acts regardless of whether or not they are applied to a technical field. The fact that the information being handled by the present invention undoubtedly has some technical significance does not I think alter that conclusion. In particular, I do not agree with Mr Young's suggestion that the fact that the data or information which is processed does have some technical significance means that the method must be regarded as more than a method for performing a mental act. Human beings frequently deal mentally with technically significant data and no-one would I think suggest that when they do so they are not performing mental acts.

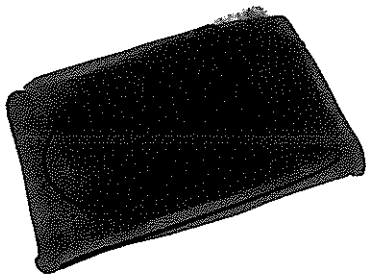
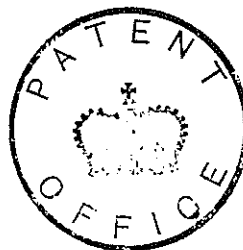
It then follows that I must consider whether or not the invention is anything more than a method for performing a mental act as such. For the reasons I have given above, I believe that the substance of the present invention is essentially intellectual and it follows from this

that it amounts to no more than a method for performing a mental act. I should perhaps add at this point that I believe that this conclusion applies regardless of whether the invention is claimed as a method or an apparatus. In this connection I note that in both Merrill Lynch and in Wang, apparatus claims were rejected as relating to methods for doing business and methods for performing mental acts respectively. Accordingly, it follows that I consider that the present invention amounts to nothing more than a method for performing a mental act using a computer program and that it should therefore be excluded by section 1(2)(c) of the Act.

In summary therefore, I have found that the present invention should be excluded by section 1(2)(c) both as a program for a computer and as a method for performing a mental act. Moreover, since I have reached this view on the basis of what I consider is the substance of the invention disclosed, it follows that I can see no way in which the claims could be amended to avoid this finding. Consequently, I hereby refuse the application under section 18(3).

Any appeal from this decision should be filed within six weeks from the date of the decision as set out below.

Dated this 29 day of June 1995.



**D. M. HASELDEN**

Principal Examiner, acting for the Comptroller.

**THE PATENT OFFICE**