

PATENTS ACT 1977

IN THE MATTER OF

Patent Applications 9112089.9
and 9413390.7 in the name of
FMC Corporation.

REASONS FOR DECISION

Application 9112089.9 was filed on 5 June 1991 claiming priority from an earlier US application and was published under the number 2246003A on 15 January 1992. During the substantive examination of the application the examiner objected that the invention claimed could not be patented because it was no more than a mathematical method, a computer program, a method for performing a mental act or the presentation of information and was therefore excluded by section 1(1)(d) and 1(2). Subsequently, on 4 July 1994, the applicants filed a divisional application number 9413390.7 directed to some of the subject matter disclosed in the original application and the examiner raised similar objections to this application. The applicant contested these objections and in the absence of agreement with the examiner, requested a hearing to determine the matter. At this point, at the applicant's request, there was a delay to give the applicant time to consider the applications further and in the event, the matter came before me at a hearing on 1 December, four days before the expiry on 5 December of the section 20 period for putting the applications in order. At the hearing the applicant was represented by Mr M Hammler of Phillips & Leigh.

Following the hearing, and having had an opportunity to consider the complex arguments arising, I wrote to the applicant on 2 December informing them that I had decided that the claims of both applications amount to no more than a mathematical method, a program for a computer or the presentation of information and are therefore excluded by sections 1(1)(d) and 1(2) of the Act. I also indicated that, having carefully considered the overall disclosures in the two specifications, I believed that they do not include anything more than a mathematical method, a program for a computer or the presentation of information and accordingly, that I could not envisage any amendment which could overcome my finding. Consequently, under section 18(3), I refused to allow either application to proceed. I also stated that I would provide reasons for this decision in writing which I now do.

The original application, 9112089.9, is concerned with the computer-aided analysis of multi-

body systems. More particularly it concerns the computer modelling of a mechanical system having interconnected elements, to determine forces, torques or motions which would prevail in the system, giving details of the mathematics. In a first phase of the process a modeller (a person relatively skilled in the characteristics and analysis of mechanical systems) inputs to a processor, via a keyboard or other input device, data defining the basic topology of a general type of the system to be modelled. The processor automatically generates symbolic equations in the form of source code representing the equations of motion of the general type of the system and the source code is then compiled into executable code which is self-contained and portable. In a second phase, a user (who may be the modeller) familiar with a specific system to be modelled enters data defining the specific system. This data is processed by running the executable code, to provide a simulation of the operation of the specific system. The simulation results are output as files, plots or a displayed animation.

Although Mr Hammler did not dwell at the hearing on any specific claims but rather directed his arguments to the subject matter disclosed, he did rest his case on the proposition that the claims at large did concern an essentially technical matter and were therefore not excluded by section 1(2). Since it is also the case that for the purposes of deciding whether the invention is excluded by section 1(2) I must look to the claims, it is convenient to set out the main claims as these stood when the hearing was appointed, which are as follows :

- "1. A method of determining forces, torques or motions prevailing within a multi-body system, comprising the steps of:
 - deriving basic topology data relating to a general type of the multi-body system;
 - inputting the basic topology data into a symbolic generator to generate automatically symbolic equations in the form of source code representative of the equations of motion of the general multi-body system;
 - converting the source code into executable code;
 - transferring the executable code to a system data module , wherein multi-body system parameters are entered into the system data module and are checked for compatibility with physical and system imposed restraints and are made accessible to the executable code; and
 - running the executable code in a simulator to simulate the operation of the multi-body system and thereby obtain simulation results.

13 Apparatus arranged to operate in accordance with the method of claims 1-12

to determine the forces, torques or motions prevailing within a mechanical system having interconnected mechanical elements therein, the apparatus comprising:

a preprocessor,

data entry means for entering the mechanical system topology and constraints into said preprocessor,

means coupled to said preprocessor for formulating symbolic equations of motion for the mechanical system based on the entered topology and constraints."

The disclosure in the divisional application, 9413390.7, is exactly the same as that in the original application but the claims are directed to a method and corresponding apparatus characterised in that they are capable of determining the forces, torques or motions in a system containing at least fifty interconnected mechanical elements and/or possessing at least one hundred degrees of freedom, and in that they involve selecting an inertially fixed reference frame for the system. The main claims of this application as they stood when the hearing was appointed are as follows:

"1. A method of determining forces, torques or motions prevailing within a mechanical system the method being effective for systems containing at least fifty interconnected mechanical elements, and/or possessing at least one hundred degrees of freedom, the method comprising the steps of :

defining the basic topology of the mechanical system;

selecting an inertially fixed reference frame for the mechanical system;

specifying the mechanical system constraints from its known degrees of freedom and configuration;

automatically generating symbolic equations of motion for the constrained system from the defined basic topology and specified system constraints and automatically solving the equations of motion to determine the prevailing forces, torques or motions.

13 Apparatus arranged to operate in accordance with the method of claims 1-12, to determine the forces, torques or motions prevailing within a mechanical system having interconnected mechanical elements therein, the apparatus comprising:

a preprocessor,

data entry means for entering the mechanical system topology and constraints into said preprocessor,

means coupled to said preprocessor for formulating symbolic equations of motion for the mechanical system based on the entered topology and constraints."

At the hearing, Mr Hammler 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."

and at line 30 :

"I turn now to section 1(2) of the Act. When considering these provisions, it is helpful to have in mind the principle of patent law, well established before the Act, that an idea or discovery as such is not patentable. It is the practical application of an idea or discovery which leads to patentability. It leads to patentability even if, as frequently happens, the practical application of the discovery is inherent in the discovery itself or is obvious once the discovery has been made and stated."

and at page 324 line 26 :

"The language of section 1(2), and of the corresponding article, Article 52(2) and (3), of the European Patent Convention, is apt as an embodiment of this principle of United Kingdom patent law. Section 1(2) comprises a non-exhaustive catalogue of matters or things, starting with "a discovery", which as such are declared not to be inventions. Thus a discovery as such is not patentable as an invention under the Act. But when applied to a product or process which, in the language of the 1977 Act, is capable of industrial application, the matter stands differently."

From this Mr Hammler argued that what he called the "Nicholls' test" was that one had to ask, first, do the claims refer to one of the matters excluded by section 1(2). If they do not, then the invention is patentable. However, if they do, then one must go on to ask whether the claimed invention, when properly construed, is capable of industrial application, that is

to say in the words of section 4(1), whether the claimed invention has capacity for use in any kind of industry, including agriculture. If it does, then in Mr Hammler's submission, the invention is not excluded by section 1(2).

As I indicated at the hearing, I do not accept that this analysis necessarily gives the full picture. I believe that there is more to it than the question of industrial applicability which is in any event an entirely separate issue. That this is so is I think underlined by the subsequent, extensive references in Nicholls LJ's judgment to further authorities, in particular the references to the judgment in *Merrill Lynch's Application* [1989] RPC 561. Indeed, Mr Hammler went on to discuss the effect of the *Merrill Lynch* judgment which, he argued, was that one must look at the claimed matter as a whole and decide whether it makes a technical contribution to the prior art or, in the words of Fox LJ at page 569, provides "a technical advance on the prior art in the form of a new result". If it does not, the invention is not patentable. However, if it does, one must also look to see whether "the field of use of the invention [is] itself an excluded matter." If it is, then the invention is not patentable. Mr Hammler also argued that this test is, in substance, largely the same as the Nicholls' test in the sense that the concept of technical advance essentially equates to that of industrial applicability. As I have suggested, I do not necessarily go all the way with Mr Hammler on this but, since Mr Hammler was of the view that this was so, and since I agree with him that the law to be applied is that stated in *Merrill Lynch*, I do not need to go any further into Mr Hammler's arguments on the, so called, Nicholls' test .

Thus, in *Merrill Lynch*, Fox LJ said at page 569 :

" ... 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*)."

Though this statement 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 applications involving computer programs.

In the particular cases before me, Mr Hammler did not dissent from the view that the apparatus disclosed is entirely conventional, consisting of a suitably programmed general purpose computer having a keyboard, VDU and data filing system. And since I believe that, as a matter of fact, this is the case, it follows from *Merrill Lynch* that the question I must decide is whether or not the invention claimed provides a technical advance.

As to what constitutes a technical advance, in *Merrill Lynch* Fox LJ specifically referred to *Vicom Systems Inc's Application T208/84 [1987] Official Journal EPO 14*. *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 :

"A basic difference between a mathematical method and a technical process is that a mathematical method is carried out on numbers (whatever these numbers may represent) and provides a result also in numerical form, the mathematical method ... being only an abstract concept prescribing how to operate on numbers. No direct technical result is produced by the method as such. In contrast, if a mathematical method is used in a technical process, that process is carried out on a physical entity (which may be a material object but equally an image stored as an electrical signal) by some technical means implementing the method and provides as its result a certain change in that entity. The technical means might include a computer comprising suitable hardware or an appropriately programmed general purpose computer."

Against that background, Mr Hammler argued strenuously that the claims of the present applications do provide technical advances in a number of different ways. The heart of his submissions was I think to the effect that there was a sufficient connection between the inventions and real world, technical processes for the inventions to be regarded as patentable. Thus, he pointed to the automatic production of source code and the fact that the

arrangements claimed enabled code written or produced on one computer to be run on another computer, or perhaps several other computers simultaneously. To my mind however, if these features are advances and for the purposes of this decision I am prepared to assume that they are, they are not technical advances but advances which lie wholly in the field of programming. Certainly, I see no direct technical result of the kind referred to in *Vicom*.

Similarly, I see no technical advance in the fact that the inventions include the step of checking that the entered data relating to a specific system are compatible with physical and system imposed restraints which, Mr Hammler argued, was sufficient to move the inventions into a technical field. While the data concerned here may represent a real world system or entity, merely checking that that data corresponds to the real world before performing calculations on the data, which is the most that is I think involved here, does not seem to me to involve any technical advance.

In the same vein, Mr Hammler also suggested that since the claims enabled the forces, torques or motions which would be produced in different circumstances to be determined, they amounted to methods of testing which as such are patentable. Equally however, he argued that the fact that the forces, torques or motions could be determined without direct measurement was a discovery capable of industrial application and which therefore constituted a technical advance. In so arguing, Mr Hammler is I think accepting that in the present cases there is no direct measurement involved and this reinforces my view that what is described and claimed in the present applications is quite different in kind from methods of testing objects or systems and amounts to no more than an abstract process of calculating the forces, torques or motions which does not involve any technical advance.

Mr Hammler also argued that a technical advance stemmed from the claimed feature whereby source code is initially produced for generic system topologies and subsequently used in conjunction with data relating to a specific system since this meant that the invention could deal with a wider variety of more complex specific systems than has hitherto been possible. He also argued that there was a technical advance arising from the fact that the improved designs which could be produced using the inventions would result in improved manufactured products. However, what I think Mr Hammler is in effect saying here is little more than that the invention is better than prior arrangements and the fact that an arrangement is better does not of itself make it patentable. What is needed is not simply an advance but a technical advance, that is to say an advance in a technical field.

On this, Mr Hammler argued that an important requirement for a patentable claim is that, while the data being processed can be represented in digital electronic form, the data should relate to a specified physical entity such as force or torque or motion as in the present cases. With respect to Mr Hammler, I do not agree that this represents the true position. In particular, I do not agree that it is a sufficient condition for patentability that the data being processed merely 'relate to' a specified physical entity. As I have already mentioned, the extract from the *Vicom* decision above speaks of a "direct technical result". In the *Vicom* case the "direct technical result" was a change in the technical quality of an image represented by numbers in electronic form which were processed in accordance with a mathematical algorithm and thus changed into a new, technically improved image. In the present cases, while the numbers or information being processed do indeed represent real world physical entities, the claimed inventions produce no direct effect on any real world entity but are confined simply to producing information about real world entities. Thus, I do not think it is relevant that there are features in the claims in the present applications which perhaps could be used to deal with a wider variety of more complex specific systems, nor that improved designs could be produced resulting in improved manufactured products. Rather, what matters is whether or not what the claimed arrangements actually do lies in a technical field.

In the present cases, what the claimed arrangements do is to calculate the forces, torques or motions arising in a system and to provide an arrangement which perhaps could be used, not which is used, in designing artifacts. In this connection, I do not agree with Mr Hammler when he argued that determining forces, torques and motions is itself a technical process. On the contrary, it seems to me that simply determining forces, torques and motions in the way this is done in the present cases is essentially an intellectual, mathematical process, albeit one in which the information represents a real world object. By contrast, the claims which were accepted in *Vicom* were to a real technical process itself, that is to a method of processing images which produced a more efficient restoration or enhancement of the technical quality of the image. While I admire the efforts Mr Hammler has made during the prosecution of these applications to introduce a real technical process into the claims, his difficulty it seems to me has been that the specifications of the two applications do not disclose any real, technical process but stop short at the point where the information is produced and displayed to an operator, for example in the form of an animation. Mr Hammler suggested a number of possible technical uses for the inventions, including investigating the properties of a proposed industrial article or designing such an article, but the fact is that the specifications of both applications are silent as to how the information which is produced by the claimed

methods and apparatus might be used.

The question then is, are the claims of these applications sufficiently close to defining a technical or practical application to be patentable, or do they fall short. Mr Hammler took the view that it was sufficient that possible technical uses could be envisaged. I do not agree. Though I have every sympathy with the view that the sort of process that is described in the present applications should be susceptible to patent protection, and that the addition of technical or practical uses which are not central to the inventive contribution should not be critical in determining whether a patent can be granted, I have reluctantly reached the view that I am compelled by the authorities by which I am bound to find that the claims of both applications do not include patentable subject matter. Specifically, for the reasons I have given, I do not believe that they involve a technical advance of the kind required by the judgment in *Merrill Lynch*. As a result, in my view the claims amount to no more than a program for a computer and are excluded by section 1(2)(c). Similarly, I believe that the claims amount to no more than a mathematical method or the presentation of information and are thus excluded by section 1(2)(a) and (d).

On the issue of the exclusion for methods for performing mental acts however, the examiner had 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."

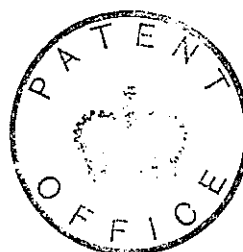
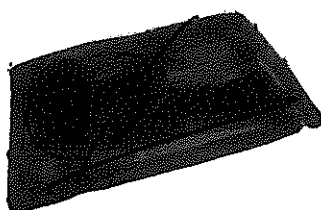
I take this to mean that in deciding whether a method is a method for performing a mental act, it is not relevant whether the steps of the method are performed by a computer, or are the same as or different from those which would normally have been performed by a human being. Thus, it would seem to follow that methods which could in principle be performed in the human mind would be excluded from patentability even if performed by a computer. However, while I can accept that the claims of both applications look very much like methods of performing, and apparatus arranged to perform, exactly the sort of operations that

would be performed mentally when calculating the forces, torques or motions arising in a multi-body linkage, I still do not feel able to say that the present invention as claimed in the two applications definitely amounts to nothing more than a method for performing a mental act. Consequently, I need say no more than I am not persuaded that the present invention should be excluded as a method for performing a mental act.

However, I have found that the claims of the present applications are excluded from patent protection by section 1(1)(d) and 1(2) as a mathematical method, a program for a computer or the presentation of information. As for the overall disclosures in the two specifications, I have also considered these very carefully but I can see no subject matter which could add anything of substance to what is set out in the present claims and could avoid this finding. As I indicated above, the specifications simply do not include any matter which could form the basis of a patentable invention.

For these reasons, I refused both the present applications under section 18(3) in my letter of 2 December 1994. Since my decision was communicated by letter on 2 December 1994, the 6 weeks allowed for appealing against that decision runs from the date of that letter, *ie* from 2 December 1994.

Dated this ~~14~~ day of December 1994



D M HASELDEN

Principal Examiner, acting for the Comptroller.

THE PATENT OFFICE