Intellectual Property Office

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PATENTS ACT 1977

APPLICANT Arthur Philip Young

ISSUE Whether patent application GB1418194.5 complies with sections 1(1)(c), 14(3) and 14(5)(b) of the Act

HEARING OFFICER Dr Jim Houlihan

DECISION

Introduction

1 Patent application GB1418194.5, entitled "Methods derived from a theoretical model of knowledge-generating systems", was filed on 14 October 2014 in the name of Arthur Philip Young. It relates to a method of specifying requirements for computer-controlled systems. The application was published on 20 April 2016 as GB2531288 A.

2 A search report under section 17(5)(b) was issued on 27 November 2015, together with an abbreviated examination report under section 18(3), reporting that a search would serve no useful purpose and raising objections on the grounds of clarity, sufficiency, and excluded matter. After some correspondence in which the examiner was not convinced by Mr Young's arguments and proposed amendments, the examiner issued a further examination report on 19 May 2016 with objections on the grounds of insufficiency, lack of industrial application, clarity, added subject matter, and excluded matter. This report also offered Mr Young a hearing which he accepted.

3 A telephone hearing was held on 25 August 2016. The examiner and the hearing assistant, Mr Thomas-Keefe, were also present. Mr Young filed a two page skeleton argument on 14 August 2016.

The invention

4 The examiner had maintained that it is not clear what the invention relates to. The first line of the description indicates the field in which the alleged invention lays. It reads "*the invention provides methods of specifying and of implementing requirements for computer-controlled systems"*. The majority of the hearing focussed on establishing what the invention is and on construing claim 1. Therefore, the clarity of the claims and the sufficiency of the specification are central to this decision, notwithstanding the other objections that have been raised by the examiner. If I find

the claims are unclear and/or insufficient then I will refuse the application under section 14(5(b) and/or section 14(3) and it will not be necessary to consider the other objections. If I find the claims are clear and sufficient, then I will consider the other objections.

The law

5 Section 1(1), as far as is relevant to the issue in this application, requires that:

> *"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) it is capable of industrial application*
> *(d)….*
> *And references in this Act to a patentable invention shall be construed accordingly.*

6 Section 4(1) reads:

> "*An invention shall be taken to be capable of industrial application if it can be made or used in any kind of industry, including agriculture*"

7 Section 14(3) of the Act requires that:

> *"The specification of an application shall disclose the invention in a manner which is clear enough and complete enough for the invention to be performed by a person skilled in the art."*

8 Section 14(5) of the Act specifies a number of requirements that the claims must fulfil for a patent to be granted. It states:

> *"14(5) The claim or claims shall –*
>
> *(a) define the matter for which the applicant seeks protection;*
>
> *(b) be clear and concise;*
>
> *(c) be supported by the description; and*
>
> *(d) relate to one invention or to a group of inventions which are so linked as to form a single inventive concept."*

The claims

9 The latest version of the claims was filed on 1 August 2016 and consists of 11 claims. In his final report of 27 July 2016 the examiner had raised an objection on the grounds of added matter to various phrases in the penultimate set of claims filed on 3 May 2016. In the latest version of claim 1 below I have underlined the matter which either the examiner had objected to in his report of 3 May 2016 or which was

incorporated by amendment following the examiner's final report and therefore had not been considered by the examiner.

10 Claim 1 reads:

> *A method of producing specifications of requirement, each such specification to specify behaviour required of a processor-controlled system;*
>
> *a specification produced according to said method to state constraints governing content of lists, each such list to describe behaviour of an entity; said processor-controlled system to be an entity while it runs, said entity to contain a population, said specification to specify that the number of entities within said population may vary; in producing said specification said method to identify entities and populations representative of said processor-controlled system; to identify physical variables each having a value within each entry of a list, said list descriptive of behaviour of an entity which has been identified; and to identify constraints on content of lists such as said list;*
>
> *an entity to be a physical object and/or physical objects and/or physical material, the nature and state of said object and/or objects and/or material to conform, while said entity exists, to a specification which is a noun or is terms equivalent to a noun;*
>
> *a first entity to contain a second entity while and only while all material content of said second entity is also material content of said first entity;*
>
> *a population to be a set of entities defined by reference to an entity termed the reference entity of said population and to exist while and only while said reference entity exists;*
>
> *a population to be an entity.*

Added matter

11 My first task is to decide if the matter added during the course of amending claim 1, either in the amendment of 3 May 2016 or in the version of 1 August 2016, represents added matter. Inevitably, this involves questions about the context of the added phrases and therefore the clarity of the claim as a whole. I will take each of the phrases in turn.

12 Line 1: "*A method of producing specifications of requirement".* This was added in the latest version of the claims and I am content to accept that it is supported by the specification, for example by the first paragraph of the description. It therefore does not represent added matter.

13 Lines 1-2: *"each such specification to specify behaviour required (of a processor-controlled system)".* The examiner had objected to this phrase in his report of 3 May 2016. In relation to this phrase, Mr Young said his main point was that he is "*not departing from the methods which are standard in physics where it is general*

practice to use values and variables like temperature and pressure and so on….to describe the behaviour of things".

14 Mr Young said the concepts of an entity and a population were important to understanding this phrase and referred me to the passage on lines 75-83 of the description. However, I cannot see a basis for specifying behaviour in a specification in that passage.

15 I studied the specification and found a reference on page 4 line 191-192 which refers to "*The behaviour of a processor in obeying a program…*". Lines 186-190 refer to a specification and then describe the behaviour of a processor. These read "*An operation is performed by a processor during a period of time which begins when the nature and state of the processor and of its physical environment begin to conform to a specification; the period ends on the next occasion when they conform to a second specification. The behaviour of the processor and of its environment during such a period is described by a set in which each member is a pair (I, J) where I identifies an arrow or branch within the standard tree descriptive of the operation and where J identifies the value taken by the corresponding variable throughout the corresponding period of time*".

16 While this phrase is not entirely clear, having read and re-read the description I can identify a concept of a processor conforming to behaviour specified in a specification. Taking this together with Mr Young's submission on this point I can accept that the phrase "*each such specification to specify behaviour"* provides adequate support and therefore, for the purposes of this decision, I am content to accept that it does not represent added matter.

17 The remaining phrases were included in the latest version of the claims following the examiner's final letter.

18 Lines 3-4: *"to state constraints governing content of lists".* The word "constraints" had been incorporated in the latest version of claim 1 to meet the examiner's earlier objection to "rules". Mr Young referred me to lines 240-249 of the description. Having read that I can see that the description of past behaviour of an entity can be recorded in a list, and lists can be stored to form a "history". There is an explicit basis for "constraints" on lines 353-354. This follows a discussion of specified content which consists of "sets" and histories. Earlier in the description lists are referred to in the context of content. On this basis I am content to accept that the phrase "*to state constraints governing content of lists"* does not represent added matter.

19 Lines 7-8: "*in producing said specification said method to identify entities and populations representative of said processor-controlled system*". Having reviewed the description, for example lines 308-310, I do not consider this phrase represents added matter.

20 Lines 8-9: "*to identify physical variables each having a value within each entry of a list, said list descriptive of behaviour of an entity which has been identified*". There is extensive reference to the identification of physical variables in the description, lines 99-101 read: "*The life of any entity may be described further by a description (V, F) where F is a list in which each entry states the value of the variable V during a period*

of time…" I am content to accept that the phrase in question here does not represent added matter.

21 Lines 9-10: "*and to identify constraints on content of lists such as said list*". This phrase has similar content to that which I have discussed above in paragraph 18 and I consider it does not represent added matter.

22 Line 13: *"which is a noun or is terms equivalent to a noun".* It is clear that an entity can be described by a noun. This phrase does not represent added matter.

23 I am content to accept that the version of claim 1 filed on 1 August 2016 does not include added matter.

Sufficiency and clarity

24 Sufficiency is generally a fatal objection as matter cannot be added to a patent specification after the filing date. The Act also requires that the claims shall be clear. However, it may be possible for a lack of clarity to be overcome by amendment, for example if the lack of clarity results from infelicitous drafting and it is clear from the specification what the invention is really intended to be.

25 The case law provides guidance on the factors which should be taken into consideration when assessing sufficiency. For example, in *Eli Lilly v Human Genome Sciences*[1]*,* Kitchen J indicated that sufficiency should be considered from the standpoint of the skilled person in light of the common general knowledge when considering the specification - the claims, description and any drawings - as a whole. Kitchin J indicated, *inter alia*, that in relation to a process claim this means being able to work the process without undue burden.

26 The determination of sufficiency and of clarity can overlap if, for example, ambiguity in the claims influences the analysis of sufficiency. This has been recognised by the courts, for example by the House of Lords in *Kirin Amgen v Hoechst Marion Roussel*[2]*,* where Hoffman LJ said:

> "*Whether the specification is sufficient or not is highly sensitive to the nature of the invention. The first step is to identify the invention and decide what it claims to enable the skilled man to do. Then one can ask whether the specification enables him to do it…. It seems to me that a good deal of the argument in this case about sufficiency, like the argument about infringement, really turns on a dispute over exactly what the invention is….All this creates ambiguity about the nature of the invention. But in order to decide whether the invention has been fully enabled, you first have to decide what the invention is*". [103-104]

27 In approaching the question of sufficiency, I am particularly minded of Hoffmann LJ's direction that first I must decide what the invention actually is. For me to do that the claim must clearly define the invention. Thus, I need to construe claim 1. At first sight

[1] *Eli Lilly and Co v Human Genome Sciences, Inc* [2008] RPC 29
[2] *Kirin Amgen Inc v Hoechst Marion Roussel Ltd [2005] RPC 9*

the claim is unclear. However, I am minded that I have a duty to try to understand the invention in light of the specification in a sense which will make it workable[3].

28 Accordingly, I will now take the series of phrases in claim 1 in turn in an attempt to construe it.

> *A method of producing specifications of requirement of a processor-controlled system;*

29 The introductory clause tells us the invention is a method. I have already considered this phrase in relation to added matter in paragraph 12 above. In the hearing, Mr Young said that "specification" means when a client tells the designer what the output or the result of the system should be. He said an example might be "I want a processor to monitor the thermocouples in the power station". I found the way Mr Young explained this in the hearing to be much clearer than the way it is written in the patent application. However, I do not think the description gets this point across at all, and it does not include any examples, such as a thermocouple in the power station. Unfortunately, the claim contradicts Mr Young's explanation, since the claim is telling us that the "specification" is the result of the inventive method, so seems not to be the input by the client.

30 Lines 350-367 of the description fall under the header of "specifying a requirement". These say at lines 351-352 "*In specifying a requirement we postulate the existence, within histories, of entries having specified content…*" Overall, having considered this phrase from the standpoint of the skilled person in light of what Mr Young has said, I consider that a specification in this context could reasonably be taken to mean a detailed description of requirements, of behaviours, which a computer processor system is required to compute or respond to. To put it another way I see a specification of behaviour as relating, in general terms, to the code of a computer program. A program specifies how a computer behaves.

> *a specification produced according to said method…*

31 This phrase introduces the desired result of the method. Critically, I need to look for the steps of a method which can be performed.

> *…to state constraints governing content of lists, each such list to describe behaviour of an entity;*

32 The description tells the reader about entities and how they represent physical things. The description (line 29-50 on page 1) uses examples of boxes within rooms, and a further example of a glass of water was used in the hearing. The description also tells us the behaviour of an entity is described by variables and that the variables have values to specify the behaviour. A "list" appears to be a sort of table held in a computer memory which holds values of the variables and hence the past behaviour of an entity (lines 99-102 on pages 2-3). As mentioned above in paragraph 18, Mr Young referred me to the passage on lines 240-249 of the description in connection with this phrase. As I understand it, this phrase of the claim

[3] Raleigh Cycle Co Ltd. and another v H Miller & Co. Ltd [1948] ER 308 at page 154, lines 35-40

informs the reader that “constraints” can be applied based on the content of the lists which the specification teaches is the history of the behaviour of an entity.

33 In summary, I can reasonably interpret this phrase as meaning that the specification which is produced includes lists which describe the behaviour or characteristics of an entity, for example a box or water in a bucket, as per the description (page 1 lines 30-40).

> *said processor-controlled system to be an entity while it runs, …*

34 This teaches that the entire system itself is an “entity” while it is running. It is not clear whether this entity is the one referred to in the previous clause. This clause is not a step of a method. Mr Young referred me to lines 268-269 of the description which read “*While it runs a processor-controlled system is represented, by a person specifying a behaviour required of that system, as an entity which contains populations of entities”*. I am not entirely clear what this means. It seems to mean that the processor is an entity itself. For example, in a room containing several boxes (a box being an entity and several boxes being a population), the room can be an entity of itself. I do not see the relevance of this phrase to the method.

> *…said entity to contain a population, said specification to specify that the number of entities within said population may vary;*

35 This does not teach a method step but refers to the relationship of entities and populations and what a specification may specify.

> *in producing said specification said method to identify entities and populations representative of said processor-controlled system;*

36 This seems to suggest the identification of entities and populations is a result of following the method. However, I think was is meant is that a computer processor has to identify entities and populations (of entities) in a system which it controls. In the description at line 452, under “Application of the proposed method”, there is an example of a message-routing system. Here, “populations” of input channels and output channels are identified. I can accept that a skilled person with suitable knowledge could perform an analytical breakdown, or an identification, of a processor-controlled system in some fashion. However, I consider that the level of direction given by the description and the message-routing example are not enough to enable an unimaginative skilled person to analyse a real system and identify entities and populations in a coherent manner in such a way as to enable the method to be completed. For example, is the identification a structural one, merely identifying the physical parts the system is made from? Is it a functional one, such as the example of a message-routing system? Could it include electrical circuit diagrams? Would it require an analysis of the computer processor itself? In the case of a typical industrial process, such an analysis may be theoretically possible but would certainly place an undue burden upon the skilled person, and in my view, would not be possible without exercising a considerable degree of imagination.

> *“to identify physical variables each having a value within each entry of a list”*

37 Mr Young said he could not identify a specific passage in the description relating to this phrase. However, I agree with him insofar as the description overall teaches that physical variables can be identified and given a value in a list. Mr Young said he was happy to delete this phrase. I will read the claim both with and without it.

> *said list descriptive of behaviour of an entity which has been identified, and to identify constraints on content of lists such as said list;*

38 Although this is not framed as a method step, it seems what is meant by this phrase is that the "list" is to be compiled with information which describes the entity(ies) identified in the previous step. Thus, as well as performing the analysis required in the previous steps, the skilled person would need to investigate the functioning and behaviour of each entity that has been identified, potentially an even greater burden than the previous step. The skilled person then has to identify constraints.

39 For example, what would be the descriptive behaviour of an entity (a box or a population of boxes) with reference to the reference entity (the room they were in)? I do not see an instruction in the specification that enables the skilled person to construct a list, notwithstanding that the claim merely states what the list is intended to contain. He/she then has to identify constraints. It is not clear what constraints need to be identified as it is not clear why such constraints would be identified. If the constraints are to be identified on the basis of the specified behaviour to which the processor control is applied, there is no teaching about what the behaviour is and what the purpose of the control is or the type of parameters the control is based on.

40 Taking the last three phrases together, the question that arises is: what are the physical variables? Numerous physical variables can be found in numerous systems, for example elements of the body, machinery, geology, or computers. Even if the skilled person in a particular art could identify variables which are descriptive of an entity, and represent them on a list, they would then have to identify constraints. There is no teaching in the specification about what the parameters of these constraints could be. In the hearing Mr Young said that "constraints" is synonymous with "rules". This suggests a third step involving further levels of analysis of the entities' behaviour to identify patterns or rules.

41 To return to the example on page 1, if the skilled person were to investigate water in a bucket, the question that arises is what aspect of that water would they be investigating? Temperature, volume, or pressure? In the absence of any teaching of the purpose of identifying entities and their variables and setting constraints it is not at all clear how these criteria would be selected and processed by a computer.

42 For reasons similar to those given in paragraph 36 above, I do not consider the section of the claim which reads "*in producing said specification said method to identify entities and populations representative of said processor-controlled system; to identify physical variables each having a value within each entry of a list; said list descriptive of behaviour of an entity which has been identified, and to identify constraints on content of lists such as said list"* is enabled by the specification.

> *an entity to be a physical object and/or physical objects and/or physical material,*

43 The examiner's view was that the "and/or" combinations in this clause could create problems with construction. At the hearing this was discussed and Mr Young consented to this being amended if necessary. In my view this clause is not problematic because the description is clear what is meant by an entity, and any combination of and/or would not affect my decision on the clarity or sufficiency of the claim as a whole.

> *the nature and state of said object and/or objects and/or material to conform, while said entity exists, to a specification which is a noun or is terms equivalent to a noun;*

44 This clause merely asserts that a specification relates to the object(s) and the entity(ies) and that entities have to conform to a specification. It also indicates that there is either some control of an entity(ies) or that entity(ies) are selected which meet the requirements of a specification. It is not clear what a skilled person trying to perform the invention would do at this point. Thus, I consider this phrase is neither clear nor enabled.

> *a population to be a set of entities defined by reference to an entity termed the reference entity of said population and to exist while and only while said reference entity exists; a population to be an entity*

45 These clauses tell us that an entity may contain other entities and may be defined with reference to other entities. This is covered by the description at lines 30-50 on page 1. In the hearing, Mr Young used an example of a glass sitting on a table to illustrate his concepts of "entities" and "populations". A glass is an entity and is a member of the population "glasses". If the glass is on the table then it is part of a population "glasses on the table", the table being a reference entity. The behaviour of an entity is further described by variables which have particular values, the values being a function of time. An entity is any physical thing that can be defined by a noun. This phrase does not instruct the skilled person to do anything. Rather, it merely states the theoretical relationship of entities, reference entities and populations.

46 In relation to sufficiency in general Mr Young said the invention "*relates to a method or principle on which to base design…requirement specification and design and points towards using entities and populations (to do that)"*. He went on to say "*there is a question how one would recognise whether the invention was being applied or not*" and that people would have to be trained to do it on an industrial scale.

47 However, it is not clear to me how the method of claim 1 could be applied to the examples given in the description that relate to water in a bucket or boxes in a room, let alone to systems in general. What would the specification for a population of entities (boxes), each box being an entity, in a room (reference entity) actually instruct a computer to do? Or to look at is another way, how would a specification be constructed by a computer program in relation to entities (boxes in a room).

48 In an attempt to answer these questions I have looked at the specification where it mentions some characteristics that relate to entities and their variables. For example lines 99-103 read: "*The life of any entity may be described further by a description (V, F) where F is a list in which each entry states the value of the variable V during a*

period of time which is of vanishingly-short duration, all such periods having the same duration; these values are listed in time order. The entity may be regarded as containing an oscillator which generates signals marking the boundaries of the periods of time, signals which "publish" successive values of V, publication explained below under that heading".

49 Mr Young put some store in the necessity of publication, for example in lines 131-135 of the description which read: "*Because values are meaningful only when published a (further) description of behaviour of an entity must be tree-structured. The tree originates from the physical change which brings the entity (and the variables having values descriptive of its behaviour) into existence and which publishes the first set to appear in the tree. A tree first exists as a published value which indicates that the tree then has no other content"*.

50 Mr Young pointed to lines 204-205 and 216-220 of the description which refer to sensors: "*During its life behaviour of a "sensed" entity may be sensed by a "sensor" entity. The behaviour is described by two standard trees, one describing the life of the sensed entity and the other that of the sensor; published values represented in the first tree will, where sensed, be represented in the second also. In sensing a value of a variable a sensor publishes the value communicated to it, using that input value to derive and publish the sensed value".* It goes on to say, at line 233: *"In effect any sensor reads from a tree selected by timing from a set containing at least one such tree. Each of these trees describes past behaviour of the entity according to a convention assumed by the designer of the sensor and is meaningful for that reason".*

51 From these passages I still cannot determine how data relating to an entity(ies) or populations is to be used in general, nor how a specification for a computer program could be derived even if I were to apply it to the example of boxes in a room.

52 In his skeleton argument, paragraph 7, Mr Young says in relation to sufficiency "*The invention proposes that physical behaviour is to a person the behaviour of entities of which some are populations, these defined using nouns or equivalent terms; a noun is necessarily drawn from a natural language*". I am afraid this does not assist me in being able to determine a sufficient basis for claim 1.

53 Towards the end of the hearing Mr Young identified what he considered to be three "inventive steps". Briefly these are (i) "Any sensor reads from a tree selected by timing" (description, lines 233-235); (ii) "publication" - of a set of values (description, lines 115-124) and of trees (description, lines 216-230); (iii) the use of language to denote entities and populations (which is clear throughout the description). Mr Young acknowledged that some of these features are not specified in the claim. In my view even if they were they do not assist his case for making the claim sufficient.

54 In this present case, the opening phrase of claim 1 indicates it is a method claim. I have analysed each of the phrases in this claim in an attempt to construe it. Having done this and also read the claim in its entirety, I consider it is unclear. For example, it is not clear whether it relates to analysing entities and populations and their behaviour and using this information to derive a specification for a computer program or whether it is to use information, for example known parameters, about entities and populations to create a specification so that a computer program could perform an

analysis of entities and populations. There is also the concept of entities conforming to a specification which implies that a computer output exerts some control or enables entities to be selected which meet a specification.

55 I do not believe the skilled person could actually work claim 1 as it is not clear what the process is. This is not just a matter of drafting. Rather, having read and re-read the specification many times I cannot identify a method or process that the skilled person could carry out.

56 I hold that claim 1 is not clear and that the specification is insufficient.

Industrial application

57 In his skeleton argument Mr Young said under the heading of industrial application "*An improved method of specifying and implementing requirements for processor-controlled systems is sorely needed in the industry*".

58 In his final letter the examiner said at paragraph 7 "*Your claims seem to define an abstract and theoretical model of a process. There would appear to be nothing that can be made or performed, and thus your claims fail the requirement of being capable of industrial application (Section 1(1)(c) of the Act*".

59 In discussing industrial application Mr Young said the method is about specifying a requirement, for example "I want you to make my fuel rods" and identifying the nouns in that requirement to produce a specification in prolog or other functional language. In trying to understand this point and to find a basis for it in the description I identified the passage in the specification on lines 350-364 headed "specifying a requirement". I have also considered, in particular, the passage under the header of "specifying a design" at lines 303-349.

60 When I asked Mr Young in the hearing about where the industrial application of the proposed method lays he said "….*Entities and populations are physical, the designer has to go through the steps of defining a requirement and recognising the entities and populations and then writing programs and then deciding how these programs are going to be initiated and obeyed….*".

61 Having read the specification several times, I consider it relates to a theoretical proposition and an exposition about entities and various parameters that could be associated with them. I cannot see an application of the features of claim 1 in the field of computer programming.

62 Having considered Mr Young's submissions and the description, similar for the reasons I have given above in relation to sufficiency, I cannot determine a clear method in claim 1; *ipso facto* it follows that there is no method which could be performed in industry. As a result, I hold that claim 1 lacks industrial application.

Conclusions

63 I have construed claim 1 in light of the description and I find that the claim is unclear and therefore does not meet the requirements of section 14(5)(b) of the Act.

64 In determining the clarity of claim 1 I consider that I have also been able to make an adequate assessment of the sufficiency of the specification. For the reasons given above, I hold that the invention is not disclosed in a manner which is clear enough and complete enough for it to be performed by a person skilled in the art. The specification therefore does not comply with section 14(3) of the Act.

65 I also hold that the invention does not meet the requirement of section 1(1)(c) of the Act as I have been unable to identify a method which could be applied in industry.

66 I have carefully considered the dependant claims and the specification in its entirety and cannot see any saving amendments in respect of sufficiency.

67 I note that the examiner had raised objections on the grounds of lack of support and that it relates to excluded subject matter by virtue of section 1(2) of the Act. As I have found that the application is insufficient I do not propose to consider these objections, which in any case the applicant did not have the opportunity to argue. I also note that the application has not been searched and therefore the examiner reserved his views on novelty and inventive step.

68 I also note that section 14(5)(a) requires that the claims shall define the matter for which the applicant seeks protection. An objection on these grounds was not specifically put to Mr Young nor was it argued at the hearing. I will therefore not make a formal finding on this point, although I consider *prima facie* that the claims do not meet section 14(5(a) of the Act.

69 I appreciated Mr Young's respectful and constructive approach at the hearing. However, I must refuse the application under section 18(3) of the Act as it does not comply with sections 1(1)(c), 14(3) or 14(5)(b) of the Act.

Appeal

70 Any appeal must be lodged within 28 days

Dr Jim Houlihan

Deputy Director, acting for the Comptroller