Commissioner=s Decision #1345
Décision du Commissaire #1345

TOPIC: B00, B22, J00, J70
SUJET: B00, B22, J00, J70

Application No. : 2,333,184

Demande n$^{o}$ : 2,333,184

IN THE CANADIAN PATENT OFFICE

DECISION OF THE COMMISSIONER OF PATENTS

Patent application number 2,333,184, having been rejected under Subsection 30(3) of the *Patent Rules*, has consequently been reviewed in accordance with Subsection 30(6) of the *Patent Rules* by the Patent Appeal Board and the Commissioner of Patents. The findings of the Board and the ruling of the Commissioner are as follows:

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## INTRODUCTION

[1] Weyerhaeuser is a wood-product company that manufactures artificial plant seeds on an industrial scale as part of its tree farming and reforestation activities. It has applied for a patent that now contains 68 claims which concern automated methods of classifying, or sorting, plant embryos of unknown germination potential before they are encapsulated and ultimately formed into artificial seeds.

[2] During examination the application was considered defective because certain claims were directed to non-statutory subject matter and/or were considered too broad. Examination was terminated by way of a Final Action chiefly on these grounds. In response, Weyerhaeuser maintained that the application was compliant with the *Patent Act* and the *Patent Rules*.

[3] An initial review by the Patent Appeal Board established that:

(i) the examiner considered method claims 1-34 non-statutory and apparatus claims 35-68 statutory;

(ii) the examiner found claims 12-22 and 46-56 (which feature a ALorenz@ curve) to be too broad; and,

(iii) the Applicant wished to proceed with a review based on the record as it stands.

[4] It now falls to us to review the rejected application and settle the following questions:

(1) Do claims 1-34 define non-statutory subject matter that fails to comply with section 2 of the *Patent Act* and subsection 27(8) of the *Patent Act*?

(2) Are claims 12-22 and 46-56 broader in scope than the teachings of the description and therefore non-compliant with section 84 of the *Patent Rules* and subsection 27(3) of the *Patent Act*?

## QUESTION 1: DO CLAIMS 1-34 DEFINE NON-STATUTORY SUBJECT MATTER?

[5] To be considered statutory, the subject matter of an invention must fall within one of the categories enumerated in section 2 of the *Patent Act*:

> Ainvention@ means any new and useful art, process, machine, manufacture or composition of matter, or any new and useful improvement in any art, process, machine, manufacture or composition of matter.

[6] Per subsection 27(8) of the Act, an invention must also not be directed to a mere scientific principle or abstract theorem.

[7] The Final Action identified non-compliance with both section 2 and subsection 27(8) as grounds for rejection. In respect of section 2, the examiner found that the claimed methods lacked physicality. In respect of subsection 27(8), the examiner considered the claims to be essentially abstract. Since both grounds for rejection are closely related, a satisfactory answer to the subject matter question can be had by considering whether the claims satisfy a singular so-called Aphysicality requirement@ as it has been expressed in the jurisprudence.

[8] The first step in addressing the question is to construe the claims.

<u>Purposive construction</u>

[9] Purposive construction is the framework used for assessing patentable subject matter: *Canada (Attorney General) v Amazon.com Inc*, 2011 FCA 328 [*Amazon*]. During purposive construction, the elements of the claimed invention are identified as either essential or non-essential: *Free World Trust v Electro Santé Inc*, 2000 SCC 66 [*Free World Trust*]. In order for an element to be considered Anon-essential@, Ait must be shown either (i) that on a purposive construction of the words of the claim it was clearly *not* intended to be essential, or (ii) that at the date of publication of the patent, the skilled addressees would have appreciated that a particular element could be substituted without affecting the working of the invention@ (*Free World Trust* at para. 55).

[10] As reasoned below, we find that there are physical essential elements of the claimed

invention that exist in combination with other claim elements and that this finding is sufficient for us to reach a conclusion with respect to the physicality requirement that arises in the context of the statutory subject matter question.

*Construction: General Considerations*

[11] To gain a better appreciation of the claimed invention it is appropriate to consider its context understood against the backdrop of the specification considered as a whole. Further, in order to give a purposive construction to the claims, Aone should understand the purpose of the invention and the problem that the invention sought to address@: *Wenzel Downhole Tools Ltd v National-Oilwell Canada Ltd,* 2011 FC 1323 at para. 61 (see also the Office Patent Notice published March 8, 2013 entitled A*Practice Guidance Following the Amazon FCA Decision*@ and its accompanying memo, PN 2013-02). At the same time the orthodox rule is that a patent Amust be read by a mind willing to understand, not by a mind desirous of misunderstanding@: *Lister v Norton Brothers and Co* (1886), 3 RPC 199 (Ch D), at 203; cited with approval in *Whirlpool Corp v Camco Inc*, 2000 SCC 67 at para. 49.

[12] Claims are construed in an informed and purposive manner from the viewpoint of the notional Aperson skilled in the art@ in light of that person=s common general knowledge and based on the patent specification itself without resort to extrinsic evidence (*Free World Trust* at para. 66).

<u>Claim 1</u>

[13] Claim 1 is a method claim and it reads as follows:

1. A method for classifying plant embryos according to their germination potential comprising:

(a) developing a classification model by
(i) using a scanning device, acquiring raw digital image data of reference samples of whole plant embryos or of embryo organs of known germination potential;
(ii) using a computer coupled to the scanning device, performing a data analysis by applying one or more classification algorithms to the acquired raw digital image data, wherein at least one of the classification algorithms uses more than an embryo perimeter from the acquired raw digital image data, the data analysis resulting in development of a classification model for classifying plant embryos by their germination potential; and
(iii) storing the developed classification model in computer memory;

(b) using the scanning device, acquiring raw digital image data of a plant embryo or a plant embryo organ of unknown germination potential; and

(c) using the computer, applying the developed classification model stored in the computer memory to the raw digital image data of step (b) to classify the plant embryo of unknown germination potential according to its presumed germination potential.

*The context of the invention, its purpose, and the problem that the invention sought to address*

[14] An artificial seed includes as its vital component an encapsulated plant embryo. Such embryos are produced in the laboratory by manipulating somatic tissues so as to trick them into producing multitudes of genetically identical Asomatic@ embryos (as opposed to naturally occurring Azygotic@ embryos). However, the embryos have unknown germination potential and may vary in their stage of maturity and development. Thus, it is necessary to select those with suitable germination potential prior to encapsulation and formation of artificial seeds.

[15] Considering the context of the invention, we thus gather that:

(i) the invention is to be performed in an industrial setting where the Adesired output will be in the millions of plants@ (page 2, lines 18-19);

(ii) it is performed on populations of somatic embryos developed in culture on a mass scale; and,

(iii) embryo classification must be done in an expedient manner before they lose viability, before a change occurs in their developmental status and before additional time and resources are needlessly dedicated to maintaining embryos that will eventually prove unsuitable.

[16] The process of manually selecting suitable embryos is inherently subjective, labour intensive, tedious, time consuming, expensive and poses a major obstacle to production on a mass scale. Thus, there exists a number of inter-related problems, including:

(i) the problem of streamlining and automating a tedious task (page 2, lines 10-12);

(ii) the existence of a Amajor production bottleneck@ when embryos are classified visually by technicians (page 2, line 18);

(iii) the problem of subjectively attempting to distinguish between subtle morphological differences that exist between plant embryos within a given plant species (page 3, lines 3-7); and,

(iv) the problem of the subjective pre-judgement of features considered important during embryo selection (page 2, lines 26-28; page 3, lines 6-7).

[17] The present application addresses these concerns by generally proposing a plant embryo classification process that relies on automated analyses of plant embryos while in culture. Analytical methods include digital image and spectral analysis. Whether the analysis done is image analysis or spectral analysis, the general goal is to extract as much meaningful information as possible from the data gathered. Taking into account certain selection criteria, the information is then analyzed by applying classification algorithms in order to develop a classification model which, in turn, is used for more accurate identification and sorting of plant embryos with suitable germination potential. More particularly, the inventors see a need to utilize complex imaging technologies (page 3, line 35); to extract as much data as possible (page 3, lines 30-32); and, to develop data analysis tools that can be applied in the present

context(page 3, lines 10-13). These aspects are reflected in the method of claim 1. It starts with a preamble and then recites a series of steps.

*The skilled person*

[18] The background of the invention suggests that the skilled person is a team that includes a bioengineer, a forestry biotechnologist and a computer specialist. As such, the skilled person would possess the following: expertise in plant tissue culture as it is conducted in an industrial setting; knowledge of what characteristics dictate embryo quality and germination potential; general knowledge of analytical techniques; and a general knowledge of statistical techniques and how they can be programmed into a computer.

*Claim 1, purposively construed, contains physical essential elements*

[19] Both the claim preamble and the body of the claim indicate that the claimed invention includes a number of physical essential elements that exist in combination with other claim elements. These physical elements cannot be substituted or omitted without affecting the working of the invention.

[20] As regards the preamble, it indicates that the claim is directed to a method for Aclassifying plant embryos.@ A literal interpretation of this expression may suggest that as few as two embryos are to be classified. However, a purposive construction of the expression does not support such an interpretation because, remembering the problems faced by the inventors, the invention is performed in iterative cycles for each member of a large population. If the invention truly addressed the simple problem of classifying as few as two plant embryos, the presently claimed solution would not, as a matter of practicality, be worthwhile. A suggestion that the skilled person first analyze a population of reference samples and then develop a classification

model B for the sake of classifying two embryos B is a proposal that is incongruous with the problem the inventors actually faced.

[21] As to the term Aclassifying@ in the expression Aclassifying plant embryos@, the specification does not provide an explicit definition. According to the Oxford Dictionary of English, the term Aclassify@ means to Aarrange (a group of people or things) in classes or categories according to shared qualities or characteristics@ and, according to the Oxford Thesaurus, it is synonymous with the terms Aorganize@, Agroup@ and Asort.@ Remembering that the skilled person is concerned with sorting the Agood@ embryos from the Abad@ embryos, the expression Aclassifying plant embryos@ would be understood by that person to include physical separation of the two types. A conclusion that the expression Aclassifying plant embryos@ has a purely abstract meaning would suggest the anomalous result that the claims are directed to the intellectual exercise of simply recognizing good versus bad embryos without actually physically separating them; i.e., an acontextual, purposeless construction that would again, as a matter of practicality, be a notion that is incongruous with the problem the inventors actually faced.

[22] The preamble therefore means that the claimed method is performed on a population of embryos and that it achieves a physical result, namely the generation of distinct sub-populations.

[23] The body of claim 1 also indicates that the claimed invention possesses physicality. It recites a series of three steps beginning first with step (a) which entails Adeveloping a classification model.@ This main step involves three sub-steps of which step (a)(i) involves acquiring Araw digital image data@ for plant embryos of known germination potential. A digital image is necessarily comprised of pixels. This indicates that the digital data generated in step (a)(i) is acquired using a digital scanner (i.e., a digital camera) and that pixel data is captured electronically. In that vein, it is worth considering at least two things that stand out after reading the specification. The first is that the specification addresses, in part, the problem of resolving the subtle morphological differences that exist between embryos, even if they are genetically identical:

> Where embryos are concerned, a further problem [of] using scanning technology is that morphology differs between clones within a given species. The differences between acceptable and rejected embryos can be very subtle, varying by clone. [page 3, lines 3-5]

[24] The second is that, under the heading of Summary of the Invention, the specification states that as much data as possible should be acquired:

> The present invention is based on classification of plant embryos by the application of classification algorithms to digitized images and absorption, transmittance, or reflectance spectra of the embryos. The methods are generally applicable and emphasize the importance of acquiring and using as much image and absorption, transmittance, or reflectance spectral information as possible, based on objective criteria. [page 3, lines 30-33]

[25] These teachings mean that the invention cannot be performed without first having physically acquired digital image data at sufficiently high resolution to allow for the discrimination between plant embryos, and second, that when acquiring the data it is important to acquire as much as possible. All of the foregoing considerations indicate that the use of physical digital data acquisition and capture tools are essential to sub-step (a)(i).

[26] Thus, claim 1 includes a number of physical essential elements that cannot be substituted or omitted without affecting the working of the invention. As explained more fully below, this finding is sufficient to answer the subject matter question and it is not strictly necessary to consider whether any remaining elements are essential.

Claims 12 and 23

[27] The other independent claims (claims 12 and 23) share common technical elements and rely on similar steps and adopt similar terminology. In claim 12 the classification model uses a Asingle metric@ model developed using more specific steps involving a classification algorithm

based on a particular statistical technique known as a ALorenz@ curve. The method of claim 23 relies on the acquisition of spectral data (instead of raw digital image data as set forth in claim 1) gathered through absorption, transmittance or reflectance analysis. However, the claim terminology unique to these claims is clear and these differences do not affect our subsequent analyses since they, like claim 1, possess physical essential elements.

Non-statutory subject matter

*The Final Action and Summary of Reasons*

[28] Citing *Lawson v Commissioner of Patents* (1970), 62 CPR 101 (Ex Ct) [*Lawson*], and *Schlumberger Canada Ltd v Commissioner of Patents* (1981), 56 CPR (2d) 204 (FCA) [*Schlumberger*], the Final Action asserted that the claims lack physicality and are Adirected to methods that are not an act or series of acts performed by a physical agent upon a physical object resulting in a change of character or condition of that object@ and the methods therefore do not constitute an art under section 2 of the Act. It was argued that:

> [t]he steps of acquiring raw digital image data, reflectance spectral data performing data analysis or calculating metric values as defined in claims 1, 12 or 23 do not define a physical step in a *per se* manner. Further none of the methods define a physical step that accomplishes a physical result.

[29] In the Summary of Reasons the examiner maintained that Ascanning embryos in claims 1, 12 and 23 does not change the embryos neither do the steps of performing data

analysis or calculating metric values.@

*The Applicant=s position*

[30] The Applicant responded to the Final Action by arguing along two lines: (i) that the claimed invention did satisfy the definition of Aart@ in *Lawson*; and, (ii) that, in any event, the *Lawson* definition has been supplanted by the broader definition set forth by the Supreme Court of Canada in *Shell Oil Co v Commissioner of Patents* (1982), 67 CPR (2d) 1 [*Shell Oil*].

[31] Referring to the *Lawson* definition, it was explained that the claims recite Aa physical agent (>a scanning device= or >a computer=) [acting] upon a physical object (i.e. plant embryos).@ Referring particularly to claim 1, it was further argued that:

> When implemented, the claimed method facilitates selection of plant embryos having an increased likelihood of germination from a maturation medium that also includes embryos that are unlikely to germinate. The selection effectively also provides a change in the character or condition of the embryos, in that the selected embryos differ from the overall population of embryos.

[32] The method was thus said to comply even with the more restrictive definition of Aart@ set out in *Lawson*.

[33] The second prong of the Applicant=s arguments relied on the more contemporary decision in *Shell Oil*. The Applicant emphasized that certain words and phrases found in a key passage in that decision supported a broader interpretation of the term Aart@. Ultimately, the Applicant relied on the Federal Court=s interpretation of *Shell Oil* as it was stated in *Progressive Games Inc v Commissioner of Patents* (1999), 3 CPR (4th) 517 (FCTD). Applied to the facts in the present case, the Applicant argued that the claims satisfied this more recent case law because: (i) the method may be practically applied to classify a plant embryo of unknown germination

potential; (ii) all previously raised novelty and obviousness objections have been overcome; and (iii) the claimed methods have a result or effect that is commercially useful.

*Analysis*

[34] The Final Action relies on *Lawson* B a case that dealt with claims related to the art of subdividing land into champagne glass-shaped parcels. The narrow issue was framed as follows:

> The narrow issue is whether the word Aart@ in the definition, includes a means of describing the boundaries of a plot of land and whether a piece of land subdivided into lots, the boundaries of which are delineated by curved lines in the shape of a champagne glass constitutes an Aart@ or Amanufacture@ within the meaning of that word as included in s. 2(*d*). [p. 109]

[35] The Court provided the following definition of the term Aart@:

> An art or operation is an act or series of acts performed by some physical agent upon some physical object and producing in such object some change either of character or of condition. It is abstract in that, it is capable of contemplation of the mind. It is concrete in that it consists in the application of physical agents to physical objects and is then apparent to the senses in connection with some tangible object or instrument. [p. 109]

[36] This is the physicality requirement alluded to in the Final Action. However, after the Final Action was issued, the Federal Court of Appeal affirmed in *Amazon* that a determination of compliance with section 2 of the Act must be based on a purposive construction of the claims.

[37] It is true that performing data analyses or mathematical calculations of the type mentioned in the claims may not, as stated in the Final Action, amount to a physical transformation *per se*. However, as explained above, a purposive construction of the claims does not support the conclusion that the invention consists solely of data analyses or mathematical calculations. A purposive construction of the claims finds that they include physical essential steps performed on populations of embryos *en masse* with the ultimate result being physical separation of members into two classes: embryos with acceptable germination potential and those with unacceptable potential. We do not agree that the data acquisition steps are non-physical abstractions as the Final Action suggests, because by their very nature they constitute physical steps that cannot be done abstractly.

[38] So understood, there is no requirement that individual embryos be changed in their character or condition. In that regard we note that the Commissioner=s Decision in *Amazon* [*Re Amazon Inc Patent Application No 2,246,933* (2009), 75 CPR (4th) 85, (PAB & Com=r Pat), CD 1290] reasoned, with reference to *Lawson*, that Athere is no change either of character or of condition to any physical object itself by the act of ordering the product in one way or another@ (at para. 175 of the Commissioner=s Decision). On appeal, however, the Federal Court found that there was a physical effect because the Atransformation or change of character resides in the customer manipulating their computer and creating an order@ and it mattered not that the goods ordered were not physically changed *(Amazon.com Inc v Canada (Attorney General)*, 2010 FC 1011 at para. 75). Ultimately the *Amazon* application issued to patent.

[39] In contrast, the claims in *Lawson* were seen as Amore approximate to a plan@ and therefore considered non-compliant because Athe superimposition of a plan of subdivision on a larger tract of land does not result in a change in the character of the land.@ Thus, there was merely notional, legal, separation of the land along lines drawn by a surveyor, as opposed to the physical separation of the good embryos from the bad in the present case.

[40] If the claims satisfy the guidance set out in *Lawson*, as we consider they do, they logically also satisfy any broader interpretation subsequently set out in *Shell Oil* and, therefore, there is no need to delve into that case. However, as this case involves a computer implemented process we must also consider the argument expressed in the Final Action that *Schlumberger* is authority for finding the claims non-compliant with section 2 of the Act.

[41] According to *Schlumberger*, and its subsequent treatment by the Federal Court of Appeal in *Amazon*, computerization of a primarily mathematical method may not be sufficient to render a claim statutory.

[42] At para. 66 of *Amazon*, the Court expressed its view on the Aphysicality@ requirement, holding that Abecause a patent cannot be granted for an abstract idea, it is implicit in the definition of >invention= that patentable subject matter must be something with physical existence, or something that manifests a discernible effect or change.@

[43] In the present case, unlike *Schlumberger*, computer implemented data analyses are not the sole focus of the claimed invention. There also exist steps B which include digital scanning, physical data acquisition and separation of embryos B performed in combination with computerized analyses, that have Aphysical existence.@

[44] For the above reasons, independent claim 1 is compliant with section 2 of the Act and, by extension, so are its dependent claims. Similar reasoning applies in respect of independent claims 12 and 23 and their dependent claims.

*Non-compliance with subsection 27(8) of the Act*

[45] A second reason for finding that the claims define non-statutory subject matter is based on a conclusion expressed in the Final Action that the claims are directed to abstract

mathematical theorems. Having considered the Final Action and the Applicant=s response, we generally agree with the Applicant=s position but do not find it necessary to dwell on this secondary aspect for two reasons.

[46] Firstly, A[j]ust as in the case of >art=, the scope of the word >process= in s. 2(d) [now s. 2] is somewhat circumscribed by the provision of s. 28(3) [now s. 27(8)] excluding a >mere scientific principle or abstract theorem=@ : *Tennessee Eastman Co v Canada (Commissioner of Patents)* (1972), 8 CPR (2d) 202 (SCC) at 206.

[47] Secondly, consideration of compliance with s. 27(8) B like a consideration of compliance with section 2 B hinges on the same purposive construction of the claims through which we have found them to be more than mere mathematical theorems and that they exhibit physicality. It follows that if a claimed invention, purposively construed, exhibits physicality, it is not abstract.

[48] Thus, our findings in respect of section 2 can be extended to a s. 27(8) analysis and we find the claims compliant with the latter as well.

## QUESTION 2: ARE CLAIMS 12-22 AND 46-56 OVERLY BROAD?

[49] The application has also been rejected based on an allegation that method claims 12-22 are broader in scope than the teachings of the description, contrary to rule 84 and subsection 27(3) of the Act. The reasoning was extended to apparatus claims 46-56, which parallel the language of claims 12-22 and were added to the claim set in response to the Final Action.

[50] Section 84 of the Rules and subsection 27(3) of the Act are concerned with the relationship between the extent of disclosure and the scope of the claims.

[51] Section 84 of the *Patent Rules* reads :

> The claims shall be clear and concise and shall be fully supported by the description independently of any document referred to in the description.

[52] The relevant paragraphs of subsection 27(3) of the Act read:

> The specification of an invention must:
>
> (*a*) correctly and fully describe the invention and its operation or use as contemplated by the inventor;
>
> (*b*) set out clearly the various steps in a process, or the method of constructing, making, compounding or using a machine, manufacture or composition of matter, in such full, clear, concise and exact terms as to enable any person skilled in the art or science to which it pertains, or with which it is most closely connected, to make, construct, compound or use it; . . .

[53] The Supreme Court decision in *Consolboard Inc v MacMillan Bloedel (Saskatchewan) Ltd* (1981), 56 CPR (2d) 145 at 157 (SCC) [*Consolboard*] states that sufficiency of disclosure primarily concerns two questions that are relevant for the purpose of subsection 27(3) of the *Patent Act*: What is the invention? How does it work?

[54] The description of the invention must be correct and full and the specification must enable the invention across its entire scope as claimed. The skilled person must not be called upon to display inventive ingenuity or undertake undue experimentation in order to practise the invention.

*The Final Action and Summary of Reasons*

[55] The Final Action asserts that the specification is lacking in respect of calculating metric values of plant embryos and how they can be used to establish Lorenz curves:

> Applicant has not taught how to classify plant embryos by calculating metric values and calculating Lorenz curves from two sets of metric values derived from whole embryos. Further applicant has not taught the metric values used to calculate said Lorenz curves. On page 29 applicant discloses the use of Lorenz curves but does

> not disclose or define which metric values are used to establish Lorenz curves. Therefore a person skilled in the art has no factual basis to rely on in order to predict which metric values can be used to establish Lorenz curves that will enable the classification of the germination potential of whole embryos.

[56] The Summary of Reasons similarly expressed that the Aapplicant must clearly disclose how the algorithms will classify the embryos as good/bad or germinating/non-germinating.@

*The Applicant=s position*

[57] In the response to the Final Action the Applicant noted that Aa metric value refers to >any scalar statistical value that captures geometric, color, or spectral features which contains information about the embryos, such as central and non-central moments, function of the spectral energy at specific wavelengths or any function of one or more of these statistics= (Page 11, lines 19 - 22, of Applicant's disclosure).@

[58] The Applicant also pointed out that specific examples of the method of claim 12 are recited on page 29, line 21 through page 35, line 4.

[59] Claim 12 was explained in greater detail as generally involving eight steps:

> First, raw digital image data are obtained from reference plant embryos of known germination potential. Second, a metric value is calculated from the acquired raw digital image data of each embryo of known germination potential. AMetrics@ refers to Aany scalar statistical value that captures geometric, color, or spectral features which contains information about the embryos, such as central and non-central moments, function of the spectral energy at specific wavelengths or any function of

one or more of these statistics@ (Page 11, lines 19 - 22, of Applicant's disclosure). Third, the metric values obtained above are divided into two sets of metric values according to their known germination potential. Fourth, a Lorenz curve is calculated from the two sets of metric values. Fifth, any point on the Lorenz curve calculated above is used as a threshold value to arrive at a single metric classification model for classifying plant embryos by their germination potential. Sixth, the developed single metric classification model is stored in computer memory (Page 16, line 25, through page 21, line 16, of Applicant's disclosure). The Lorenz curve and its threshold value, found as described above, can be used to form a Asingle metric classification model,@ in which Avalues of a metric less than its threshold are assigned to one embryo quality [e.g., having good germination potential] and values greater than the threshold are assigned to the other embryo quality class [e.g., having poor germination potential]. (Page 20, lines 12-14.)

Seventh, raw digital image data are obtained from plant embryos of *unknown* germination potential. Eighth, the single metric classification model developed above is applied to the raw digital image data of embryos of unknown germination potential, to thereby classify those plant embryos of unknown germination potential according to their *presumed* germination potential.

[60] The Applicant concluded by saying that the claims are clear and concise and that the specification fully describes the claimed invention so as to enable any person skilled in the art to make and use the claimed invention.

*Analysis*

[61] The specification is directed to the person skilled in the art (*Consolboard* at p. 158), who, in this case, has been determined to be a team of people comprising a bioengineer, a forestry biotechnologist and a computer specialist. It should be remembered that it is these people who, working together, must be able to make and use the claimed invention.

[62] The Final Action focuses on two narrower aspects not found in either of the broader independent claims: how to classify plant embryos by calculating metric values and thereafter using these metrics values to calculate Lorenz curves. Accordingly, we will consider whether the inclusion of these elements renders the claims overly broad.

[63] Metric values are defined in the description and are scalar, statistical values that capture things such as the geometry, color, or spectral features which contain information about plant embryos. A forestry biotechnologist knows what features are predictive of good germination potential. For example, an embryo with proper colour and axial symmetry can be expected to have better germination potential than an off-coloured, malformed one. A bioengineer would know how to collect the relevant information. For example, an embryo can be imaged from many viewpoints in order to acquire raw digital information that can then be processed to yield metrics in order to identify and emphasize embryo data that is useful in the development of an embryo quality classification model (see page 10, lines 3-19). Since the skilled person would understand that each type of metric is a useful and relevant quantity in the context of determining germination potential, we see no reason why the claims must be narrowed to any one metric in particular.

[64] After embryo data acquisition has been completed, the skill of a computer specialist would become important in order for the data to be manipulated using classification algorithms for the purpose of generating a classification model developed from training sets of known embryo germination potential.

[65] The claims in question are a variation on other claims but employ a classification model that uses a Asingle metric@ and a particular classification algorithm based on a ALorenz@ curve. According to page 19 of the specification, a Lorenz curve has its origins in the field of economics and was developed to compare income distribution among different groups of people. It is created by plotting the fraction of income versus the fraction of the population that owns that fraction of the income.

[66] The description generally explains (on page 4, line 33 to page 5, line 2) how a Lorenz curve is applied for the present purposes:

> The metric values are first divided into two sets of metrics based on the known embryo quality. A Lorenz curve is then calculated from each set of metric values. A threshold value is determined from a point on the Lorenz curve which serves as a single metric classification model to classify plant embryos by embryo quality.

[67] Pages 20-22 explain in greater detail how a Lorenz curve is to be applied in the present context. Beyond that, example 4 describes the successful application of a method in accordance with claim 12.

[68] The Final Action asserts that the claims are too broad. However, the specification establishes B in example 4 for instance B that the claimed method can be applied to certain metrics and we find that it is reasonable to extend it to other metrics. We further note that the claims narrowly call for the use of a Lorenz curve, and they are also quite specific in respect of the type of mathematical manipulation to be done; in fact more so in that respect than other claims.

*Conclusion*

[69] Based on the record as it stands, we conclude that claims 12-22 and 46-56 are not too broad and comply with rule 84 and subsection 27(3) of the Act.

## RECOMMENDATION OF THE BOARD

[70] We find in favour of the Applicant on both questions and conclude that the rejected application complies with the section 84 of the Rules, subsection 27(3) of the Act, section 2 of the Act and subsection 27(8) of the Act.

[71] We recommend that the Examiner's rejection of the application be reversed and that the application proceed to allowance.

| | | |
|---|---|---|
| Ed MacLaurin | Paul Fitzner | Christine Teixeira |
| Member | Member | Member |

## DECISION OF THE COMMISSIONER

[72] I concur with the findings and the recommendation of the Board. The Examiner's rejection of the application is reversed and the application is to proceed to allowance.

Sylvain Laporte

Commissioner of Patents

Dated at Gatineau, Quebec
this 22nd day of May, 2013