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Commissioner's Decision #1595
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Date: 2021-09-28

TOPIC: J00 Meaning of Art

J10 Computer
Programs

SUJET: J00 Signification de
la technique

J10 Programmes
d'ordinateur

Application No. : 2,874,978
Demande n° 2 874 978

IN THE CANADIAN PATENT OFFICE

DECISION OF THE COMMISSIONER OF PATENTS

Patent application number 2,874,978, having been rejected under subsection 30(3) of the *Patent Rules* (SOR/96-423) as they read immediately before October 30, 2019 (“*former Rules*”) has consequently been reviewed in accordance with paragraph 199(3)(c) of the *Patent Rules* (SOR/2019-251) (“*Patent Rules*”). The recommendation of the Patent Appeal Board and the decision of the Commissioner are to withdraw the rejection and allow the application.

Agent for the Applicant:

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INTRODUCTION

- [1] This recommendation concerns the review of rejected Canadian patent application number 2,874,978 (“the instant application”), which is entitled “METHODS AND SYSTEMS FOR NON-PHYSICAL ATTRIBUTE MANAGEMENT IN RESERVOIR SIMULATION” and is owned by LANDMARK GRAPHICS CORPORATION (“the Applicant”). A review of the rejected application has been conducted by the Patent Appeal Board (“the Board”) pursuant to paragraph 199(3)(c) of the *Patent Rules*. As explained in more detail below, my recommendation is that the Commissioner of Patents withdraw the rejection and that the application be allowed.

BACKGROUND

The Application

- [2] The instant application was filed under the *Patent Cooperation Treaty* and has an effective filing date in Canada of May 28, 2013. It was laid open to public inspection on December 19, 2013.
- [3] The instant application relates to methods for performing simulations of hydrocarbon production systems using data collected from the systems. The control parameters resulting from the simulation are used to control production operations.

Prosecution History

- [4] On August 14, 2018, a Final Action (“FA”) was written pursuant to subsection 30(4) of the *former Rules*. The FA stated that the instant application is defective on the ground that all of the claims 1-20 on file at the time of the FA (“claims on file”) are directed to non-patentable subject-matter that lies outside the definition of “invention” and do not comply with section 2 of the *Patent Act*.
- [5] In a January 23, 2019 response to the FA (“R-FA”), the Applicant submitted a proposed claim set 1-20 (“proposed claims”) and submitted arguments in favor of patentability.
- [6] As the Examiner considered the application not to comply with the *Patent Act*, pursuant to subsection 30(6) of the *former Rules*, the application was forwarded to

the Board for review on May 6, 2019 along with an explanation outlined in a Summary of Reasons (“SOR”). The SOR set out the position that the claims on file were still considered to be defective as being directed to non-patentable subject-matter and therefore non-compliant with section 2 of the *Patent Act*. The SOR also indicated that the proposed claims did not overcome the non-patentable subject-matter defect.

- [7] In a letter dated May 9, 2019, the Board forwarded to the Applicant a copy of the SOR and requested that the Applicant confirm its continued interest in having the application reviewed.
- [8] In a response dated July 31, 2019, the Applicant indicated its desire for the Board to proceed with a review of the application.
- [9] As a result of the Federal Court Decision in *Choueifaty v Canada* (AG) 2020 FC 837 and the subsequent publication of the Patent Office Patent Notice in respect of patentable subject-matter, “Patentable subject-matter under the *Patent Act*” (CIPO, November 2020) [PN2020-04], the Examiner re-evaluated the instant application for compliance with the *Patent Act* and provided a Supplemental Summary of Reasons (“SSOR”) dated March 2, 2021 to the Board. The SSOR indicated that in light of PN2020-04, the Examiner now considered the claims on file to be patentable.
- [10] I have reviewed the instant application in accordance with paragraph 199(3)(c) of the *Patent Rules* and provide my analysis below.

ISSUE

- [11] The issue to be addressed by the present review is whether claims 1-20 on file are directed to patentable subject-matter.
- [12] If the claims on file are considered to be directed to non-patentable subject-matter, then the proposed claims may be reviewed to determine if they are considered a necessary amendment under subsection 86(11) of the *Patent Rules*.

LEGAL PRINCIPLES AND OFFICE PRACTICE

Purposive Construction

- [13] In accordance with *Free World Trust v Électro Santé Inc*, 2000 SCC 66 and *Whirlpool Corp v Camco Inc*, 2000 SCC 67, purposive construction is performed from the point of view of the person skilled in the art in light of the relevant common general knowledge (CGK), considering the whole of the disclosure including the specification and drawings. In addition to interpreting the meaning of the terms of a claim, purposive construction distinguishes the essential elements of the claim from the non-essential elements. Whether or not an element is essential depends on the intent expressed in or inferred from the claim, and on whether it would have been obvious to the skilled person that a variant has a material effect upon the way the invention works.
- [14] “Patentable Subject-Matter under the Patent Act” (CIPO, November 2020) [PN2020–04] also discusses the application of these principles, pointing out that all elements set out in a claim are presumed essential unless it is established otherwise or such presumption is contrary to the claim language.

Patentable Subject-Matter

- [15] The definition of invention is set out in section 2 of the *Patent Act*:

invention 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.

- [16] Subsection 27(8) of the *Patent Act* also prescribes that:

No patent shall be granted for any mere scientific principle or abstract theorem.

- [17] PN2020–04 describes the Patent Office’s approach to determining if a claim is patentable subject matter:

To be both patentable subject-matter and not be prohibited under subsection 27(8) of the *Patent Act*, the subject-matter defined by a claim must be limited to or narrower than an actual invention that either has physical existence or manifests a discernible physical effect or change and that relates to the manual or productive arts, meaning those arts involving or concerned with applied and industrial sciences as distinguished in particular from the fine arts or works of art that are inventive only in an artistic or aesthetic sense.

ANALYSIS

Claim Construction

The person skilled in the art

[18] In the FA at page 2, the person skilled in the art was set out:

The person who may be a team skilled in the art would be a person skilled in the field of oil field operations. The person or team is also skilled in the field of general purpose computing technologies.

[19] In the R-FA at page 1, the Applicant contended that the person skilled in the art is “a technician or an engineer in the field of oil and gas recovery.”

[20] While I agree with the Applicant’s position that the skilled person may be more specifically a technician or an engineer, and that they are from the field of oil and gas recovery, it is my view that such a technician or engineer would be skilled in general purpose computing technologies, given that the claims relate to production system simulation that is computer-implemented.

The relevant common general knowledge

[21] In the FA at page 2, the relevant CGK was set out as:

The skilled person or team in the field of oil field operations is familiar with reservoir simulations, which are typically performed by computers.

The skilled person or team in the field of oil field operations is also familiar with general purpose computer hardware and general purpose computer programming techniques.

[22] In the R-FA at page 2, the Applicant contended that the relevant CGK “is knowledge of existing reservoir simulation systems and systems for hydrocarbon recovery.”

[23] I accept for the purposes of this review the Applicant’s description of what would have been part of the skilled person’s CGK, with the additional point that the skilled person would also be familiar with general purpose computer hardware and general purpose computer programming techniques.

The essential elements of the claims

[24] The instant application includes independent claims 1, 11 and 18 of which claim 1 on file is taken as representative:

1. A computer-implemented method for operating a hydrocarbon production system, comprising:
 - collecting, by a computer system, production system data;
 - performing, by the computer system, a simulation based on the collected production system data, a fluid model, and a fully-coupled set of equations;
 - expediting, by the computer system, convergence of a solution for the simulation by reducing occurrences of negative mobility of components during the simulation;
 - determining, by the computer system, production control parameters of the hydrocarbon production system for the solution based on the simulation;
 - outputting, by the computer system, the production control parameters determined for the solution for use with the production system; and
 - operating the hydrocarbon production system in dependence of the production control parameters.

[25] The FA presented an analysis of the purposive construction of the claims on file in accordance with the guidance set out in the *Manual of Patent Office Practice*, revised June 2015 (CIPO) at §12.02. As this approach has now been superseded by *PN2020-04*, I undertake anew the identification of the essential elements of the claims on file.

[26] I note that there have been no issues raised during the prosecution of the instant application in regard to the meaning or scope of any of the terms used in the claims on file. I proceed below on the basis that the meaning and scope of the claims would have been clear to the skilled person.

[27] As set out above, *PN2020-04* states in respect of the identification of essential/non-essential elements that:

In carrying out this identification of essential and non-essential elements, all elements set out in a claim are presumed essential, unless it is established otherwise or is contrary to the language used in the claim.

[28] With respect to the claims on file, the person skilled in the art would understand that there is no use of language in any of the claims indicating that any of the elements in each claim are optional, a preferred embodiment or one of a list of alternatives.

[29] Therefore, in my view, all the elements of the claims on file are considered to be essential, including the computer implementation and computer-related components.

Patentable Subject-Matter

[30] I set out below my assessment of patentable subject-matter in light of the essential elements identified above and the guidance as to the assessment of patentable subject-matter set out in *PN2020-04*.

[31] Claim 1 on file specifies that the method is for “operating a hydrocarbon production system.” In relation to this objective, the instant application at page 16 states that:

In some embodiments, the disclosed non-physical attribute management operations are used to plan out or adapt a new production system before production begins. Alternatively, the disclosed non-physical attribute management operations are used to optimize operations of a production system that is already producing.

[32] Claim 1 primarily relates to the steps of a computer-implemented algorithm for simulating the behavior of a hydrocarbon production system. Most of the claimed steps relate to steps that are designed to expedite the convergence of a series of equations used in simulating the behavior of the hydrocarbon production system.

[33] However, claim 1 on file also includes the essential step of “operating the hydrocarbon production system in dependence of the production control parameters”, which parameters are output based on the calculated simulation. As such, the production control parameters that result from the simulation are applied to effect control over the physical hydrocarbon production system.

[34] Though in relation to the previous practice, in the R-FA at the paragraph spanning pages 2-3, the Applicant highlighted this aspect of the invention:

operating the hydrocarbon production system is a key feature to addressing the problem and its physical existence cannot be ignored. Thus, claim 1 cannot be considered disembodied and cannot be considered to be only a scheme or abstract idea.

[35] The SSOR at page 2 also indicated that the operation of the hydrocarbon production system in dependence of the control parameters output from the simulation met the requirement of physicality for a patentable invention.

- [36] In my view, it is evident from the claim language and the rest of the specification that the simulation calculations and the control parameters that they produce cooperate with the hydrocarbon production system to effect changes in its operation. They thus form a single actual invention that produces discernable physical effects and “manifests a discernable effect or change” (*Canada (Attorney General) v Amazon.com Inc*, 2011 FCA 328 at paragraph 66). The actual invention of claim 1 on file also relates to the manual or productive arts and is not prohibited subject-matter under subsection 27(8) of the *Patent Act*.
- [37] The other independent claims on file, namely claims 11 and 18, also include the same step of operating the hydrocarbon production system in dependence of the production control parameters output from the simulation calculations.
- [38] Therefore, claims 11 and 18 on file also comprise a single actual invention that “manifests a discernable effect or change”. Further, they relate to the manual or productive arts and are not prohibited subject-matter under subsection 27(8) of the *Patent Act*.
- [39] Dependent claims 2-10, 12-17 and 19-20, being directly or indirectly dependent on independent claims 1, 11 or 18, also comprise actual inventions that manifest a discernable effect or change. Further, they relate to the manual or productive arts and are not prohibited subject-matter under subsection 27(8) of the *Patent Act*.
- [40] I note that the SSOR also indicated that the steps in the claims on file of collecting data from a production system and of “expediting, by the computer system, convergence of a solution for the simulation by reducing occurrences of negative mobility of components during the simulation”, also provided the required physicality for compliance with section 2 and subsection 27(8) of the *Patent Act*. Since the claims on file are already considered patentable in light of the step of operating the hydrocarbon production system in dependence of the control parameters output from the simulation, I need not comment on the effect of these steps on the patentability of the claims.
- [41] In light of the above, I conclude that claims 1-20 on file are directed to patentable subject-matter. Therefore, they are compliant with section 2 of the *Patent Act* and are not prohibited subject-matter under subsection 27(8) of the *Patent Act*.

Proposed Claims

[42] Though the Applicant submitted a set of proposed claims with the R-FA, in light of the conclusion that the claims on file are directed to patentable subject-matter, the proposed claims are not considered a “necessary” amendment under subsection 86(11) of the *Patent Rules*.

CONCLUSIONS

[43] I have determined that claims 1-20 on file are directed to patentable subject-matter. Therefore, they are compliant with section 2 of the *Patent Act* and are not prohibited subject-matter under subsection 27(8) of the *Patent Act*.

RECOMMENDATION OF THE BOARD

[44] In view of the above, I am of the view that the rejection is not justified on the basis of the defect indicated in the Final Action notice and I have reasonable grounds to believe that the instant application complies with the *Patent Act* and the *Patent Rules*. I recommend that the Applicant be notified in accordance with subsection 86(10) of the *Patent Rules* that the rejection of the instant application is withdrawn and that the instant application has been found allowable.

Stephen MacNeil

Member

DECISION OF THE COMMISSIONER

[45] I concur with the conclusion and recommendation of the Board. In accordance with subsection 86(10) of the *Patent Rules*, I hereby notify the Applicant that the rejection of the instant application is withdrawn, the instant application has been found allowable and I will direct my officials to issue a Notice of Allowance in due course.

Virginie Ethier

Assistant Commissioner of Patents

Dated at Gatineau, Quebec

this 28th day of September, 2021