Citation: Landmark Graphics Corporation (Re), 2021 CACP 9
Commissioner's Decision #1562
Décision du Commissaire #1562
Date: 2021-03-25

TOPIC:	J00	Meaning of Art
	J10	Computer Programs
SUJET:	J00	Signification de la technique
	J10	Programmes d'ordinateur

Application No. : 2,527,855
Demande n^{o} 2 527 855

IN THE CANADIAN PATENT OFFICE

DECISION OF THE COMMISSIONER OF PATENTS

Patent application number 2,527,855, 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 Board and the decision of the Commissioner are to withdraw the rejection and allow the application.

Agent for the Applicant:

NORTON ROSE FULBRIGHT CANADA LLP/S.E.N.C.R.L., S.R.L.
1 Place Ville Marie, Suite 2500
MONTREAL Quebec
H3B 1R1

INTRODUCTION

[1] This recommendation concerns the review of rejected Canadian patent application number 2,527,855 ("the instant application"), which is entitled "SIMULATION OF PETROLEUM RESERVOIR EXPLOITATION USING PLANNING VARIABLES" 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 April 28, 2004. It was laid open to public inspection on November 18, 2004.

[3] The instant application relates to petroleum production planning and the use of reservoir simulation and economic computation models to predict oil, gas and water production profiles of prospective wells and the economic returns associated with them. Typically, the usefulness of the outputs of such modelling is affected by the uncertainty of the input parameters. For example, it is very difficult to estimate the porosity of the rock surrounding the site, the initial saturations of oil, gas and water, as well as time and cost of drilling. Parameters such as oil and gas prices and tax rates are difficult to predict. The instant application proposes a computational method by which the impact of economic uncertainties associated with petroleum production planning may be computed and used in the physical oil and gas production processes.

Prosecution History

[4] On December 7, 2017, 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 1-19 on file at the time of the FA ("claims on file") encompass subject-matter that lies outside the definition of "invention" and do not comply with section 2 of the *Patent Act*.

[5] In a May 29, 2018 response to the FA ("R-FA"), the Applicant submitted proposed claims 1-19 ("proposed claims"), which included modifications to independent claims 1, 14, 15, 16 and 19 on file. Arguments in favor of the claims on file and proposed claims were submitted.

[6] As the Examiner considered the application not to comply with the *Patent Act*, pursuant to paragraph 30(6)(c) of the *former Rules*, the application was forwarded to the Board for review on July 26, 2018 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 encompassing subject-matter that lies outside the definition of "invention" and were non-compliant with section 2 of the *Patent Act*. The SOR also indicated that the proposed claims did not overcome the section 2 defect.

[7] In a letter dated July 30, 2018, 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 October 26, 2018, the Applicant indicated its continued interest in having the application reviewed.

[9] I have reviewed the instant application in accordance with paragraph 199(3)(c) of the *Patent Rules*.

[10] In a preliminary review letter ("PR letter") dated May 28, 2020, I set out my preliminary analysis of the patentable subject-matter issue under section 2 of the *Patent Act* with respect to the claims on file and the proposed claims, considered in light of the claim construction approach set out in the *Manual of Patent Office Practice*, revised June 2015 (CIPO) at §12.02 [*MOPOP*]. I also provided the Applicant with an opportunity to make oral and/or written submissions.

[11] In an email dated September 8, 2020, the Applicant indicated that no written submissions would be filed in response to the PR letter.

[12] An oral hearing via videoconference was held on September 14, 2020 at which time the Applicant presented oral arguments in favor of the claims on file and proposed claims.

[13] As a result of the Federal Court Decision in *Choueifaty v Canada* (AG) 2020 FC 837 [*Choueifaty*] and the subsequent publication of the Patent Office practice notice in respect

of patentable subject-matter, "Patentable subject matter under the Patent Act" (CIPO, November 2020) [*PN2020–04*], a review of this application has been undertaken anew.

ISSUE

[14] The issue to be addressed by the present review is whether claims 1-19 on file are directed to patentable subject-matter.

[15] In view of the analysis and recommendation below, it is not necessary to turn to the proposed claims and consider whether they constitute amendments necessary for compliance with the *Patent Act* and *Patent Rules*, pursuant to subsection 86(11) of the *Patent Rules*.

LEGAL PRINCIPLES AND OFFICE PRACTICE

Claim Construction

[16] In accordance with *Free World Trust v Électro Santé Inc.*, 2000 SCC 66, purposive construction of a claim is done by considering the whole of the disclosure, including the specification and drawings (see also *Whirlpool Corp. v Camco Inc.*, 2000 SCC 67 at paragraphs 49(f) and (g) and 52). This consideration is performed from the point of view of the person skilled in the art in light of the relevant common general knowledge.

[17] With respect to the determination of the essential/non-essential elements of a claim, *PN2020-04* clarified the Patent Office's approach to this determination:

> During purposive construction of a claim, the elements of the claimed invention "are identified as either essential elements (where substitution of another element or omission takes the device outside the monopoly) or non-essential elements (where substitution or omission is not necessarily fatal to an allegation of infringement)." 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.

Patentable Subject-Matter

[18] 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.

[19] Subsection 27(8) of the *Patent Act* prescribes that:

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

[20] Following *Choueifaty*, *PN2020-04* clarified Patent Office practice with respect to the determination of patentable subject-matter under section 2 and subsection 27(8) of the *Patent Act*. In general:

> 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.

[21] With particular reference to the determination of patentable subject-matter in respect of computer-implemented inventions, *PN2020-04* states that:

> The mere fact that a computer is identified to be an essential element of a claimed invention for the purpose of determining the fences of the monopoly under purposive construction does not necessarily mean that the subject-matter defined by the claim is patentable subject-matter and outside of the prohibition under subsection 27(8) of the *Patent Act*. In such a case, it is necessary to consider whether the computer cooperates together with other elements of the claimed invention and thus is part of a single actual invention and, if so, whether that actual invention has physical existence or manifests a discernible physical effect or change and relates to the manual or productive arts.

ANALYSIS

Claim Construction

The person skilled in the art

[22] In the PR letter at page 3, I set out the person skilled in the art as characterized in the FA:

> Petroleum production planners in cooperation with Information Technology personnel, skilled in computerized petroleum production planning and data systems.

[23] The Applicant did not provide any written submissions in response to the PR letter and did not dispute the above at the oral hearing. I therefore apply it in my analysis below.

The relevant common general knowledge

[24] In the PR letter at page 4, I set out the relevant CGK. The relevant CGK was based on information taken from the BACKGROUND OF THE INVENTION section of the instant application and information taken from the following documents:

D7: Luo et al., "Multi-Resolution Modeling of Power Converter Using Waveform Reconstruction", SPE Annual Technical Conference and Exhibition, Proceedings 33rd Annual Simulation Symposium (SS 2000), Pages 1 - 10, April 20, 2000;

D8: Davis et al., "Exploratory Analysis and a Case History of Multiresolution, Multiperspective Modeling", RAND, RP-925, Pages 1 - 46, December 30, 2000; and

D9: Barkley, "A model for fast computer simulation", Physica D: Nonlinear Phenomena, Volume 49, Issues 1 - 2, Pages 1 - 10, April 1, 1991.

[25] The relevant CGK was identified as including knowledge of:

- petroleum production systems, including system input parameters, initial conditions, operating constraints, economic projections, and uncertainties of planning a production project (present application: page 1, lines 10 - 34; page 2, lines 6 - 23; page 4, lines 25 - 32; page 4, line 39 - page 5, line 4); and
- computer components, devices, networks, and computer applications, including their design, implementation, operation and maintenance, including, but not limited to:
    - reservoir simulators (present application: page 1, lines 35 - 39);
    - economic computation engines (present application: page 1, line 40 - page 2, line 5);
    - scaling model resolution for quicker simulation (D7 (abstract), D8 (page 10: sec. 3), D9 (abstract));
    - general purpose computers, special purpose computers, computing devices, processors, input and output devices, network interfaces, and user interfaces;
    - computer software and associated programming languages and memory devices and storage mediums;
    - distributed computing systems, including internetwork protocols and information/data transfers between devices and modules; and
    - computer databases and associated database management protocols.

[26] As there were no submissions in response to the PR letter and the Applicant did not dispute the above at the oral hearing, I proceed based on the above-identified CGK.

The essential elements of the claims

[27] The instant application includes independent claims 1, 14, 15, 16 and 19, of which claim 1 on file was taken as representative in the PR letter:

> 1. A computer-implemented method comprising:
>
> (a) acquiring at least one planning variable via at least one input device, where each planning variable is defined on a corresponding range;
>
> (b) assembling a set of models in memory in response to acquiring the at least one planning variable, wherein the models of said set represent components of a value chain of at least one of a petroleum exploration and production project, wherein at least one of the models of said set of models is a high-resolution geocellular reservoir model, wherein each of the models of said set includes at least one of the at least one planning variable;
>
> (c) executing a reservoir model scaling engine to scale the at least one of the models of said set of models to a lower resolution;
>
> (d) executing a plurality of iterations of a calculation loop, wherein each iteration of the calculation loop includes:
>
> selecting values of the at least one planning variable in their respective range to create instantiated models;
>
> assembling the instantiated models into a workflow;
>
> executing a plurality of simulation engines on the workflow to generate data output, wherein the simulation engines include at least one physics-based flow simulator, wherein the at least one physics-based flow simulator is configured to simulate reservoirs, wells and surface-pipeline hydraulics;
>
> storing the selected values of the at least one planning variable and the data output from the simulation engines to the memory; and
>
> (e) using the data from the simulation engines in a well perforation and completion process;
>
> wherein (a), (b), (c), and (d) are performed by a computer system in response to the execution of stored program instructions.

[28] In the PR letter at pages 5-11, I presented a preliminary analysis of the essential features of the claims on file in accordance with the approach set out in the *MOPOP*. I note that the Applicant has previously provided arguments in the R-FA and at the oral hearing against the use of such an approach. As this approach has now been superseded by *PN2020-04*, I undertake anew the identification of the essential elements of the claims on file.

[29] 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.

[30] 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.

[31] 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.

[32] 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

[33] In light of the revised essential elements identified above and the guidance as to the assessment of patentable subject-matter set out in *PN2020-04*, I set out below a revised assessment of patentable subject-matter.

[34] Representative claim 1 on file, set out above, primarily relates to the steps of a computer-implemented algorithm for improved modelling of oil, gas and water production profiles of prospective wells and the economic returns associated with them. The purpose of the improved analysis steps is to help the well production planner to produce a better well production plan that maximizes average profit and minimizes uncertainty by modelling the effect of input parameter uncertainty on well production and the associated economic returns. The production of the improved plan involves modelling the behavior of the wells based on the estimated physical parameters of them, which thereby provides the planner with information on the best physical characteristics of the planned well system, such as well perforation locations. The physical characteristics of the modelling process may then be used in the real world physical well production system.

[35] At page 5 of the R-FA and at the hearing, the Applicant pointed to step (e) of claim 1 on file which set out the step “using the data from the simulation engines in a well perforation and completion process.” The Applicant stated that this claimed process is clearly something with physical existence.

[36] In my view, the skilled person would interpret this step to indicate that after the computer simulation analysis has been completed and an optimal well production plan derived, those simulation results (including the operating parameters and physical characteristics) are used in the physical implementation of the processes of well perforation and completion.

[37] It is evident from the claim language and the rest of the specification that the simulation algorithms and the use of their results in the parameters for the well perforation and completion processes cooperate to form a single actual invention that produces improved well production results. As step (e) includes steps that produce discernable physical effects, the actual invention of claim 1 on file "manifests a discernable effect or change" (*Canada (Attorney General) v Amazon.com Inc*, 2011 FCA 328 at paragraph 66). In comprising the use of a computer and the physical steps of well perforation and completion, 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*.

[38] The other independent claims on file, namely 14, 15, 16 and 19, also include steps of using the simulation output data in well perforation and completion processes. These steps, in cooperation with the computer simulation algorithms, form actual inventions that manifest a discernable effect or change, are related to the manual or productive arts and that are not prohibited subject-matter under subsection 27(8) of the *Patent Act*.

[39] Dependent claims 2-13, 17 and 18, being directly or indirectly dependent on independent claims 1, 14, 15, 16 or 19, also comprise actual inventions that manifest a discernable effect or change, are related to the manual or productive arts and that are not prohibited subject-matter under subsection 27(8) of the *Patent Act*.

[40] In light of the above, I conclude that claims 1-19 on file are directed to patentable subject-matter and therefore comply with section 2 of the *Patent Act*.

PROPOSED CLAIMS

[41] Although considered in the PR letter at page 12, given that I have concluded that the claims on file are compliant with section 2 of the *Patent Act* and therefore should be allowed, it is not necessary to further consider the proposed claims. No amendments are "necessary" for compliance with the *Patent Act* and *Patent Rules*.

CONCLUSIONS

[42] I have determined that claims 1-19 on file are directed to patentable subject-matter and are therefore compliant with section 2 of the *Patent Act*.

RECOMMENDATION OF THE BOARD

[43] 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

[44] 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 25th day of March, 2021