Commissioner’s Decision #1426

Décision du Commissaire n^{o} 1426

TOPIC: O-00 (Obviousness)

SUJET: O-00 (Évidence)

Application No.: 2,655,279

Demande n°: 2 655 279

IN THE CANADIAN PATENT OFFICE

DECISION OF THE COMMISSIONER OF PATENTS

Patent application number 2,655,279, having been rejected under subsection 30(3) of the *Patent Rules*, has been reviewed in accordance with paragraph 30(6)(*c*) of the *Patent Rules.* The recommendation of the Patent Appeal Board and the decision of the Commissioner are to allow the application.

Agent for the Applicant:

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INTRODUCTION

[1] This recommendation concerns the review of rejected patent application number 2,655,279, which is entitled "Fugitive Emission Flux Measurement" and is owned by Golder and Associates Ltd. The outstanding substantive defect to be addressed is whether the claimed subject matter is obvious. A review of the rejected application has been conducted by the Patent Appeal Board pursuant to paragraph 30(6)(*c*) of the *Patent Rules*. As explained in more detail below, our recommendation is that the application be allowed.

BACKGROUND

The Application

[2] Patent application 2,655,279 (the "instant application") was filed in Canada on March 10, 2009 and laid open for public inspection on May 18, 2009.

[3] The instant application relates to methods for obtaining a fugitive emission flux measurement of airborne matter. The methods involve:

- measuring the airborne matter along one or more measurement planes that span the fugitive emission using two or more measurement beam paths that are vertical and parallel to each other;
- obtaining a mass per unit length measurement of the airborne matter for each measurement beam path;
- determining a representative wind velocity at or near the one or more measurement planes; and
- calculating the fugitive emission flux of the airborne matter in mass per unit length using the mass per unit length of the airborne matter and the representative wind velocity.

Prosecution history

[4] On November 15, 2013, a Final Action ("FA") was written pursuant to subsection 30(4) of the *Patent Rules*. The FA stated that the application was defective on the grounds that claims 1-11 (the "claims on file") would have been obvious and thus do not comply with section 28.3 of the *Patent Act*.

[5] In a February 14, 2014 response to the Final Action ("R-FA"), the Applicant submitted that the claims would have been inventive.

[6] As the Examiner considered the instant application not to comply with the *Patent Act*, pursuant to subsection 30(6) of the *Patent Rules,* the application was forwarded to the Patent Appeal Board (the "Board") for review on July 23, 2015, along with an explanation outlined in a Summary of Reasons ("SOR") that maintained that the claims on file would have been obvious.

[7] In a letter dated October 5, 2015, the Board forwarded to the Applicant a copy of the SOR and offered the Applicant an opportunity to make further written submissions and to attend an oral hearing.

[8] The Applicant, in a letter dated December 23, 2015, provided written submissions in response to the SOR ("R-SOR") and requested an oral hearing. The Applicant maintained that the claims on file would have been inventive.

[9] The present panel ("the Panel") was thereafter formed to review the instant application under paragraph 30(6)(*c*) of the *Patent Rules* and to make a recommendation to the Commissioner as to its disposition.

[10] In a letter dated March 30, 2017 (the "Panel Letter"), the Panel set out a preliminary analysis and rationale as to why, based on the record, the subject-matter of the claims on file does not comply with section 28.3 of the *Patent Act*.

[11] The Applicant, in a letter dated April 28, 2017, provided written submissions in response to the Panel Letter (the "Reply Letter"). The Applicant maintained that the claims on file would have been inventive.

[12] In an oral hearing held June 1, 2017, the Applicant further expanded upon the submissions in the Reply Letter.

ISSUES

[13] The only issue to be addressed by this review is whether the subject-matter of the claims on file would have been obvious and thus contravenes section 28.3 of the *Patent Act*.

[14] As the Panel Letter formed our preliminary analysis and rationale as to why the claimed subject matter would have been obvious, our recommendation below provides a review of the Panel Letter positions and details the Panel's further considerations of the Applicant's submissions in the Reply Letter and at the oral hearing.

LEGISLATION, LEGAL PRINCIPLES AND OFFICE PRACTICE

Purposive construction

[15] In accordance with *Free World Trust v. Électro Santé Inc.*, 2000 SCC 66, essential elements are identified through a purposive construction of the claims done by considering the whole of the disclosure, including the specification and drawings (see also *Whirlpool Corp. v. Camco Inc.*, 2000 SCC 67 at paras 49(f) and (g) and 52). In accordance with the *Manual of Patent Office Practice*, §13.05, the first step of purposive claim construction is to identify the person skilled in the art (the "skilled person") and their relevant common general knowledge ("CGK"). The next step is to identify the problem addressed by the inventors and the solution put forth in the application. Essential elements can then be identified as those required to achieve the disclosed solution as claimed.

Obviousness

[16] The *Patent Act* requires that the subject-matter of a claim not be obvious. Section 28.3 of the Act provides as follows:

> 28.3 The subject-matter defined by a claim in an application for a patent in Canada must be subject-matter that would not have been obvious on the claim date to a person skilled in the art or science to which it pertains, having regard to
>
> (a) information disclosed more than one year before the filing date by the applicant, or by a person who obtained knowledge, directly or indirectly, from the applicant in such a manner that the information became available to the public in Canada or elsewhere; and
>
> (b) information disclosed before the claim date by a person not mentioned in paragraph (a) in such a manner that the information became available to the public in Canada or elsewhere.

[17] In *Apotex Inc. v. Sanofi-Synthelabo Canada Inc.*, 2008 SCC 61 at para 67 [*Sanofi*], the Supreme Court of Canada stated that it is useful in an obviousness inquiry to follow the following four-step approach:

> (1)(a) Identify the notional "person skilled in the art";
> (b) Identify the relevant common general knowledge of that person;
> (2) Identify the inventive concept of the claim in question or if that cannot readily be done, construe it;
> (3) Identify what, if any, differences exist between the matter cited as forming part of the "state of the art" and the inventive concept of the claim or the claim as construed;
> (4) Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention?

ANALYSIS

Purposive Construction

[18] A purposive construction of the claims is not set out explicitly, as there was no dispute regarding the essentiality of the claim elements or the meaning of any terms recited in the claims. As stated in the Panel Letter, all claim elements are considered essential for the purposes of this review.

Obviousness

Sanofi step (1)(a) – Identify the notional person skilled in the art

[19] The Panel Letter characterized the skilled person as "skilled in the fields of chemistry, physics, spectroscopy and optical gas analyzers" based on the FA.

[20] The Applicant agreed, in the Reply Letter, with the Panel's characterization of the identity of the skilled person.

Sanofi step (1)(b) – Identify the relevant common general knowledge of that person

[21] The Panel Letter identified the CGK of the skilled person evidenced from portions of references D1-D6 cited in the FA:

D1: Babilott *et al*., "Fugitive methane emissions from landfills: A field comparison of five methods on a trench landfill," Global Waste Symposium, September 7-10, 2008
D2: Desjardins *et al*., "Evaluation of a micrometeorological mass balance method employing an open-path laser for measuring methane emissions," Atmospheric Environment, 29 March 2004
D3: US Patent Number 4,135,092, issued 16 January 1979 to Milly
D4: Tregoures, "Comparison of seven methods for measuring methane flux at a municipal solid waste landfill site," Waste Management & Research, ISSN 0734 242X, 1999
D5: Scharff, "Landfill Gas Production and Emission on Former Landfills," NV Afvalzorg, October 2005
D6: Denmead, "Approaches to measuring fluxes of methane and nitrous oxide between landscapes and the atmosphere," Plant Soil, 2008

[22] D1 describes a comparative study of five measurement methods for fugitive emission assessments for landfills, including a helicopter-borne spectroscopy method M1.

[23] D2 summarizes trial results of a mass balance method for measuring methane emissions by calculating horizontal fluxes.

[24] D3 describes a method for quantifying fugitive emission rates by defining a vertical profile of pollutant flux downwind of pollution sources.

[25] D4 compares seven methods for measuring methane flux at a landfill and describes methods of accumulation chambers, micrometeorological techniques (eddy correlation and mass balance methods), tracer gas methods and an airborne infrared thermography.

[26] D5 describes methods pertinent to methane emission measurements for landfills.

[27] D6 reviews the theory, applications, strengths and weaknesses of approaches commonly used for measuring trace gas fluxes.

[28] The Panel Letter characterized the CGK of the skilled person as:

- calculating flux values of a fugitive emission as a function of concentration measurements and wind speed measurements (see, for example, D3, column 3, line 54 to column 7, line 2);
- techniques for measuring and calculating the concentration of airborne matter and calculating flux values of a fugitive emission using parts per million meter ("ppm-m") or mass per unit area measurements along a beam path and corresponding wind velocity measurements at each beam path, including:
    - vertical sampling planes (see, for example, D3, figures 3 and 4);
    - micrometeorological techniques (see, for example, D4, abstract; eddy correlation method A3; mass balance method A4; D5, mass balance method, section 5.4; D6, mass balance method open systems, pages 11-12);
    - open laser systems such as helicopter (airborne) spectroscopy (see, for example, instant application, para [0014]; D1, method M1);
    - mass-balance systems employing an open-path laser (see, for example, instant application, para [0012]; D2, abstract);
    - radial plume mapping using Optical Remote Sensing Instrumentation ("ORSI") (see, for example, instant application, paragraph [0008]; D1, method M4);

- sensors for obtaining wind velocity data at one or more measurement planes such that flux values can be calculated (see, for example, D1, radial plume mapping method M4; D2, mass-balance method, section 2.4);
- optical remote sensing techniques and equipment using airborne-based platforms and ground based targets (see, for example, D1 method M1) or, alternatively, using ground-based platforms and airborne targets, such as reflectors (see, for example, D2, sections 2.3 and 2.4; Figure 2);
- means for measuring the vertical profile of wind speed and direction using "extensible masts for supporting wind direction and speed sensors and corresponding recording equipment, or by well-known pilot balloon observational systems" (see, for example, D3, Figs. 4-9, column 7, line 24 to column 8, line 68);
- correcting the fugitive emission flux by determining the flux of airborne matter upwind of the emission source of interest (see, for example, D3, column 9, lines 8-14);
- using the component of the representative wind velocity that is perpendicular to the measurement plane in the calculation of the emission flux (see, for example, D3, column 8, lines 3-7); and
- measuring the amount of airborne matter along a top of the measurement plane (see, for example, D3, sampling at various heights to encompass the vertical extent of the pollution cloud, column 7, lines 20-23).

[29] The Applicant, in the Reply Letter at page 2, submitted that:

> The Panel's statement that D3, figures 3 and 4 show "vertical sampling planes" for measuring and calculating the concentration of airborne matter and calculating flux values of a fugitive emission is not accurate, in that Panel omits that the vertical sampling plane described in D3, figures 3 and 4 is generated using measurements obtained using horizontal or substantially horizontal measurement paths. Moreover, as detailed in the Applicant's R-FA and below, paragraph [0014] of the instant application and D1, method M1 do not disclose methods for calculating flux values of a fugitive emission, and in fact D1 teaches away from using helicopter (airborne) spectroscopy to calculate flux values of a fugitive emission.

[30] The Panel conceded during the oral hearing that the characterization of D3 figures 3 and 4 as "vertical sampling planes" was incomplete. In this review, the Panel adopts the Applicant's characterization of D3 figures 3 and 4 as "vertical sampling planes generated using measurements obtained through horizontal or substantially horizontal measurement paths."

[31] In this review, the Panel also agrees with the Applicant that the CGK item "open laser systems such as helicopter (airborne) spectroscopy (see, for example, instant application, para [0014]; D1, method M1)" should be clarified as a technique for measuring and calculating the concentration of airborne matter but not as a technique for calculating flux values of a fugitive emission.

[32] Therefore, for the purposes of this review, the Panel adopts the CGK as presented above in para [28], as modified by the clarifications of paras [30] and [31].

[33] To summarize, as relevant to the analysis below, the prior art showed methods of quantifying flux using, primarily, horizontal beam path concentration measurements of airborne matter combined with a wind velocity at the horizontal beam path.

Sanofi step (2) Identify the inventive concept of the claim in question or if that cannot readily be done, construe it

[34] The Panel Letter adopted the general inventive concept of the independent claims 1 and 2 as submitted by the Applicant in the R-FA at page 4 as:

> … an inventive concept of the presently claimed invention, as set out in claims 1 and 2, comprises the combination of using an airborne component, either an airborne platform (claim 1) or an airborne target (claim 2) to measure airborne matter along vertical or substantially vertical beam paths that span or substantially span the fugitive emission, measuring the wind velocity, and calculating the fugitive emission flux of the airborne matter using the data collected along the vertical or substantially vertical beam paths and the measured wind velocity.

[35] Therefore, the inventive concept may be summarized as the calculation a fugitive emission flux using an airborne concentration measurement along a vertical beam path combined with a representative wind velocity.

Sanofi step (3) – Identify what, if any, differences exist between the matter cited as forming part of the "state of the art" and the inventive concept of the claim or the claim as construed

Independent Claim 1

[36] The Panel Letter identified the differences between the helicopter-borne spectroscopy method M1 disclosed in D1, best representing the state of the art, and the inventive concept of independent claim 1 as:

- determining a wind velocity at more than one location at or near the measurement planes, and
- calculating the fugitive emission flux of the airborne matter in mass per unit time using the total mass per unit length of the airborne matter and the representative wind velocity.

[37] The Applicant, in the Reply Letter, agreed with these identified differences. The Applicant also submitted in the Reply Letter at page 2 that:

> Additionally, as the Applicant detailed in the R-FA, neither (1) the combination of measuring airborne matter in a vertical manner with a wind velocity sensor at or near the vertical measurement plane, nor (2) a method for measuring and calculating the integrated concentration of a fugitive emission employing a vertical measurement path and calculating flux values of the fugitive emission, is disclosed or even suggested in the cited prior art.

[38] As will be more thoroughly explained in the *Sanofi* step (4) analysis below, the skilled person would also view these aspects as additional differences between the prior art and independent claim 1.

Independent Claim 2 and Dependent Claims 3 to 11

[39] As will be seen in the *Sanofi* step (4), the non-obviousness of the broadest claim, independent claim 1, is determinative of the non-obviousness of the remaining, narrower claims. Therefore, it is unnecessary to enumerate additional differences between each of the claims 2 to 11 and the state of the art.

Sanofi step (4) – Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention?

Independent Claim 1

[40] The Panel Letter detailed the rationale for the Panel's preliminary view that the differences between independent claim 1 and the state of the art constituted steps which would have been obvious to the skilled person.

[41] This review considers the Panel's rationale within the framework of obviousness analysis factors enumerated in *Novopharm Limited v. Janssen-Ortho Inc.*, 2007 FCA 217 at para 25 [*Novopharm*], referenced in the Applicant's Reply Letter at pages 2 and 3.

Climate in the Relevant Field

[42] The climate in the relevant field at the time the alleged invention was made includes not only knowledge and information but also attitudes, trends, prejudices and expectations (*Novopharm*, para 25).

[43] The Panel Letter submitted that the skilled person would not view the airborne method M1 of D1 as teaching away from the present invention, contrary to the Applicant's submissions in the R-FA and the R-SOR. The Reply Letter contended that such an interpretation is inconsistent with the language of D1 and the climate in the relevant field demonstrated by the prior art. The following paragraphs outline the specific submissions of the Panel Letter and the Reply Letter on this point.

[44] The Panel Letter argued that the skilled person would view the D1 method M1 directed to detecting and measuring localized methane concentrations, as separate and distinct from the other D1 methods M2-M5 directed to calculating a flux measurement.

[45] The Reply Letter at page 5 submitted that D1 does not make any distinction between the D1 method M1 and the methods M2-M5. The purpose of the study undertaken in D1 was to "achieve a new international method comparison campaign, in order to

assess the abilities of available techniques" (D2, "Introduction", second-to-last paragraph). D1 also makes reference to the comparison of five measurement methods for landfills methane fugitive emissions assessment (see, for example, D1, abstract; "Introduction", last paragraph; "Conclusions", first paragraph).

[46] The Panel Letter further submitted that the skilled person would be aware that, in certain emission assessments, such as assessments to detect gas leaks in pipelines implied in the D1 method M1, only the concentrations (and source) of the emissions are required, rather than a calculation of the emission flux. The Reply Letter counters this position by noting that the prior art teaches the calculation of emission flux from localized sources (see, for example, D6, page 11-12).

[47] The Panel Letter submitted that the D1 statement "[method M1] does not allow a flux calculation" would be viewed by the skilled person as an acknowledgement that this particular emission assessment method is merely directed to measuring emission concentrations, rather than an indication that the method M1 cannot be used for flux measurements.

[48] The Reply Letter at page 5 submitted that:

> …the authors of D1 explicitly state that "[a]lthough the helicopter-borne applicability is simple, further results exploitation is presently limited: a vertical and punctual PIC measurement does not allow a flux calculation neither a full cartography" (D1, page 13, emphasis added). That statement is clear: The authors of the study did not quantify flux using M1 because they believed that vertical path concentration measurement does not allow a flux quantification, reflecting the bias within the art that vertical measurement paths are not suited for flux determination. [emphasis in the Reply Letter]

[49] This bias, referred to in the previous passage, refers to a technical prejudicial bias of the skilled person, which was expanded upon in the Reply Letter. To summarize, the Applicant submitted that the skilled person, faced with problem of measuring fugitive emission rates from a landfill, was aware of numerous techniques to calculate emission flux, most notably, techniques that combined a wind speed with a horizontal concentration measurement of airborne matter. While vertical sampling methods of airborne matter concentrations were known, "it was generally recognized

amongst those of skill in the art that integrated concentration measurements obtained using vertical sampling could not be readily combined with a measured wind velocity to calculate flux, due to variances in wind velocity as a function of height from the ground surface" (Reply Letter at page 4).

[50] The Panel has reconsidered the submissions by the Applicant in this review with respect to the climate in the relevant field. The Panel now views that the skilled person would have been biased against combining a concentration measurement obtained using vertical sampling with a representative wind speed. This is best evidenced by D1 itself which states explicitly states that:

- "[Method M1] provides a path-integrated concentration on a vertical line, and does not allow fluxes quantification" (D1, "Equipment and Methods, III. Compared methods presentation, i. Helicopter-borne spectroscopy (M1)", para 2); and
- "[a]lthough Helicopter-borne applicability is simple, further results exploitation is presently limited: a vertical and punctual path-integrated concentration measurement doesn't allow a flux calculation neither a full cartography" (D1, "Conclusions", para 2).

[51] Furthermore, the Panel also recognizes that although an average wind speed was measured in the study results for method M1 (Dl, average wind speed measured 2m off the ground was 5m/s with North-East direction, "Equipment and Methods, Ill. Compared methods presentation, i. Helicopter-borne spectroscopy (Ml)"), the authors of the study presented in D1, presumably well versed in the field as skilled technicians, did not combine this wind speed with the vertical concentration measurement obtained in method M1 to calculate an emission flux.

Motivation in existence at the time of the alleged invention to solve a recognized problem

[52] According to *Novopharm* at para 25, "'[m]otivation' in this context may mean the reason why the claimed inventor made the claimed invention, or it may mean the reason why one might reasonably expect the hypothetical person of ordinary skill in the art to combine elements of the prior art to come up with the claimed invention"

and "if commonplace thought and techniques can come up with a solution, there may be a reduced possibility that the solution required inventive ingenuity."

[53] The Panel Letter at page 10 submitted that "it would be more or less self-evident to the skilled person that, in order to calculate a flux measurement using the Dl method M1, a wind measurement is needed. The skilled person, using their CGK, would be lead directly and without difficulty to a solution to measure wind velocities at the measurement planes" and ultimately to combine this wind measurement with the concentration measurements to calculate an emission flux.

[54] In addition to the technical bias of the skilled person against calculating the flux using method M1 and a representative wind measure, the Reply Letter at page 6 also noted an inconsistency between the stated positions in the Panel Letter, namely,

> …the unimaginative notional skilled technician would not simultaneously consider M1 of D1 as a method for which 'flux quantification is not required' (Preliminary Review, page 9, para. 4) and then seek to 'calculate a flux measurement using the D1 method M1' (Preliminary Review, page 10, para. 2). The decision to do so would require at least some degree of invention.

[55] The Reply Letter, and further expanded upon by the Applicant representatives at the oral hearing, countered the Panel's position that it would have been self-evident for the skilled person to calculate a flux measurement using the Dl method. Specifically, the skilled person would have been aware of numerous methods of obtaining flux measurement without any specific indication of any one preferred method, such as method M1 of D1.

[56] Upon further consideration of the Applicant's submissions, the Panel considers that the skilled person would not have been motivated to combine a wind velocity with the concentration measurement obtained using method M1 of D1 to calculate an emission flux.

Summary on obviousness for independent claim 1

[57] Having reconsidered the matter in view of the Applicant's submissions in its Reply Letter and the further explanations provided at the oral hearing, the Panel considers that the skilled person would have been biased against combining a concentration measurement obtained using vertical sampling with a representative wind speed, as evidenced by D1. In addition, the skilled person would not have been motivated to combine a wind velocity with the concentration measurement obtained using method M1 of D1 to calculate an emission flux.

Independent Claim 2

[58] Given that the claimed invention in independent claim 1 would not have been obvious to the skilled person, this same analysis equally applies to independent claim 2 that recites similar features and limitations using an alternate configuration for the vertical measurement apparatus.

Dependent Claims 3 to 11

[59] Dependent claims 3-11 recite additional features and limitations and therefore are also not obvious given their dependence on independent claims 1 and 2.

[60] Therefore claims 1-11 are compliant with section 28.3 of the *Patent Act*.

RECOMMENDATION OF THE BOARD

[61] For the reasons set out above, the Panel is of the view that the rejection is not justified on the basis of the defect indicated in the Final Action notice and has reasonable grounds to believe that the instant application complies with the *Patent Act* and the *Patent Rules*. We recommend that the Applicant be notified in accordance with subsection 30(6.2) of the *Patent Rules* that the rejection of the instant application is withdrawn and that the instant application has been found allowable.

Lewis Robart	Paul Fitzner	Andrew Strong
Member	Member	Member

DECISION

[62] I concur with the findings and recommendation of the Board. In accordance with subsection 30(6.2) 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.

Johanne Bélisle
Commissioner of Patents
Dated at Gatineau, Quebec,
this 7th day of August, 2017