

COMMISSIONER'S DECISION

Sections 2 and 28(3), Obviousness: SEISMIC EXPLORATION

The division of the frequency bandwidths of the signal waves to produce an improved signal-to-noise ratio was found to be proper subject matter under S 2 and 28(3). The claims defined the inventive difference over the cited art. Rejection withdrawn. *****

Patent application 305,977 (Class 349-16) was filed on June 22, 1978 for an invention entitled "A METHOD OF SEISMIC EXPLORATION". The inventors are Pierre Gros, Jean Millouet and Philippe Staron and the assignee is Societé Nationale Elf Aquitaine (Production). The Examiner in charge of the application wrote a Final Action on December 3, 1982 refusing to allow it to proceed to patent. In reviewing the rejection, the Patent Appeal Board held a Hearing on October 31, 1983 at which Mr. M. Sher, the Patent Agent, represented the Applicant, assisted by Mr. D. Levy, the French Patent Agent, and Mr. P. Staron, the inventor.

The subject matter of this application relates to the field of seismic exploration in which each acoustic vibrational wave emitted into the formation of interest is divided into a plurality of consecutive frequency bands, each band having a different bandwidth from the adjacent ones. The reflected signals from the formation subsurface layers are processed to generate final seismograms.

In the Final Action the Examiner rejected the application as being directed to non-patentable subject matter under Sections 2 and 28(3) of the Patent Act. He also cited United States Patent 3,929,144 - December 13, 1966 - Lee et al. Although he did not say why the Lee patent was cited, in his previous action, dated January 6, 1982, the Examiner had cited the Lee patent, along with another, in rejecting claims for obviousness. In the Final Action the Examiner said the Lee patent was a "Reference Re-applied".

The issues before the Board are whether or not the application is directed to patentable subject matter under Sections 2 and 28(3) of the Act, and whether or not the claims are patentable over the cited art. Claim 1 reads:

A method of seismic exploration of a medium which comprises the steps of:

a) determining a frequency spectrum to be emitted into the medium to be explored and depending on some characteristics of said medium,

b) dividing said frequency spectrum into a plurality of bands so that any two consecutive bands have a different bandwidth and no interruption between the said bands is provided within said frequency spectrum,

c) emitting into the medium, at least at one emission point and by means of at least one emission source, vibrational acoustic signals of long time duration, each of said signals having a frequency content corresponding to that of one of the frequency bands and the various signals being emitted one after the other,

d) receiving in at least one receiver the signals resulting from said emissions and reflected by the reflectors of the medium to be explored,

e) forming a processed signal for each frequency band by processing the received signal corresponding to said frequency band with a reference of the emitted signal associated thereto, and,

f) producing a final seismogram from said processed signals in which, for each of said frequency bands, an improved signal-to-noise ratio is obtained whereby said seismogram has an improved signal-to-noise ratio.

At the Hearing, Mr. Sher stressed that in Applicant's method of seismic exploration, the acoustic waves are divided into a plurality of frequency bandwidths, each bandwidth having a different width from the adjacent ones. He referred to charts to illustrate that the different bandwidths are emitted into the formation one after the other in non-overlapping manner. He also referred to the charts to show that each bandwidth is transmitted and received separately. He then said that the results obtained for each reception are thereafter combined. Mr. Staron explained that by sending a plurality of different

bandwidths a reinforcement of the frequencies which are to be absorbed by the ground to be explored is achieved and provides the improved results as described in this application. Mr. Sher commented that the claim contained the physical steps of dividing a wave into different bandwidths and transmitting the bandwidths one at a time and he argued that the facts in the present application are different from the facts in *Schlumberger v Commissioner of Patents* (1981) 56 C.P.R. 204 and that the application contains statutory subject matter under Sections 2 and 28(3) of the Patent Act.

In considering the issue of patentable subject matter, we refer first to the Schlumberger decision, *supra*, in which Pratt J. had these comments:

In order to determine whether the application discloses a patentable invention, it is first necessary to determine what, according to the application, has been discovered.

and

I am of the opinion that the fact that a computer is or should be used to implement discovery does not change the nature of that discovery.

From the present disclosure, we learn that the "what" Applicant has discovered is that by emitting into the strata of interest signals which have been divided into a plurality of different bandwidths, seismograms of an improved signal-to-noise ratio can be obtained.

In the Final Action the Examiner comments on this discovery and he concludes that it does not present patentable subject matter. He states, in part, in his final action:

...

If the mere fact that different signal waves are employed to produce a new result is of sufficient subject matter for the grant of a patent the field of patents would be enormously extended - there might be as many patents as there are possible signal waves.

...

In the opinion of the Board, however, the subject matter of this application is not merely a description of the use of different signal waves from those previously used. Here, the different frequency bandwidths of the signal waves have produced a final seismogram having a new and improved signal-to-noise ratio. This, in our opinion, constitutes a definite advantage for the described method of seismic exploration. The application is not, as in Schlumberger, merely a description of a machine method of manipulating analytical data and it is not, in our view, merely a mathematical theorem. We consider, therefore, that the subject matter of this application, being directed to an improvement in methods of seismic exploration, which methods are patentable of themselves, should be considered to be patentable under Sections 2 and 28(3) of the Patent Act.

We next turn to a consideration of whether the claims are directed to patentable subject matter in view of the cited art. Lee et al teach one way of reducing the correlation residues. They divide the received signals into bands of frequencies and adjust their relative amplitudes. The correlation is carried out using the adjusted received signals. We find that the Lee et al patent does not teach the frequency band division of the present application because its frequency bands have an equal bandwidth. In the present application an actual way of determining the frequency bands is governed by the criteria set forth on page 9 of the disclosure. The criteria are dependent upon the data gathered by previous surveys. This concept of frequency division is the main characteristic of the present alleged invention. This was argued in the Applicant's response and was emphasized at the Hearing.

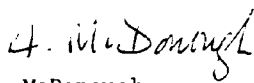
We further find that the Lee et al patent carries out a conventional seismic exploration with a sweep frequency wave and the data gathered are conventional. In the patent the data are normalized in accordance with the characteristics of the medium of interest determined by previous surveys. The present application, on the other hand, modifies the bandwidths of the signals to be emitted into the medium in accordance with its previously determined characteristics. The data thus obtained by receivers contain improved information.

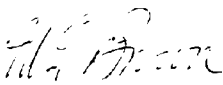
We are satisfied that these differences are significant and not obvious in the light of the teachings of the cited patent.

In reviewing the claims on file, we note that at the Hearing the Examiner agreed that claims 8, 22 and 37 were allowable. After careful review of the application and consideration of the art cited and the arguments presented, we believe however that all the claims on file properly define Applicant's discovery. We also find that they are inventively different from the cited patent and therefore should be allowable.

In summary, we are satisfied that the application is directed to patentable subject matter under Sections 2 and 28(3) of the Patent Act, and that the claims are not open to the rejection based on the cited art.

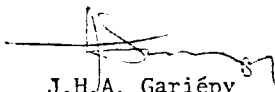
We recommend the rejection of the application for being directed to non patentable subject matter contrary to Sections 2 and 28(3) and for non inventiveness be withdrawn, and the application be returned for continued prosecution.


A. McDonough
Chairman
Patent Appeal Board


M.G. Brown
Assistant Chairman


S.D. Kot
Member

I concur with the findings and the recommendation of the Patent Appeal Board. Accordingly, I withdraw the Final Action and I am remanding the application to the Examiner for prosecution consistent with the recommendation.


J.H.A. Gariépy
Commissioner of Patents

Dated at Hull, Quebec

this 29th. day of August, 1984

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