Commissioner's Decision #1251
Décision du commissaire #1251

TOPIC: O

SUJET: O

Application No: 2,149,244 (Class E21B-021/00)

Demande No: 2,149,244 (Classe E21B-021/00)

COMMISSIONER'S DECISION SUMMARY

C.D. 1251 App'n 2,149,244

Prior publication

The examiner rejected this application on the basis that the invention was obvious in view of the cited prior art. The Board agreed with the examiner and found that an unimaginative, skilled technician would have been led directly and without difficulty to the alleged invention.

The application was refused by the Commissioner of Patents.

IN THE CANADIAN PATENT OFFICE

DECISION OF THE COMMISSIONER OF PATENTS

Patent application 2,149,244 having been rejected under Rule 30(4) of the Patent Rules, the Applicant asked that the Final Action of the Examiner be reviewed. The rejection has consequently been considered by the Patent Appeal Board and by the Commissioner of Patents. The findings of the Board and the ruling of the Commissioner are as follows:

Agent for Applicant

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This decision deals with the Applicant's request for a review by the Commissioner of Patents of the Examiner's Final Action dated December 16, 1997, on application 2,149,244 (International Classification E21B-021/00), filed on June 14, 1994 and entitled "Non-Cryogenic Production of Nitrogen for On-Site Injection in Downhole Drilling". The inventor is Keith Michael and the application has been assigned to International Nitrogen Service, Inc..

At the Applicant=s request, the Patent Appeal Board conducted a hearing on July 25, 2001 at which time the Applicant was represented by Mr David French, agent for the Applicant and Mr Gregory Carr of Carr & Storm, L.L.P. of Dallas, Texas, U. S. A.. The Patent Office was represented by Mr David Kerr, the Examiner in charge of the application and Mr Paul Fitzner, Section Head.

The application relates to a method of drilling oil, gas or geothermal wells which uses an inert gas as a drilling fluid to remove drill cuttings from around the drill bit. The inert gas is preferably nitrogen which is supplied on-site using a non-cryogenic source such as a membrane separation system.

Figure 2 of the application shows a membrane separation unit which generates nitrogen that is then delivered to the drill bit and figure 5 show the downhole drill arrangement.

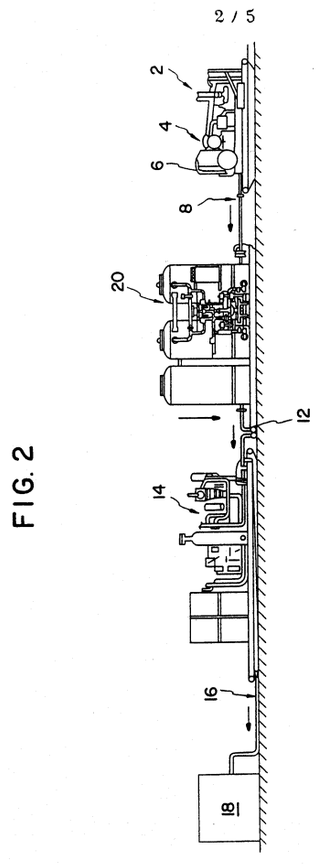
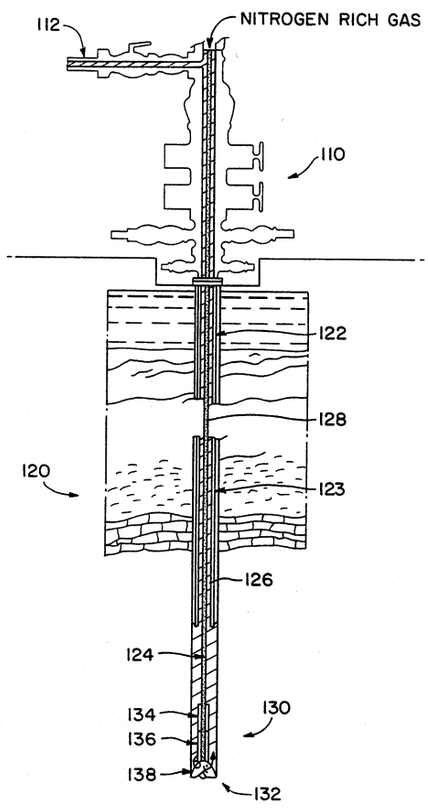


FIG. 2

FIG. 5



In figure 1, air enters the system through intake port 4 and is compressed by compressor 6. It then moves through a conduit 8 to a membrane separation unit 10 where the air is separated into a nitrogen rich stream and an oxygen rich stream which is discharged from the system. The nitrogen rich stream moves through conduit 12 to compressor 14 and then to an installation 18 at the well-head. Nitrogen then passes down the interior of the drill stem assembly 124 to the drill bit 138 and returns to the surface with drill cuttings via pathway 126.

Claim 1 of the application reads as follows:

> A method for drilling for oil or gas or a geothermal well in which a compressed gas is delivered to a drill bit within a downhole, the improvement comprising:
>
> (a) removing at least a substantial portion of the oxygen contained within a feed stream of air at the site of said drilling to produce an inert rich gas and an oxygen enriched waste gas; and
>
> (b) delivering the inert rich gas to the vicinity of said drill bit within the downhole in a volume sufficient that the inert rich gas is capable of flushing drill cuttings away from the drill bit,
>
> wherein step (a) comprises passing a feed stream of air through a membrane which preferably separates nitrogen gas from the other gaseous components of air.

In the Final Action, the examiner cited the following references to reject all of the claims, as well as the application itself:

<u>British patent</u>

2,186,682 August 19, 1987 SPAC et al

Publications

ÄMembrane Separation Offers Low-Cost Inert Gas Safety@, Ocean Industry, July 1990

1991-1992 Catalogue, Stewart and Stevenson Petroleum Products

ÄNitrogen Generators@, Power News, Vol 31, No. 1, Spring 1991

These references were brought to the attention of the Examiner in the form of a protest which was filed on March 19, 1996.

In rejecting claims 1 to 6 and the application itself, the Examiner stated, in part:

> Each of the cited references illustrates that Nitrogen rich inert gas may be produced, and supplied in ample quantities, on-site for use in oilfield operations. The latter three references (publications) disclose the use of Membrane Separation(MS) technology for the production of Nitrogen gas (N2).
>
> The applicant has argued, in the response of October 29, 1996, that the technique disclosed employs nitrogen produced by this known method to flush away drill cuttings from a drill bit. The applicant further argues that the references cited illustrate many uses of nitrogen in the oilfield but that none suggests using it in the drilling operation.
>
> The use of compressed gasses for flushing drill cuttings is well known in the art of drilling and earth boring. The Ocean Industry publication studies the safety advantage gained by the use of inert gas instead of compressed air in the petroleum industry. This publication states, on page 28:
>
> > Highly inert N2 would seem to offer obvious safety and environmental advantages when compared to compressed air and methane. It neither adds to the fire/explosion potential already present in drilling and producing operations nor creates environmental hazards to be mitigated. In addition, the use of N2 instead of compressed air can reduce corrosion in the serviced applications.

In its June 19, 1998 reply to the Examiner=s Final Action, the Applicant stated, in part:

> The article from Ocean Industry, the only reference analysed in detail by the Examiner, states that nitrogen produced by a gas-separation membrane can be used in the vicinity of an offshore drilling rig. But it does not teach or suggest the use of membrane-produced nitrogen as a drilling fluid. The reference suggests that the membrane-produced nitrogen could be used for such tasks as purging tanks, or other Änumerous inert gas uses@ aboard an offshore drilling rig. Although the article says that there are numerous uses for inert gas at a drilling rig, it makes no statement whatever about the possibility of using membrane-produced nitrogen as a drilling fluid.
>
> .....
>
> This reference [British patent 2,186,682] shows a device for supplying nitrogen to the head of an oil well, using a pressure swing adsorption unit. The reference says that there is a need for producing nitrogen at the site of an oil well, and lists various uses of nitrogen in such environments. These include use as a carrier for the introduction of fluids into oil-bearing formations, such as in acidizing, solvent treatment, treatment with surfactants and/or detergents, fracturing of well formations, and enhanced recovery. But the reference says nothing about the use of nitrogen as a drilling fluid. Again, if such use had been recognized, it surely would have been included in the list of other uses. The fact that the reference fails to mention the use of non-cryogenically produced nitrogen as a drilling fluid further shows the non-obviousness of the present claimed invention.
>
> .....
>
> The Stewart and Stevenson catalogue also states that nitrogen has many uses in the

> vicinity of an oil well. The reference mentions the use of nitrogen for cementing operations, for cleaning out wells with coiled tubing units, and for artificial flooding of oil wells for additional enhanced recovery of oil from depleted reservoirs. The reference even describes the use of gas- separation membrane units and pressure swing adsorption units for producing such nitrogen. But nowhere does the reference mention the use of such nitrogen as a drilling fluid.
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> .....
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> The Power News article essentially restates what appears in the Stewart and Stevenson catalogue. The article states that nitrogen produced by a gas-separation membrane, or by a pressure swing adsorption unit, can be used at an oil well. But it lists only the uses given in the Stewart and Stevenson catalogue. There is no mention of the use of nitrogen as a drilling fluid.

The Applicant also submitted a brief to the Patent Appeal Board and in that brief, outlined several factors which must be examined with considering the question of patentability. These factors include the standard for obvious and commercial success.

In support of the Applicant=s assertion that the alleged invention has enjoyed commercial success, a declaration, signed by C. Robin Young, an employee of the Applicant has been submitted. This declaration gives the total annual sales by the Applicant of the services described in the instant application for the years 1993 to 1997.

Subsection 28.3 of the Patent Act sets out the requirement for non-obviousness. It reads as follows:

> 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.

Over the years, there have been many court decisions which have set out tests to be employed to determine if an invention is obvious. One of the shorter tests was set out in *Beecham Canada Ltd v Proctor & Gamble* (1982), 61 CPR (2d), 1 at 27 by Urie JA, where he stated:

> The question to be answered is whether at the date of invention (August-September 1964) an unimaginative skilled technician, in light of his general knowledge and the literature and information on the subject available to him on that date, would have been led directly and without difficulty to Gaiser=s invention.

To begin the test for obviousness, the Board must first determine what was the state of the art in the field of well drilling at the claim date (June 14, 1994). The Applicant discloses that use of nitrogen as a drilling fluid was known (see page 2, lines 16 to 25 of the Applicant=s disclosure). Apparently, liquid nitrogen was transported to the well site. Of course, transporting liquid nitrogen to the well site presented logistical problems when the well was being drilled at a remote

location so attempts were made to obtain other reliable sources of nitrogen. These other sources all presented further problems, being either too expensive or corrosive (or both).

As time went by, several non-cryogenic systems for separating air into a nitrogen rich component and an oxygen rich component were being developed. These include membrane separation, pressure swing adsorption, vacuum swing adsorption and fuel cells. By 1990, membrane separation technology had been developed to a stage where, as the Ocean Industry article indicates, nitrogen produced by membrane separation was being used in many applications. The Stewart and Stevenson catalogue shows that this technology was readily available commercially and that one unit could produce up to 96,000 standard cubic feet per hour of nitrogen.

So, it is necessary to return to our unimaginative skilled technician and assess what knowledge was available at the claim date. The technician would have known about the use of a gas as opposed to a drilling mud to clear out the bore hole. A technician would have been aware of the possibility of causing explosions from sparks created by the drill bit cutting into the rock. He/she would have known from technical journals about the inert nature of nitrogen making it a suitable gas. The Ocean Industry article would have directed our technician to the concept of using membrane separation in a well drilling environment. This article emphasises its portability and thus its suitability for remote locations. The catalogue from Stewart and Stevenson has a section entitle ANitrogen Pumping Systems@ which discusses the advantages of using inert nitrogen in the oil/gas industry and directs a reader to their portable membrane separation nitrogen generators. It provides our technician with the technical specifications of such generators available. Such specifications give information as to the portability of the units and the nitrogen output it being merely a matter of our technician choosing the appropriate unit for the job.

The Board feels that with this knowledge in hand, the technician would have been led directly and without difficulty to the alleged invention which is disclosed and claimed in the instant application. As a result, the Board concludes that the alleged invention disclosed and claimed in this application was obvious at the claim date and fails to comply with the requirements of Subsection 28(3) of the *Patent Act.*

In summary, the Board recommends that the examiner's rejection of the instant application be upheld.

P. J. Davies	M. Wilson
Chairman	Member

I concur with the findings and the recommendation of the Patent Appeal Board. Accordingly, I refuse to grant a patent on this application.

David Tobin
Commissioner of Patents

Dated at Hull, Quebec
this 21st day of March 2002