Title: SYSTEM FOR RAPIDLY BORING THROUGH MATERIALS

Abstract: The present invention is a self-contained, high-energy liquid rock- boring system that will bore a small-diameter access hole [5] several hundred meters through hard granite and other obstacles within minutes of deployment. It employs a land unit [100] platform subsystem [1000] with an energetic fluid fuel reservoir [1300] and a boring subsystem [3000] having a plurality of pulsejets [3100]. Each pulsejet [3100] repeatedly ignites the energetic fluid [7] causing a plurality of rapidly-expanding gas bubbles [3250] which create and force a plurality liquid slugs [10] ahead of them rapidly out through a nozzle [3260] causing the slugs [10] to impact against materials ahead of the nozzles [3260], boring an access hole [5]. The system also employs an umbilical subsystem [2000] connecting the boring [3000] and the platform subsystems [1000]. The system can be used to rapidly bore an access hole [5] to provide air and resources to trapped miners. Alternatively, the system may also be used to bore an access hole [5] to underground threatening targets to neutralize them.
Declarations under Rule 4.17:
— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
— as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))
— of inventorship (Rule 4.17(iv))

Published:
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(88) Date of publication of the international search report: 28 December 2006

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.
INTERNATIONAL SEARCH REPORT

International application No.
PCT/US06/11091

A. CLASSIFICATION OF SUBJECT MATTER

IPC:  
E21B 7/14 (2006.01)  
E21B 7/04 (2006.01)

USPC: 175/14,17,61  
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
U.S.: 175/14,17,61,15

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched none

Electronic database consulted during the international search (name of database and, where practicable, search terms used)  
Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
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<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>US3,934,659A (TSIFEROV) 27 January 1976 (27/01/76), see entire document.</td>
<td>1-26</td>
</tr>
<tr>
<td>A</td>
<td>US4,301,875A (MUNDING et al) 24 November 1981 (24/11/81), see entire document.</td>
<td>1-26</td>
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Further documents are listed in the continuation of Box C. See patent family annex.

Date of the actual completion of the international search  
15 August 2006 (15.08.2006)

Date of mailing of the international search report  
17 OCT 2006

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Continuation of B. FIELDS SEARCHED Item 3:

cast

search terms: umbilical, ignition or ignitor, drilling or boring