



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:  
**04.05.2011 Bulletin 2011/18**

(51) Int Cl.:  
**E21B 33/124** (2006.01) **E21B 33/129** (2006.01)  
**E21B 43/119** (2006.01) **E21B 43/267** (2006.01)  
**E21B 43/11** (2006.01) **E21B 23/14** (2006.01)  
**E21B 43/25** (2006.01)

(43) Date of publication A2:  
**09.02.2011 Bulletin 2011/06**

(21) Application number: **10185217.6**

(22) Date of filing: **14.02.2001**

(84) Designated Contracting States:  
**DE DK GB IT NL**

(30) Priority: **15.02.2000 US 182687 P**  
**30.10.2000 US 244258 P**

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:  
**01909197.4 / 1 264 075**

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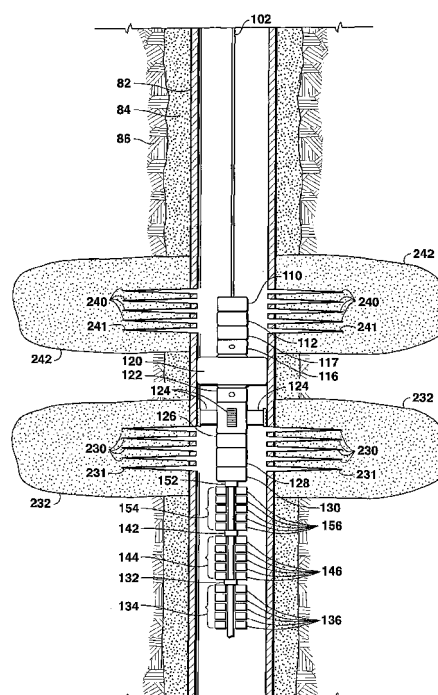
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(54) **Method and apparatus for stimulation of multiple formation intervals**

(57) The invention provides an apparatus and method for perforating and treating multiple intervals of one or more subterranean formations (86) intersected by a wellbore by deploying a bottom-hole assembly having a perforating device (134) and at least one sealing mechanism (120) within said wellbore. The perforating device (134) is used to perforate the first interval to be treated. Then the bottom-hole assembly is positioned within the wellbore such that the sealing mechanism (120), when actuated, establishes a hydraulic seal in the wellbore to positively force fluid to enter the perforations (230, 231) corresponding to the first interval to be treated. A treating fluid is then pumped down the wellbore and into the perforations (230, 231) created in the perforated interval. The sealing mechanism (120) is released, and the steps are then repeated for as many intervals as desired, without removing the bottom hole assembly from said wellbore.



**FIG. 7**



## EUROPEAN SEARCH REPORT

Application Number  
EP 10 18 5217

DOCUMENTS CONSIDERED TO BE RELEVANT			
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Y	* column 1, lines 15-18, 52-64; figures 1-6, 16 *	6,10-15	
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 24 March 2011	Examiner Georgescu, Mihnea
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)



## EUROPEAN SEARCH REPORT

Application Number  
EP 10 18 5217

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
Place of search <b>Munich</b>		Date of completion of the search <b>24 March 2011</b>	Examiner <b>Georgescu, Mihnea</b>
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... &amp; : member of the same patent family, corresponding document</p>			

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EPO FORM 1503 03.82 (P04C01)



Application Number

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**CLAIMS INCURRING FEES**

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

**LACK OF UNITY OF INVENTION**

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



**LACK OF UNITY OF INVENTION  
SHEET B**

Application Number

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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-5, 7, 8

Apparatus of claim 1, wherein (potential special technical feature of claim 4) said tubing string is jointed tubing.  
Technical problem: to provide a supporting means.

1.1. claim: 6

Apparatus of claim 1, wherein (potential special technical feature of claim 6) said BHA further comprises a casing collar locator.  
Technical problem: to position the tool at a specific place.

1.2. claims: 9, 10

Apparatus of claim 1, wherein (potential special technical feature of claim 9) said perforating device is actuated by hydraulic pressure transmitted from the surface through the said wellbore.  
Technical problem: to actuate the tool.

1.3. claim: 11

Apparatus of claim 1, wherein (potential special technical feature of claim 11) said perforating device is a jet cutting device that uses fluid pumped down said tubing string to establishing hydraulic communication between said wellbore and said one or more intervals of said one or more subterranean formations.  
Technical problem: to provide a cutting device.

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2. claims: 12-16

Apparatus of claim 1 (comprised in claim 12), wherein (potential special technical feature of claim 12) the apparatus further comprises at least one tractor device, said tractor device capable of positioning said BHA at different positions in said wellbore.  
Technical problem: to pull the supporting string in wellbores portions closing to horizontal.

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Please note that all inventions mentioned under item 1, although not necessarily linked by a common inventive concept, could be searched without effort justifying an additional fee.

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 10 18 5217

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

24-03-2011

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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82