

Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) **EP 0 679 859 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:  
**03.07.1996 Bulletin 1996/27**

(51) Int Cl.<sup>6</sup>: **F42B 3/13, F42B 3/188**

(43) Date of publication A2:  
**02.11.1995 Bulletin 1995/44**

(21) Application number: **95302104.5**

(22) Date of filing: **29.03.1995**

(84) Designated Contracting States:  
**DE FR GB IT**

(72) Inventor: **Motley, Jerry D.**  
**Arlington, Texas 76017 (US)**

(30) Priority: **29.03.1994 US 219588**  
**23.03.1995 US 410606**

(74) Representative: **Wain, Christopher Paul et al**  
**A.A. THORNTON & CO.**  
**Northumberland House**  
**303-306 High Holborn**  
**London WC1V 7LE (GB)**

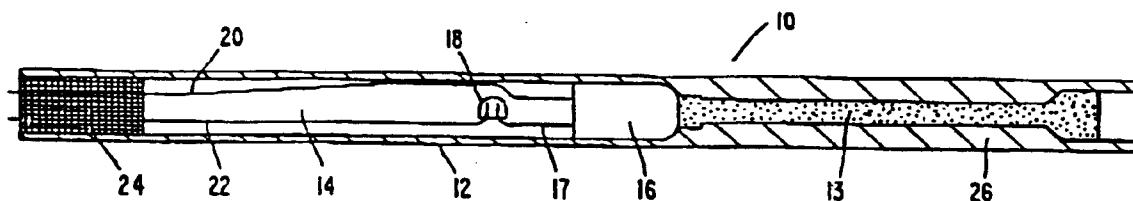
(71) Applicant: **HALLIBURTON COMPANY**  
**Dallas, Texas 75381-9052 (US)**

(54) **Electrical detonator**

(57) An electrical detonator has a case (12) containing an explosive charge (13), a semiconductor bridge (16) positioned adjacent one end of the explosive charge (13) and electrically connected to a spark gap (18) and, in some embodiments, a capacitor and a bleeder resistor. A pair of electrically conductive wires (20,22) are connected to the spark gap (18) and semiconductor bridge (16) to provide a means for passing an electrical charge to the semiconductor bridge (16). The detonator also may include an rf attenuator (24), such as a ferrite bead, through which the electrically conductive wires (20,22) pass.

(20,22) are connected to the spark gap (18) and semiconductor bridge (16) to provide a means for passing an electrical charge to the semiconductor bridge (16). The detonator also may include an rf attenuator (24), such as a ferrite bead, through which the electrically conductive wires (20,22) pass.

**FIG. 2**



**EP 0 679 859 A3**



European Patent  
Office

## EUROPEAN SEARCH REPORT

Application Number  
EP 95 30 2104

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	US-A-5 094 167 (E. HENDLEY) * column 3, line 37-48; figure 5 * ---	1-10	F42B3/13 F42B3/188
Y	US-A-3 117 519 (C. HAMILTON) * column 1, line 52-61; figure 1 * * column 2, line 30-59 * ---	1-10	
Y	US-A-4 592 280 (M. SHORES) * column 4, line 63 - column 5, line 51; figures 1-9 * ---	2	
Y	US-A-4 976 200 (D. BENSON) * column 7, line 7-15 * * column 6, line 6-25 * ---	5	
Y	US-A-4 312 271 (E. DAY) * column 2, line 62 - column 3, line 17 * * column 2, line 63-34 * * column 8, line 1-22 * ---	5-9	
Y	US-A-3 169 482 (L. NOBLE) * column 2, line 17 - column 3, line 20; figures 1-3A * ---	1,5-10	TECHNICAL FIELDS SEARCHED (Int.Cl.6) F42B
Y	US-A-4 708 060 (R. BICKES) * column 1, line 10-12 * * column 6, line 64 - column 7, line 21 * * column 10, line 12-22; table 3 * ---	1,5-10	
A	US-A-3 524 408 (E. PIERSON) * the whole document * ---	1	
A	US-A-3 274 937 (J. KYLE) * column 3, line 28-52; figures 1-8 * ---	1	
A	US-A-3 640 224 (J. PETRICK) * column 2, line 4-28; figure 1 * ---	3,4	
	-/--		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 7 May 1996	Examiner Van der Plas, J
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	

EPO FORM 1503 03/82 (P/C/C01)



European Patent  
Office

**CLAIMS INCURRING FEES**

The present European patent application comprised at the time of filing more than ten claims.

- All claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for all claims.
- Only part of the claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claims:
- No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

**LACK OF UNITY OF INVENTION**

The Search Division considers that the present European patent application does not comply with the requirement 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.
- 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 respects of which search fees have been paid, namely claims:
- None of the further search fees has 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



European Patent  
Office

EUROPEAN SEARCH REPORT

Application Number  
EP 95 30 2104

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	FR-A-2 436 963 (ÉTAT FRANÇAIS) * page 4, line 14-33; figure 2 * ---	4	
A	US-A-3 960 083 (R. DIETZEL) * column 1, line 62 - column 2, line 16 * * column 5, line 51 - column 6, line 56 * ---	5	
A	US-A-3 366 055 (L. HOLLANDER) * column 5, line 50-73; figures 1,8 * -----	10	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>7 May 1996</b>	Examiner <b>Van der Plas, J</b>
<b>CATEGORY OF CITED DOCUMENTS</b> 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	

EPO FORM 1503 03/82 (PM COI)



European Patent  
Office

EP 95 30 2104 -B-

**LACK OF UNITY OF INVENTION - A POSTERIORI -**

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

1. Claims 1-4,10: Detonator with semi-conductor bridge and means for protection against static electricity and RF-currents
2. Claims 1,5-9 : Detonator comprising a mixture of titanium hydride and potassium perchlorate as an igniting charge