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EUROPEAN PATENT APPLICATION

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E 21 B 10/32

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54 **Improved shaft sinking method.**

57 A method of sinking shafts comprising excavating a series of lifts wherein each lift is excavated by drilling a pattern of blast holes (4,6,9,16,18) for the full depth of the lift including boring a large diameter hole (17) and creating a chamber at the lower end of the large diameter hole, blasting the walls of the chamber to deposit rock material into the chamber, extracting at least a portion of the rock material created by the blast and repeating the blasting and extraction step throughout the length of the lift wherein one the volume of said lift being blasted the remaining rock broken material is extracted.

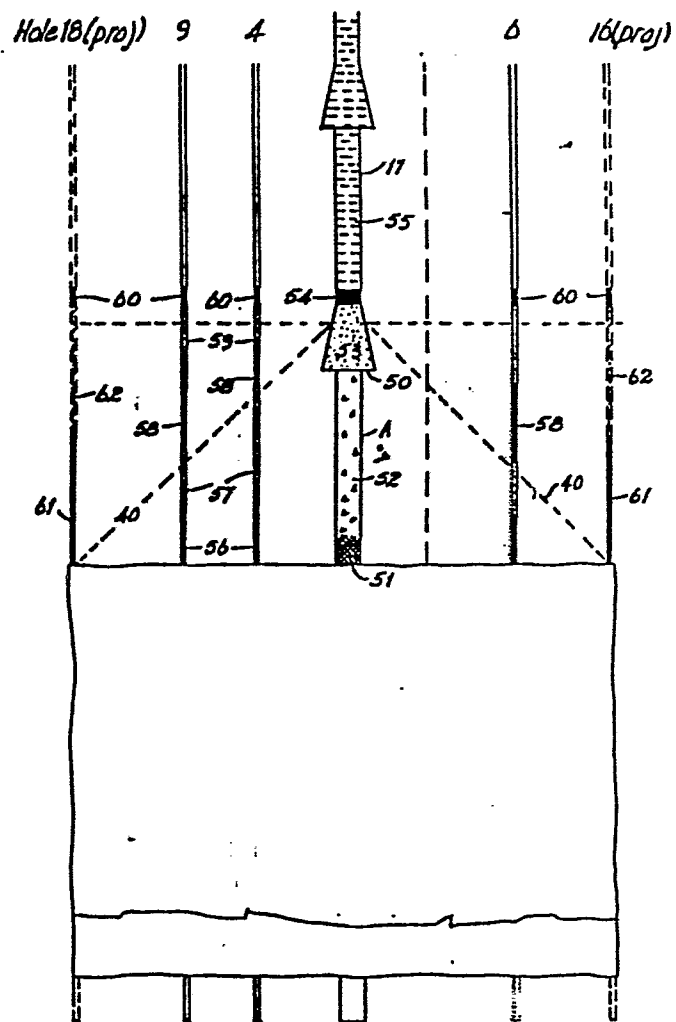


Fig. 2.



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EUROPEAN SEARCH REPORT

0184460

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EP 85 30 8878

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. 4)
X	US-A-1 611 282 (SAMUELSON) * Page 1, line 100 - page 2, line 95; figures 2,3,6 * ---	9-14	E 21 D 1/03 E 21 B 10/32
X	US-A-2 170 452 (GRANT) * Page 1, lines 29 - page 2, line 71; figures 1,2 * ---	9-12	
X	DE-A-2 238 598 (BETON- UND MONIER-BAU) * Claim 3; figures *	9-11	
A	---	14	
X	US-A-4 431 065 (ANDREWS) * Column 2, line 39 - column 5, line 3; figure 1 *	9,10	
A	---	11-14	TECHNICAL FIELDS SEARCHED (Int. Cl. 4) E 21 D E 21 C E 21 B
X	US-A-4 169 510 (MEIGS) * Abstract; figures *	9,10, 14	
X	US-A-3 757 877 (LEATHERS) * Abstract; figures 4-9 *	9,10	
A	---	11-13	
A	DE-C- 596 715 (DEILMANN) ./.		
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 16-12-1986	Examiner RAMPELMANN
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			



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.

X 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:

- 1) Claims 1-8: Shaft sinking method
- 2) Claims 9-14: Drilling tool for enlarging boreholes

- ☒ 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 respect 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:



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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. 4)
A	C.H. FRITZSCHE: "LEHRBUCH DER BERG-BAUKUNDE", vol. 2, 10th edition, 1983, pages 288-290, chapter 90; Springer-Verlag, Berlin, DE "Firstenstossbau als Speicherbau"		
A	INDUSTRIE MINERALE, supplement no. 2, February 1983, pages 74-78; Paris, FR A. PERROTTE et al.: "Diverses variantes de chambres avec piliers abandonnés dans la mine de fer de Soumont"		
A	INDUSTRIE MINERALE, supplement no. 2, February 1983, pages 173-178; Paris, FR P. MELOY et al.: "Chambres-magasins dans les mines de fer de Segré"		
			TECHNICAL FIELDS SEARCHED (Int. Cl. 4)
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
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			