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(71) Applicant: **Trevi S.p.A.**
I-47023 Cesena (Forli) (IT)

(72) Inventor: **Trevisani, Stefano**
I-47020, Roncofreddo (Forli) (IT)

(74) Representative: **Fioravanti, Corrado**
Jacobacci & Partners S.p.A.
Corso Emilia, 8
10152 Torino (IT)

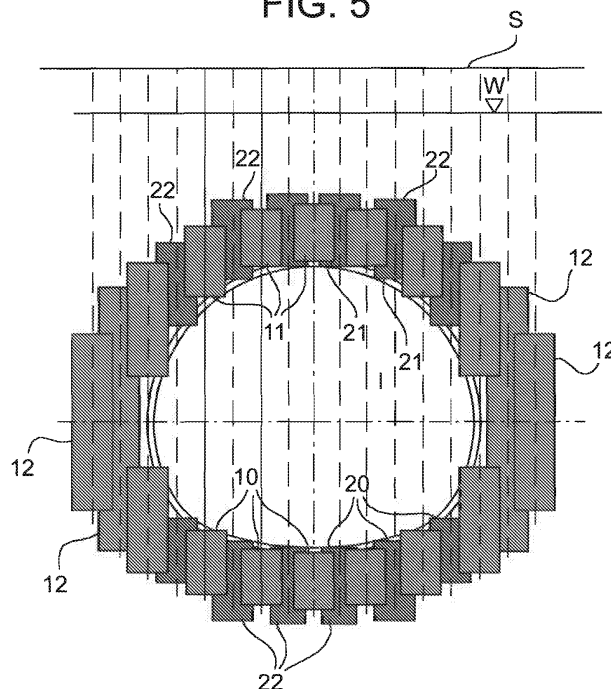
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(54) **Method for consolidating and impermeabilizing the ground around a tunnel**

(57) A set of primary blocks of artificial conglomerate (10, 11) spaced apart from each other around the portion of ground (T) which has to be excavated is formed using jet grouting techniques in a vertical plane transverse to the axis of the tunnel which has to be excavated. A set of infill blocks of artificial conglomerate (20, 21) each located between two consecutive primary blocks in order

to firmly connect them together is then formed. Each infill block has an outer portion (22) which extends over the outer surfaces (13-16) of two consecutive primary blocks (10, 11). A continuous closed ring structure is thus obtained. By repeating these operations alongside the structure already formed, a continuous tubular structure of artificial conglomerate is obtained.

FIG. 5





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP 10 205274 A (MAEDA CONSTRUCTION) 4 August 1998 (1998-08-04) * abstract *	1,11-13	INV. E21D9/00 E02D3/12
A	JP 56 115415 A (HAZAMA GUMI) 10 September 1981 (1981-09-10) * abstract *	1-13	
A	EP 1 418 277 A (CHIAVEROTTI BVBA [BE]) 12 May 2004 (2004-05-12) * abstract *	1-13	
A	DE 196 17 196 C1 (CARBOTECH BERG TUNNELBAUSYST [DE]) 26 June 1997 (1997-06-26) * column 4, lines 47-66 *	1-13	
A	US 4 370 077 A (COLGATE STIRLING A [US]) 25 January 1983 (1983-01-25) * column 7, lines 15-50 *	1-13	
A	WO 02/12638 A (THERMAX INTERNAT CORP [CA]) 14 February 2002 (2002-02-14) * page 9, line 18 - page 10, line 3 *	1-13	TECHNICAL FIELDS SEARCHED (IPC) E21D E02D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 10 September 2007	Examiner GARRIDO GARCIA, M
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)

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

EP 06 11 9250

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
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10-09-2007

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
JP 10205274	A	04-08-1998	NONE	
JP 56115415	A	10-09-1981	NONE	
EP 1418277	A	12-05-2004	BE 1015173 A5	05-10-2004
DE 19617196	C1	26-06-1997	NONE	
US 4370077	A	25-01-1983	AU 548279 B2	05-12-1985
			AU 8107382 A	08-09-1983
			CA 1174864 A1	25-09-1984
			GB 2083105 A	17-03-1982
			SE 455327 B	04-07-1988
			SE 8201336 A	05-09-1983
			ZA 8105345 A	25-08-1982
WO 0212638	A	14-02-2002	AU 8738501 A	18-02-2002
			CA 2315468 A1	10-02-2002
			US 2002057948 A1	16-05-2002