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- (81) **Designated States (unless otherwise indicated, for every  
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BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,  
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KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD,  
ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI,  
NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU,  
RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ,  
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TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,  
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(54) **Title:** AN IMPROVED DENTAL MATERIAL AND METHOD

(57) **Abstract:** The present invention relates to a dental composition incorporating silver fluoride ions and used to prevent the spread of dental caries and the further development of caries in a tooth.

**INTERNATIONAL SEARCH REPORT**

International application No  
PCT/US2012/063098

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> INV. A61K6/083 A61K6/00 ADD.				
According to International Patent Classification (IPC) or to both national classification and IPC				
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) A61K A61Q				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched				
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal , WPI Data, CHEM ABS Data				
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>				
<b>Category*</b>	<b>Citation of document, with indication, where appropriate, of the relevant passages</b>	<b>Relevant to claim No.</b>		
X	US 2010/247456 AI (NI EDERMAN RICHARD [US] ET AL) 30 September 2010 (2010-09-30) page 1, paragraph 6 - paragraph 8 and 12 claims; examples	1,2, 16-21 1-6		
Y	----- US 4 861 808 A (BI LLINGTON RICHARD WI LLIAM ET AL) 29 August 1989 (1989-08-29) column 3; example 3	1-6		
X	----- WO 2008/079149 AI (COOLEY MARIANNA [US] ; FRASER TIMOTHY W [US] ) 3 July 2008 (2008-07-03) page 2, paragraph 10 page 3, paragraph 16 - page 5, paragraph 24 page 7, paragraph 32 - paragraph 33 claims 1,2,4,8 ----- - / - -	1,5, 16		
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.				
* Special categories of cited documents : <table style="width:100%; border:none;"> <tr> <td style="width:50%; border:none;">                     "A" document defining the general state of the art which is not considered to be of particular relevance                      "E" earlier application or patent but published on or after the international filing date                      "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)                      "O" document referring to an oral disclosure, use, exhibition or other means                      "P" document published prior to the international filing date but later than the priority date claimed                 </td> <td style="width:50%; border:none;">                     "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention                      "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone                      "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art                      "&amp;" document member of the same patent family                 </td> </tr> </table>			"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family
"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family			
Date of the actual completion of the international search  <p align="center">21 February 2013</p>		Date of mailing of the international search report  <p align="center">29/04/2013</p>		
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer  <p align="center">Pel li Wablat, B</p>		

INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2012/063098

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	wo 2011/058345 A2 (LANDMARK INNOVATIONS LTD [GB] ; GOWERS PETER [GB] ; SIMPKINS DAVID [GB] ; ) 19 May 2011 (2011-05-19) c l a i m s 19 , 23 24 -----	1,4, 16-22
A	GB 2 180 833 A (G C DENTAL IND CORP G C DENTAL IND CORP [JP] ) 8 Apr i l 1987 (1987-04-08) page 3, l i n e 45 - l i n e 57 page 4; exampl es 3,4 -----	1-6
Y	US 6 756 421 B1 (TODO ATSUHI RO [JP] ET AL) 29 June 2004 (2004-06-29) col umn 2, l i n e 58 - l i n e 62 -----	1-6

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US20 12/063Q98

## Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1.  As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
  
2.  As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
  
3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos. :  
  
1 - 6 , 16 -22

### Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

## 1. claims: 1-6, 16-22

## Invention 1

i)

A dental composition for use in treatment of dental caries, the composition comprising a powder component as specified in claim 1

and a liquid component consisting of a 1 - 10% silver compound solution at 100 wt. %.

ii)

A method of restoring a tooth having a dental caries, method comprising:

Removing a first amount of carious dentine from a tooth being restored and forming a void in the tooth being restored;

Applying a first amount of a dental composition to a deep section of the void, the composition comprising a powder component of claim 1

and a liquid component consisting of a silver compound solution at 1 -10 wt. %;

Allowing the first amount of the dental composition to set; and

Filling the remainder of the void with a dental restorative material.

## Invention 2 ( product claims 7-15)

The dental composition for use in treatment of dental caries, the composition comprising a powder component consisting of:

claim 7

and a liquid component consisting of:

claim 7

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## 2. claims: 7-15

## Invention 2

The dental composition for use in treatment of dental caries, the composition comprising a powder component consisting of:

[image removed]

and a liquid component consisting of:

[image removed]

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2012/063098
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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