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[Continued on next page]

(54) Title: CHEMICAL DETECTION OF SUBSTANCES BY UTILIZING A SAMPLE MEDIUM IMPREGNATED WITH SOLID TEST CHEMICALS

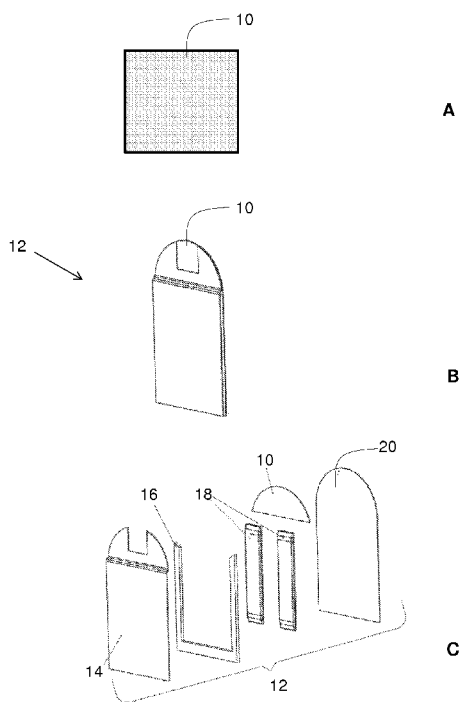


FIG. 1

(57) Abstract: In some embodiments, the present disclosure pertains to substance detecting assemblies that include: (1) a sample medium (e.g., filter paper); and (2) a solid test chemical (e.g., zinc) impregnated with the sample medium. In some embodiments, the present disclosure pertains to methods of making an assembly for detecting a substance by: (1) providing a sample medium; (2) providing a solid test chemical; and (3) impregnating the sample medium with the solid test chemical. In further embodiments, the present disclosure pertains to methods for detecting a substance by: (1) collecting the substance on a sample medium that is impregnated with a solid test chemical; and (2) initiating a reaction of the substance with the solid test chemical on the sample medium to generate a color that corresponds to the substance. In some embodiments, the sample medium is then inserted into a chemical detection unit for the detection of the substance.

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INTERNATIONAL SEARCH REPORT

International application No.

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A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - G01N 21/78 (2014.01) USPC - 436/110 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC(8) - G01N 21/78, 33/52 (2014.01) USPC - 436/106, 110, 111		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched CPC - G01N 21/78, 31/227, 33/52 (2014.09)		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Orbit, Google Scholar		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2011/0081723 A1 (MILLER et al) 07 April 2011 (07.04.2011) entire document	1-8, 11, 12, 14-17, 27
Y		9, 10, 13, 18-26, 28-34
Y	US 5,480,612 A (MARGALIT) 02 January 1996 (02.01.1996) entire document	9, 10, 13
Y	US 5,648,047 A (KARDISH et al) 15 July 1997 (15.07.1997) entire document	18-26, 28-34
Y	WO 2008/044043 A1 (DAVIS et al) 17 April 2008 (17.04.2008) entire document	24-26
A	US 8,293,188 B2 (BUKHTIYAROV et al) 23 October 2012 (23.10.2012) entire document	1-34
A	US 5,679,584 A (MILEAF et al) 21 October 1997 (21.10.1997) entire document	1-34
A	US 2010/0229633 A1 (PAGORIA et al) 16 September 2010 (16.09.2010) entire document	1-34
A	US 2008/0182334 A1 (AMISAR) 31 July 2008 (31.07.2008) entire document	1-34
A	US 2005/0101027 A1 (HAAS) 12 May 2005 (12.05.2005) entire document	1-34
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/>		
* Special categories of cited documents: "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 01 September 2014	Date of mailing of the international search report 24 SEP 2014	
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774	

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2014/030467

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 Extra 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 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.:
1-34

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.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2014/030467

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees need to be paid.

Group I: Claims 1-34 are drawn to a method for detecting a substance

Group II: Claims 35-46 are drawn to a method of making an assembly for detecting a substance

Group III: Claims 47-52 are drawn to an assembly for detecting a substance

The inventions listed in Groups I through III do not relate to a single general inventive concept under PCT Rule 13.1, because under PCT Rule 13.2 they lack the same or corresponding special technical features for the following reasons:

The special technical features of Group I, a method for detecting a substance, are not present in Groups II and III; the special technical features of Group II, a method of making an assembly for detecting a substance, are not present in Groups I and III; and the special technical features of Group III, an assembly for detecting a substance, are not present in Groups I and II.

Groups I through III share the technical features of a method of detecting a substance, said method comprising: providing a sample medium; providing a solid test chemical; and impregnating the sample medium with the solid test chemical. However, these features do not represent a contribution over the prior art.

Specifically, US 8,293,188 B2 to Bukhtiyarov et al. teach a method of detecting a substance (Abstract), said method comprising: providing a sample medium (Col. 10, Lines 46-49); providing a solid test chemical (Col. 10, Lines 46-49; Col. 6, Lines 15-44); and impregnating the sample medium with the solid test chemical (Col. 10, Lines 46-49).

The inventions listed in Groups I through III therefore lack unity under Rule 13 because they do not share a same or corresponding special technical feature.