



- (51) **International Patent Classification:**  
*B29C 47/88* (2006.01)    *B29K 83/00* (2006.01)  
*B29D 11/00* (2006.01)
- (21) **International Application Number:**  
PCT/US2014/037690
- (22) **International Filing Date:**  
12 May 2014 (12.05.2014)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**  
61/855,207    10 May 2013 (10.05.2013)    US
- (71) **Applicant:** ABL IP HOLDING LLC [US/US]; One Lithonia Way, Conyers, Georgia 30012 (US).
- (72) **Inventors:** MARQUARDT, Craig Eugene; 195 Mission Pointe Lane, Covington, Georgia 30016 (US). MCCANLESS, Forrest Starnes; 1003 Wesley Street, Oxford, Georgia 30054 (US). CHEN, Jie; 1546 Lechemin Drive, Snellville, Georgia 30078 (US). HARVEY, John Bryan; 285 Heather Dr. S., Newark, Ohio 43055 (US). WU, Yin-an; 324 Catalina Lane, Pataskala, Ohio 43062 (US). WEISS, Daniel Aaron; 3301 Briarcliff Gables Circle, Atlanta, Georgia 30329 (US).
- (74) **Agents:** PRATT, John S. et al.; Kilpatrick Townsend & Stockton, LLP, 1100 Peachtree Street Suite 2800, Atlanta, Georgia 30309 (US).

- (81) **Designated States** (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, 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, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (84) **Designated States** (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

**Published:**

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

- (88) **Date of publication of the international search report:**  
29 January 2015

(54) **Title:** METHOD AND APPARATUS FOR MAKING SILICONE OPTICS

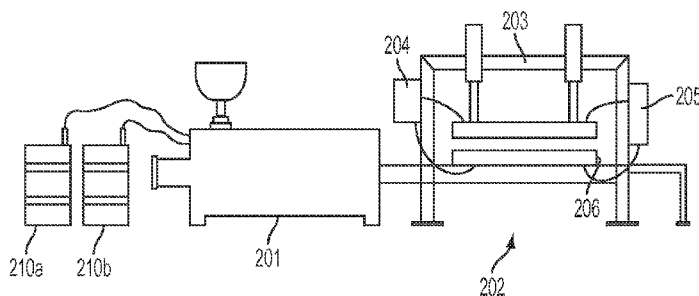


FIG. 2

(57) **Abstract:** Method and apparatus for manufacturing an optical component may include mixing two precursors of silicone (210a, 210b), opening a first gate of an optic forming device (202), moving the silicone mixture from the extrusion machine (201) into the optic forming device, cooling (204) the silicone mixture as it enters the optic forming device, filling a mold within the optic forming device with the silicone mixture, closing the first gate, and heating (205) the silicone mixture in the mold to at least partially cure the silicone. Alternatively, a method for manufacturing an optical component may include depositing a layer of heat cured silicone optical material to an optical structure, arranging one or more at least partially cured silicone optics on the layer of heat cured silicone optical material, and heating the heat cured silicone optical material to permanently adhere the one or more at least partially cured silicone optics to the optical structure.

WO 2014/183113 A3

**INTERNATIONAL SEARCH REPORT**

International application No  
PCT/US2014/037690

**A. CLASSIFICATION OF SUBJECT MATTER**  
 INV. B29C47/88 B29D11/00  
 ADD. B29K83/00

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)  
 B29C B29K B29D H01L

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

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 689 000 A (KOUICHI MAEDA [JP] ET AL) 25 August 1987 (1987-08-25)	22-26
Y	column 4, line 35 - column 5, line 64 column 14, lines 39-42	1
Y	----- WO 2004/054773 A1 (KONINKL PHILIPS ELECTRONICS NV [NL]; VAN SANTEN HELMAR [NL]; STAPERT H) 1 July 2004 (2004-07-01) page 1, line 25 - page 2, line 1 page 3, lines 8-13	1
A	----- US 5 316 703 A (SCHRENK WALTER J [US]) 31 May 1994 (1994-05-31) column 7, lines 27-33	2
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Further documents are listed in the continuation of Box C.

See patent family annex.

\* 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  4 September 2014	Date of mailing of the international search report  11/12/2014
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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  Pipping, Lars
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# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2014/037690

## 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.:

1-5, 22-26

### 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

Information on patent family members

International application No PCT/US2014/037690
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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WO 9212857 A1 06-08-1992			
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**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

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

1. claims: 1-5, 22-26

Method and apparatus for manufacturing an optical component by extruding a silicone mixture and co-extruding one or more additional elements, which are partially encapsulated by the optical component

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2. claims: 6-17

Method for manufacturing an optical component by mixing silicone, cooling it, filling a mold with it and heating the silicone mixture to cure it

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3. claims: 18-21

Method for manufacturing an optical component by depositing a silicone layer and one or more silicone optics to an optical structure and heating to permanently adhere the silicone optics to the optical structure

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