

EXHIBIT A

(12) **United States Patent**
Esbech et al.

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 (45) **Date of Patent:** **May 8, 2018**

(54) **FOCUS SCANNING APPARATUS**
RECORDING COLOR
 (71) Applicant: **3SHAPE A/S, Copenhagen K (DK)**
 (72) Inventors: **Bo Esbech, Gentofte (DK); Christian Romer Rosberg, Bronshoj (DK); Mike Van Der Poel, Rodovre (DK); Rasmus Kjaer, Copenhagen (DK); Michael Vinther, Copenhagen (DK); Karl-Josef Hollenbeck, Copenhagen (DK)**
 (73) Assignee: **3SHAPE A/S, Copenhagen K (DK)**
 (*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 223 days.

(52) **U.S. Cl.**
 CPC **A61C 9/0073** (2013.01); **A61C 9/006** (2013.01); **A61C 9/0066** (2013.01); **G01B 11/24** (2013.01);
 (Continued)

(58) **Field of Classification Search**
 CPC .. **G01B 11/24; G01B 11/2509; G01B 11/2518**
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Related U.S. Application Data
 (60) Provisional application No. 61/764,178, filed on Feb. 13, 2013.

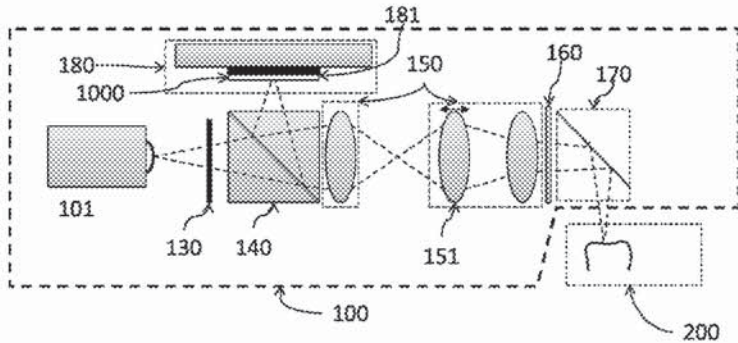
Primary Examiner — Kevin Pyo
 (74) *Attorney, Agent, or Firm* — Buchanan Ingersoll & Rooney P.C.

(30) **Foreign Application Priority Data**
 Feb. 13, 2013 (DK) 2013 70077

(57) **ABSTRACT**
 Disclosed are a scanner system and a method for recording surface geometry and surface color of an object where both surface geometry information and surface color information for a block of said image sensor pixels at least partly from one 2D image recorded by said color image sensor.

(51) **Int. Cl.**
H01J 40/14 (2006.01)
A61C 9/00 (2006.01)
 (Continued)

35 Claims, 4 Drawing Sheets



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| | G01J 3/50 | (2006.01) | | | |
| | G01B 11/24 | (2006.01) | | | |

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- (58) **Field of Classification Search**
 USPC 250/226, 234; 348/47
 See application file for complete search history.

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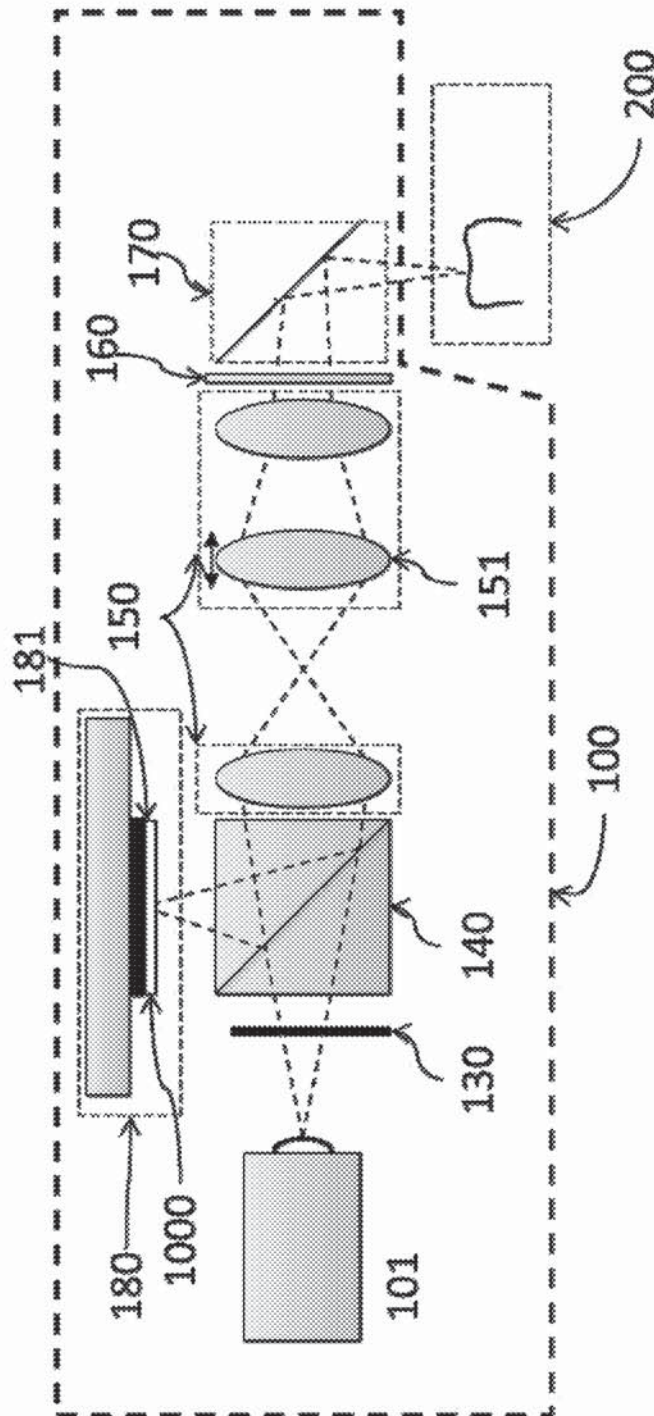


Fig. 1

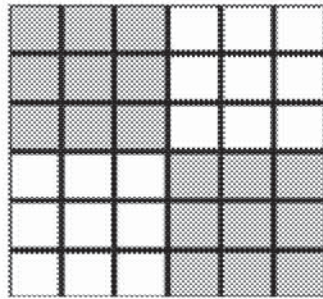


Fig. 2A

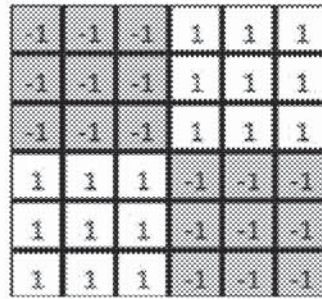


Fig. 2B

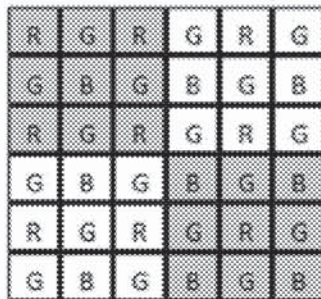


Fig. 3A



Fig. 3B

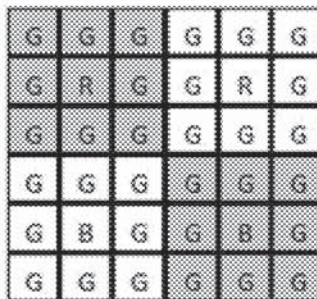


Fig. 4

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