

(12) **United States Patent**
Babayoff

(10) **Patent No.:** **US 8,675,207 B2**
(45) **Date of Patent:** ***Mar. 18, 2014**

(54) **METHOD AND APPARATUS FOR COLOUR IMAGING A THREE-DIMENSIONAL STRUCTURE**

(71) Applicant: **Cadent Ltd., Or Yehuda (IL)**

(72) Inventor: **Noam Babayoff, Rishon Le Zion (IL)**

(73) Assignee: **Cadent Ltd., Or Yehuda (IL)**

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **13/868,926**

(22) Filed: **Apr. 23, 2013**

(65) **Prior Publication Data**

US 2013/0243284 A1 Sep. 19, 2013

Related U.S. Application Data

(63) Continuation of application No. 13/620,159, filed on Sep. 14, 2012, now Pat. No. 8,451,456, which is a continuation of application No. 13/333,351, filed on Dec. 21, 2011, now Pat. No. 8,363,228, which is a continuation of application No. 12/770,379, filed on Apr. 29, 2010, now Pat. No. 8,102,538, which is a continuation of application No. 12/379,343, filed on Feb. 19, 2009, now Pat. No. 7,724,378, which is a continuation of application No. 11/889,112, filed on Aug. 9, 2007, now Pat. No. 7,511,829, which is a continuation of application No. 11/154,520, filed on Jun. 17, 2005, now Pat. No. 7,319,529.

(60) Provisional application No. 60/580,109, filed on Jun. 17, 2004, provisional application No. 60/580,108, filed on Jun. 17, 2004.

(51) **Int. Cl.**
G01B 11/24 (2006.01)

(52) **U.S. Cl.**
USPC **356/601**; 250/559.4; 250/559.49; 356/479; 356/609

(58) **Field of Classification Search**
USPC 250/559.4-559.49; 356/479, 601-609
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

7,098,435 B2 * 8/2006 Mueller et al. 250/208.1
8,451,456 B2 * 5/2013 Babayoff 356/601

* cited by examiner

Primary Examiner — Gregory J Toatley

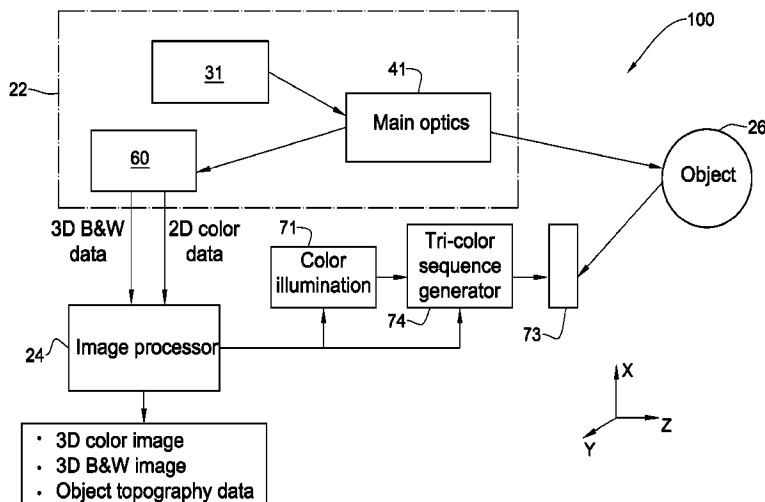
Assistant Examiner — Iyabo S Alli

(74) *Attorney, Agent, or Firm* — Wilson Sonsini Goodrich & Rosati

(57) **ABSTRACT**

A device for determining the surface topology and associated color of a structure, such as a teeth segment, includes a scanner for providing depth data for points along a two-dimensional array substantially orthogonal to the depth direction, and an image acquisition means for providing color data for each of the points of the array, while the spatial disposition of the device with respect to the structure is maintained substantially unchanged. A processor combines the color data and depth data for each point in the array, thereby providing a three-dimensional color virtual model of the surface of the structure. A corresponding method for determining the surface topology and associate color of a structure is also provided.

21 Claims, 11 Drawing Sheets



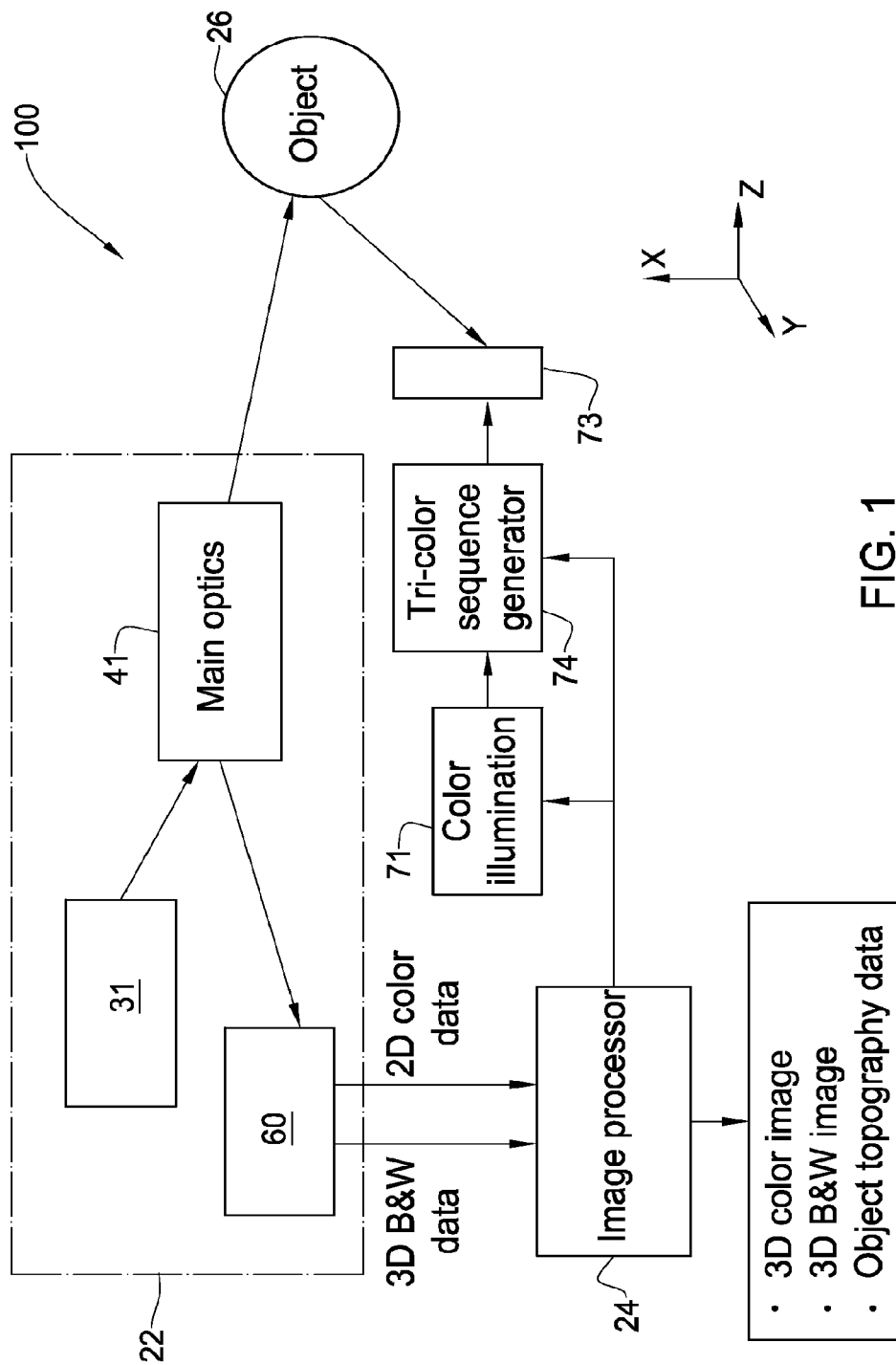


FIG. 1

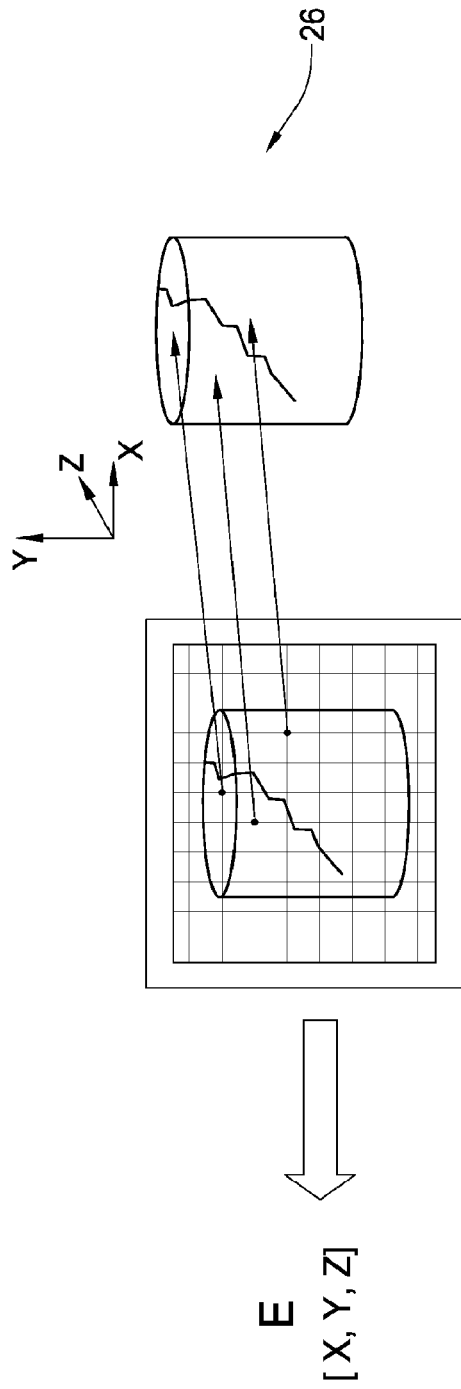


FIG. 2A

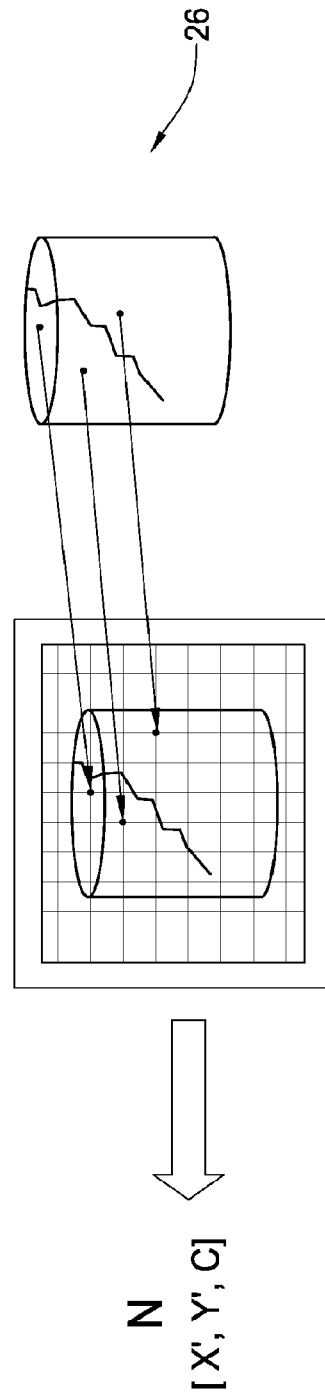


FIG. 2B

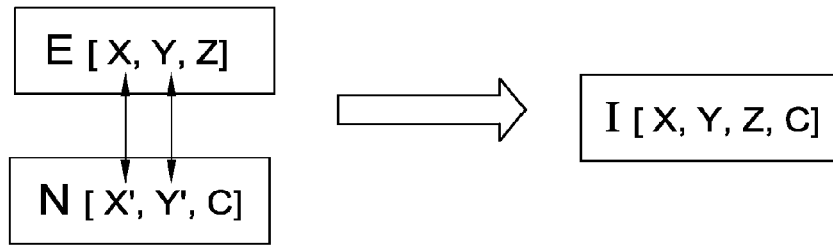


FIG. 2C

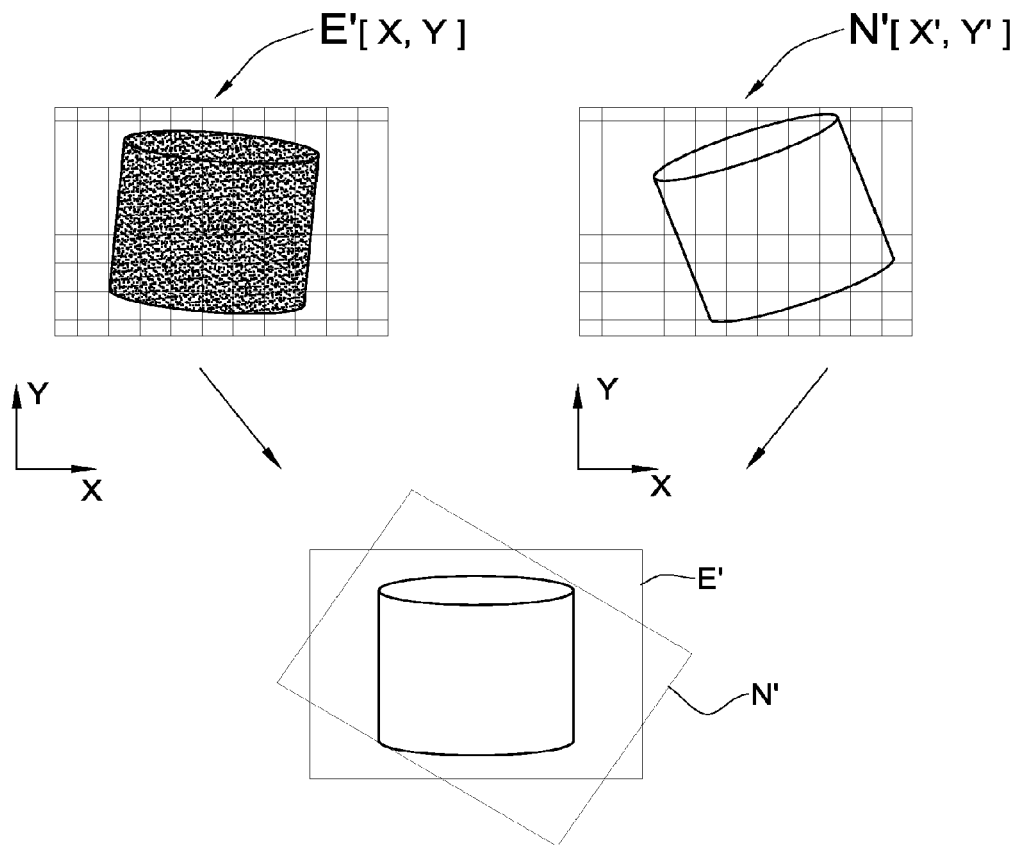


FIG. 3

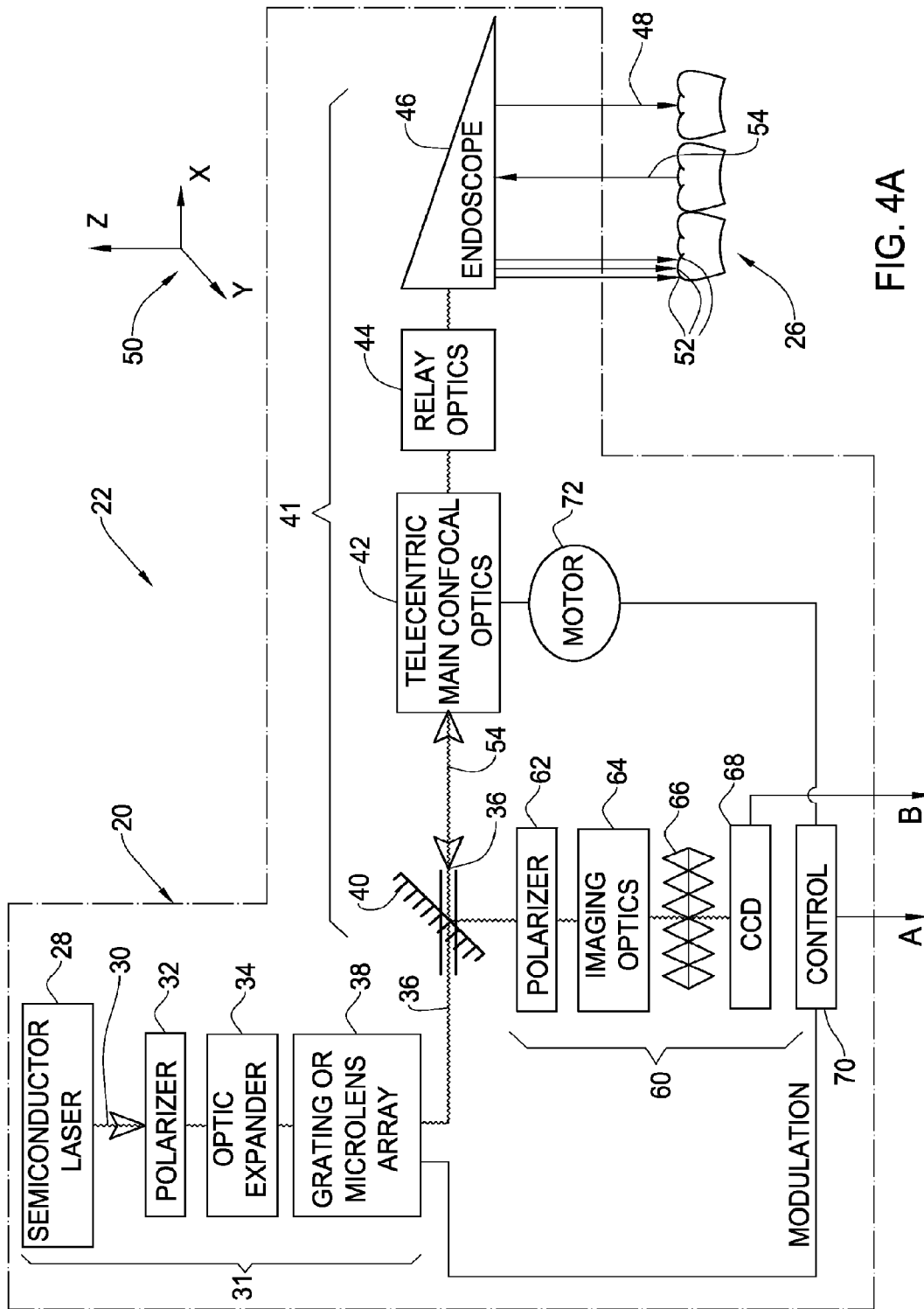


FIG. 4A

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.