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[54] **METHOD AND APPARATUS FOR OPTICALLY DIGITIZING A THREE-DIMENSIONAL OBJECT**

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[52] **U.S. Cl.** **250/559.19**; 250/559.22; 250/578.1; 356/376

[58] **Field of Search** 250/559.19, 559.22, 250/559.23, 559.24, 578.1; 356/375, 376, 384, 385, 387, 388

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[57] **ABSTRACT**

An apparatus and method for digitizing an object for creating a three-dimensional digital model of the object comprises a turntable for rotating the object about a rotation axis, at least first and second light sources positioned and oriented for directing a thin sheet of light toward the object along an illumination plane substantially parallel to and substantially intersecting with the rotation axis, a first detector positioned to one side of the illumination plane and oriented for detecting light reflected along a first detection plane from the object for creating a plurality of first side contours as the object rotates, a second detector positioned to a side of the illumination plane, opposite the one side, for detecting light reflected along a second detection plane from the object for creating a plurality of second side contours as the object rotates, a third detector for capturing illumination on-axis contours in the form of a vertical straight line to derive an instantaneous color of the object's surface as a function of the height of the object, and a combining and evaluating computer for combining the first side contours, the second side contours, and the illumination on-axis contours for generating a plurality of composite contours and for evaluating the composite contours for creating a three-dimensional digital model of the object.

16 Claims, 3 Drawing Sheets