

Exhibit 1001



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

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(45) **Date of Patent:** **Jun. 29, 2004**

(54) **METHODS AND SYSTEMS TO CONTROL A SHAPING TOOL**

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

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(22) Filed: **Apr. 30, 2003**

(65) **Prior Publication Data**

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Related U.S. Application Data

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(51) **Int. Cl.⁷** **G06F 19/00**

(52) **U.S. Cl.** **700/186; 83/768; 606/128**

(58) **Field of Search** **700/186, 163, 700/159, 245; 606/128; 318/568.11; 144/3.1; 83/76.8, 367, 370; 451/5**

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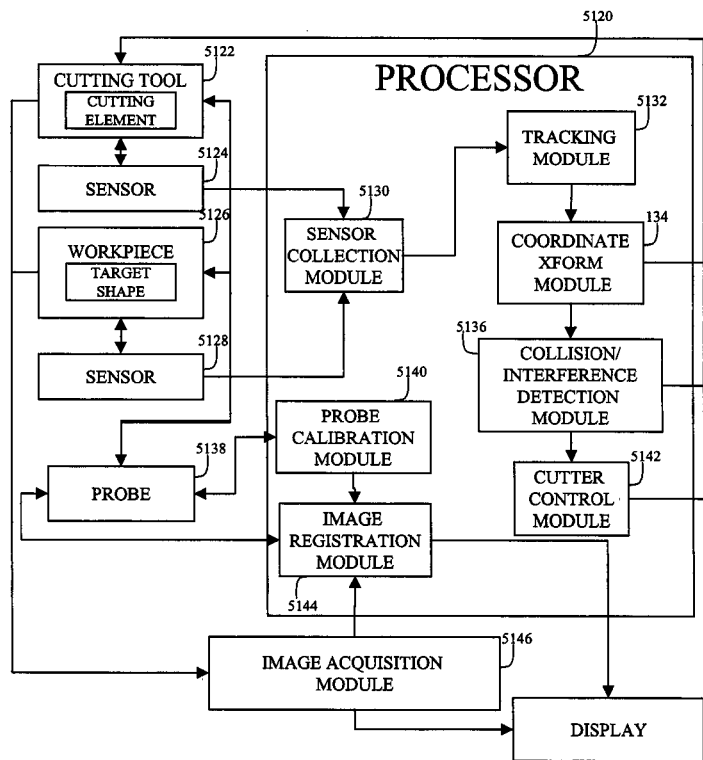
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(57) **ABSTRACT**

A method and system for providing control that include providing a workpiece that includes a target shape, providing a cutting tool, providing a 3-D image associated with the workpiece, identifying the target shape within the workpiece image, providing a 3-D image associated with the cutting tool, registering the workpiece with the workpiece image, registering the cutting tool with the cutting tool image, tracking at least one of the workpiece and the cutting tool, transforming the tracking data based on image coordinates to determine a relationship between the workpiece and the cutting tool, and, based on the relationship, providing a control to the cutting tool. In one embodiment, the workpiece image can be represented as volume pixels (voxels) that can be classified and/or reclassified based on target shape, waste, and/or workpiece.

65 Claims, 13 Drawing Sheets



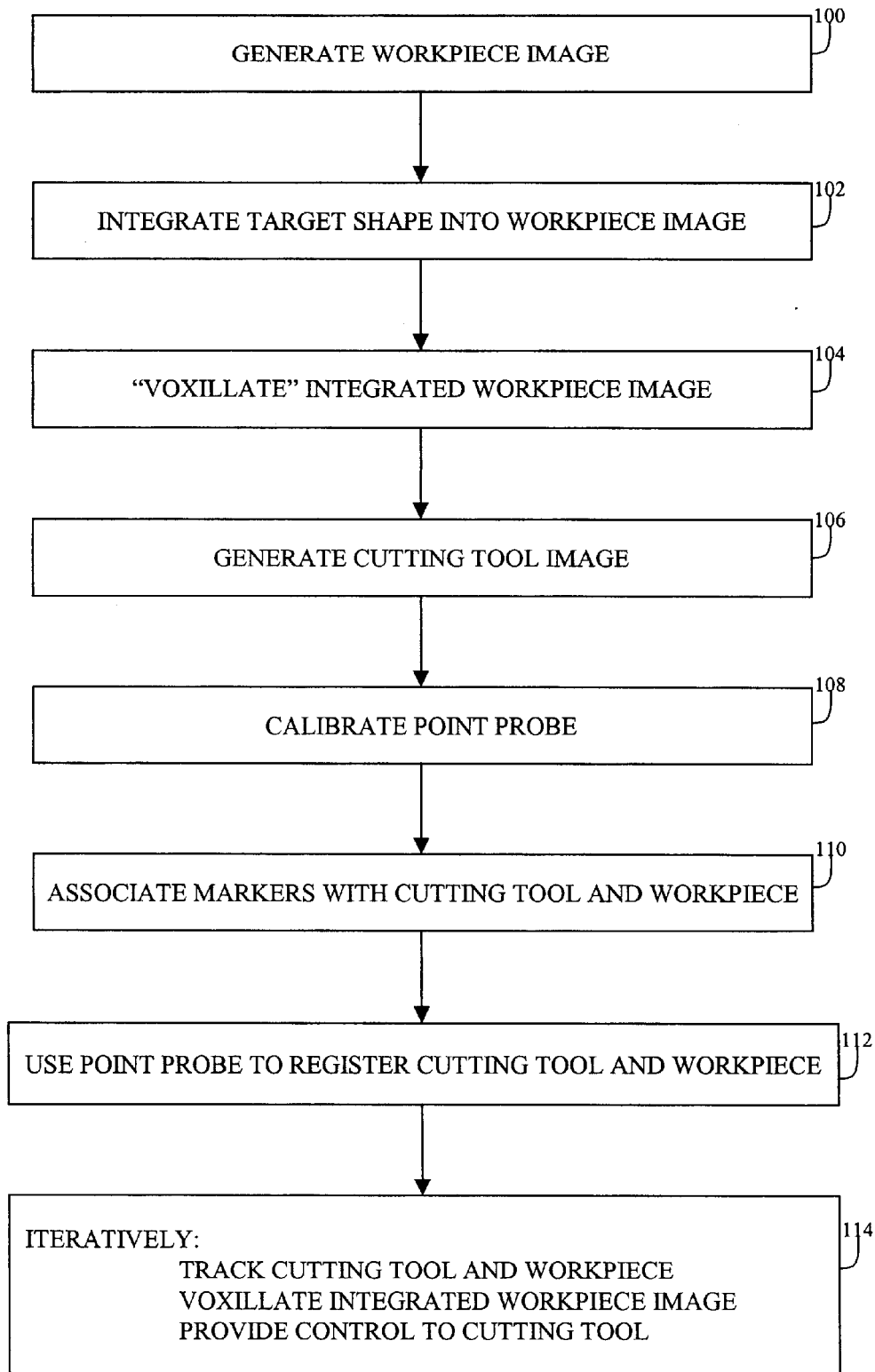


FIGURE 1

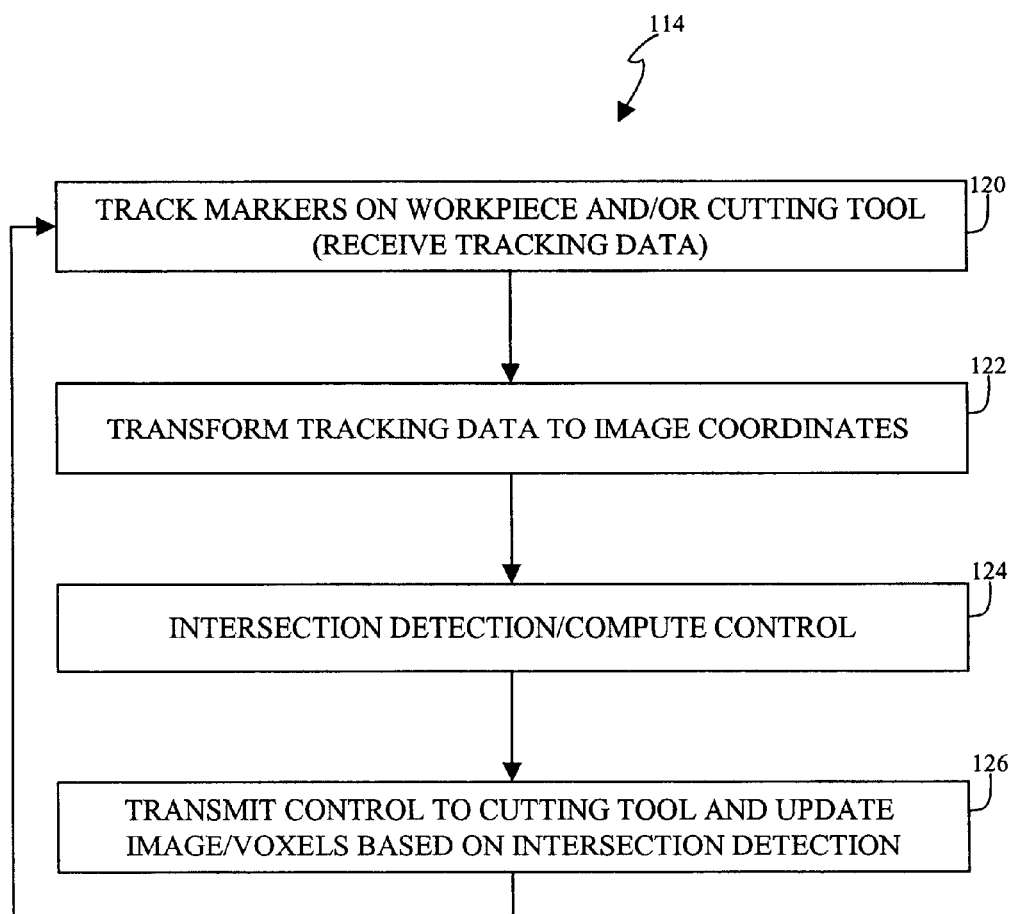


FIGURE 2A

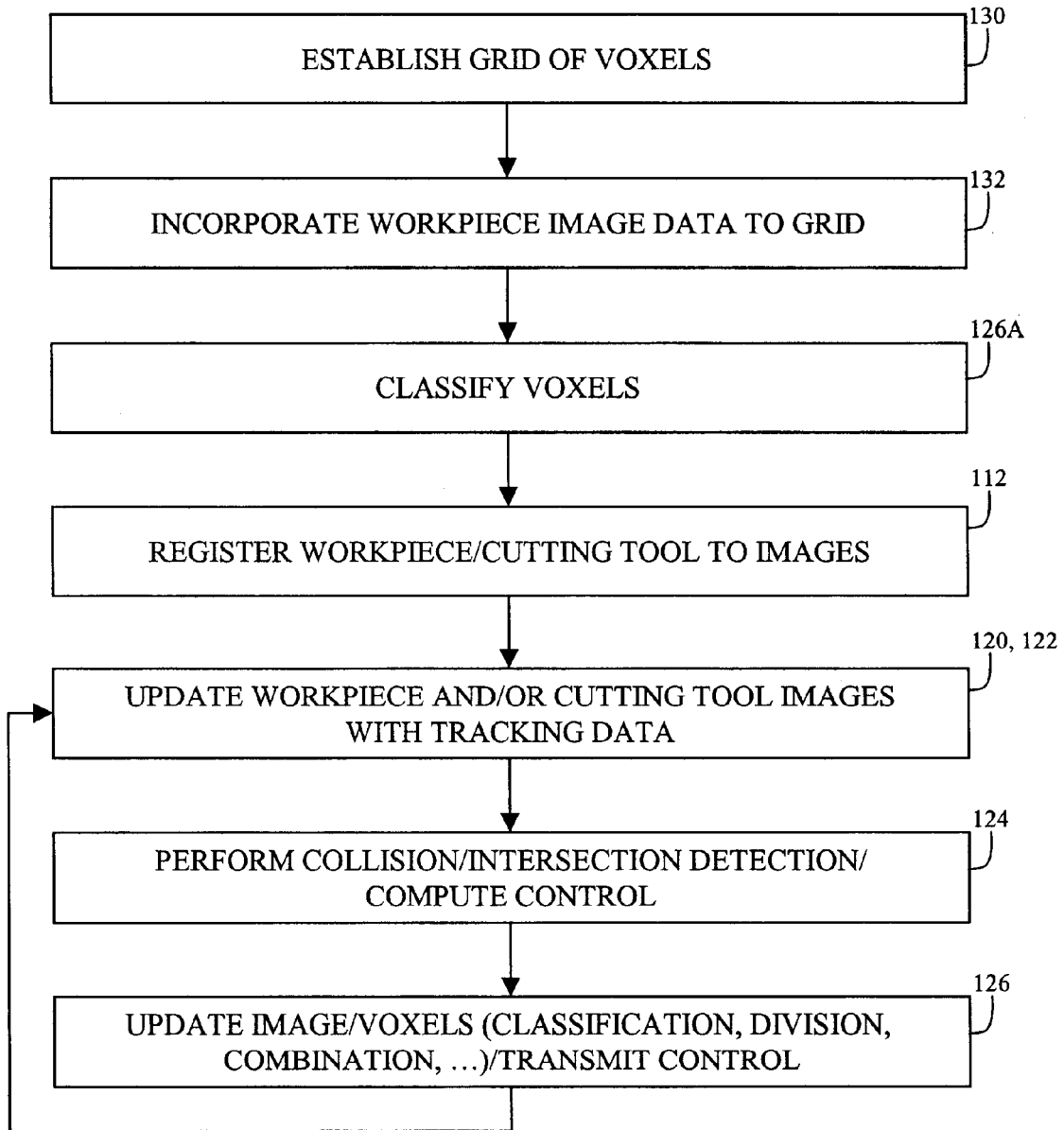


FIGURE 2B

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