Exhibit 1010

(12) **United States Patent**
DiGioia, III et al.

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(54) **COMPUTER-ASSISTED SURGERY PLANNER AND INTRA-OPERATIVE GUIDANCE SYSTEM**

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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.

This patent is subject to a terminal disclaimer.

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Related U.S. Application Data

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(51) **Int. Cl.**[7] **A61F 2/32**; A61F 2/34; A61F 2/36

(52) **U.S. Cl.** **703/11**; 703/7; 623/19; 623/20; 623/21; 623/22

(58) **Field of Search** 703/11, 7; 606/86, 606/89, 90, 91; 623/11, 16, 18, 19, 20, 21, 22, 23, 914

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(57) **ABSTRACT**

An apparatus for facilitating the implantation of an artificial component in one of a hip joint, a knee joint, a hand and wrist joint, an elbow joint, a shoulder joint, and a foot and ankle joint. The apparatus includes a pre-operative geometric planner and a pre-operative kinematic biomechanical simulator in communication with the pre-operative geometric planner.

17 Claims, 14 Drawing Sheets
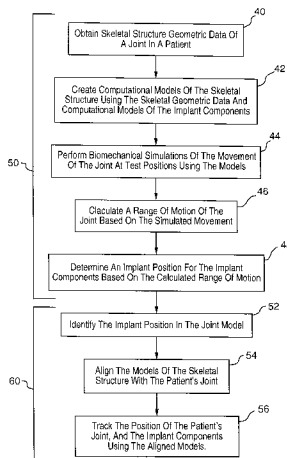
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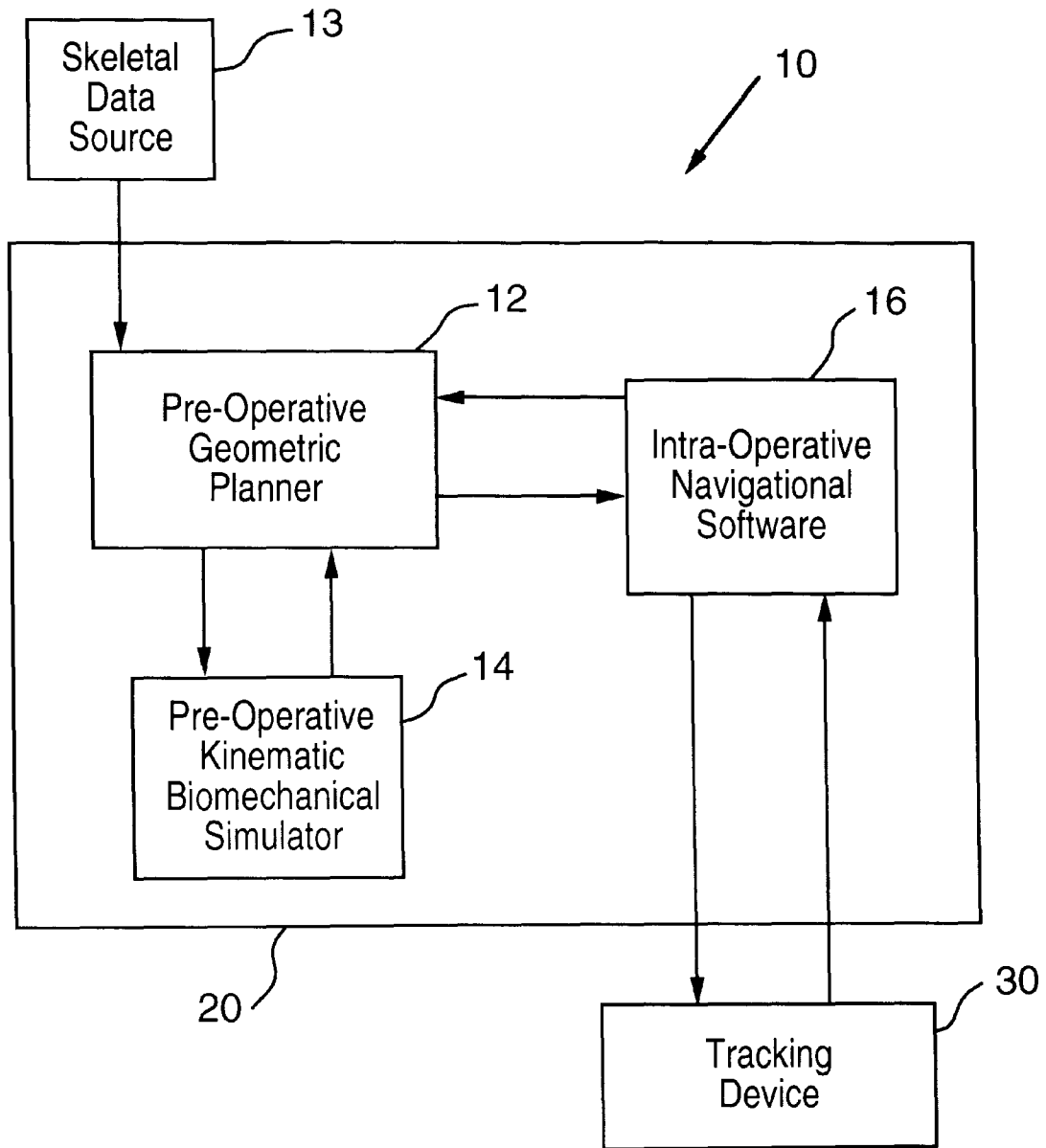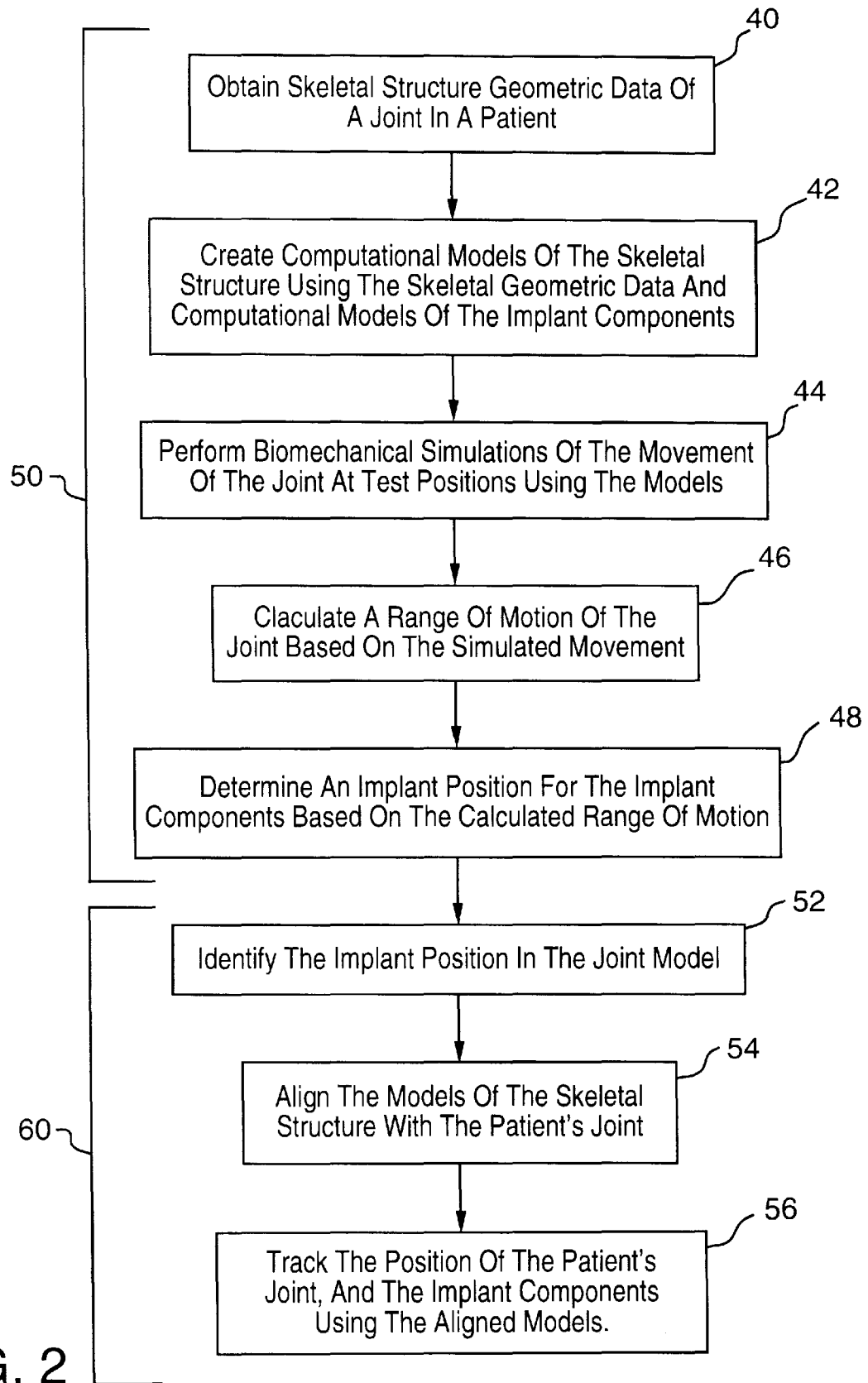
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FIG. 1

40

Obtain Skeletal Structure Geometric Data Of
A Joint In A Patient

42

Create Computational Models Of The Skeletal
Structure Using The Skeletal Geometric Data And
Computational Models Of The Implant Components

44

Perform Biomechanical Simulations Of The Movement
Of The Joint At Test Positions Using The Models

50

46

Claculate A Range Of Motion Of The
Joint Based On The Simulated Movement

48

Determine An Implant Position For The Implant
Components Based On The Calculated Range Of Motion

52

Identify The Implant Position In The Joint Model

54

Align The Models Of The Skeletal
Structure With The Patient's Joint

60

56

Track The Position Of The Patient's
Joint, And The Implant Components
Using The Aligned Models.

FIG. 2

DOCKET ALARM

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.

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