Exhibit 1

U.S. Patent No. 8,384,771

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(12) **United States Patent**
Douglas

(10) **Patent No.:**   **US 8,384,771 B1**
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(54) **METHOD AND APPARATUS FOR THREE DIMENSIONAL VIEWING OF IMAGES**

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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 1312 days.

(21) Appl. No.: **11/941,578**

(22) Filed: **Nov. 16, 2007**

Related U.S. Application Data

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(51) **Int. Cl.**
H04N 13/04 (2006.01)
(52) **U.S. Cl.** **348/53**; 348/51; 348/42
(58) **Field of Classification Search** .... None
See application file for complete search history.

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Primary Examiner — Jeffrey R Swearingen

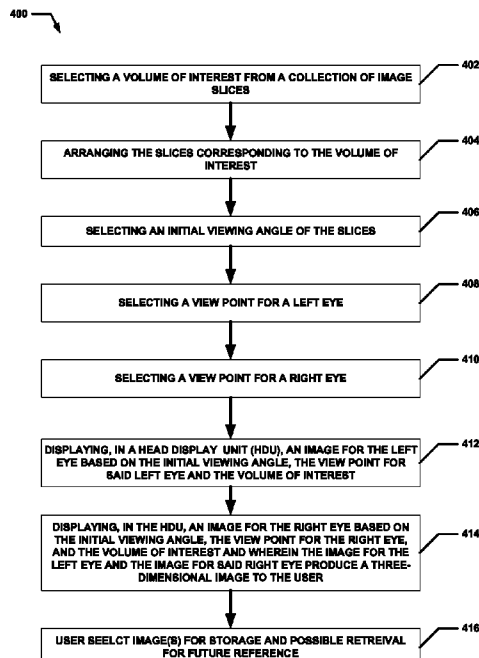(74) *Attorney, Agent, or Firm* — Anderson Gorecki & Rouille LLP

(57) **ABSTRACT**

A method, apparatus and computer program product for three dimensional viewing of images is presented. Embodiments of the invention provide a process for combining slices generated by medical imaging devices to create a volume of interest and then present this volume in a three-dimensional representation to a head display unit so that the user can obtain a holistic view of the patient. Key image processing techniques are applied which enable the user to rotate and view the volume of interest from alternative viewpoints; to enable tissue subtraction to facilitate unobstructed viewing of a region of interest; to identify differing tissues with color schematics; and to zoom in for optimal viewing.

21 Claims, 12 Drawing Sheets

400

402 SELECTING A VOLUME OF INTEREST FROM A COLLECTION OF IMAGE SLICES

404 ARRANGING THE SLICES CORRESPONDING TO THE VOLUME OF INTEREST

406 SELECTING AN INITIAL VIEWING ANGLE OF THE SLICES

408 SELECTING A VIEW POINT FOR A LEFT EYE

410 SELECTING A VIEW POINT FOR A RIGHT EYE

412 DISPLAYING, IN A HEAD DISPLAY UNIT (HDU), AN IMAGE FOR THE LEFT EYE BASED ON THE INITIAL VIEWING ANGLE, THE VIEW POINT FOR SAID LEFT EYE AND THE VOLUME OF INTEREST

414 DISPLAYING, IN THE HDU, AN IMAGE FOR THE RIGHT EYE BASED ON THE INITIAL VIEWING ANGLE, THE VIEW POINT FOR THE RIGHT EYE, AND THE VOLUME OF INTEREST AND WHEREIN THE IMAGE FOR THE LEFT EYE AND THE IMAGE FOR SAID RIGHT EYE PRODUCE A THREE-DIMENSIONAL IMAGE TO THE USER

416 USER SEELCT IMAGE(S) FOR STORAGE AND POSSIBLE RETREIVAL FOR FUTURE REFERENCE

FIGURE 1

FIGURE 2

FIGURE 3

DOCKET ALARM
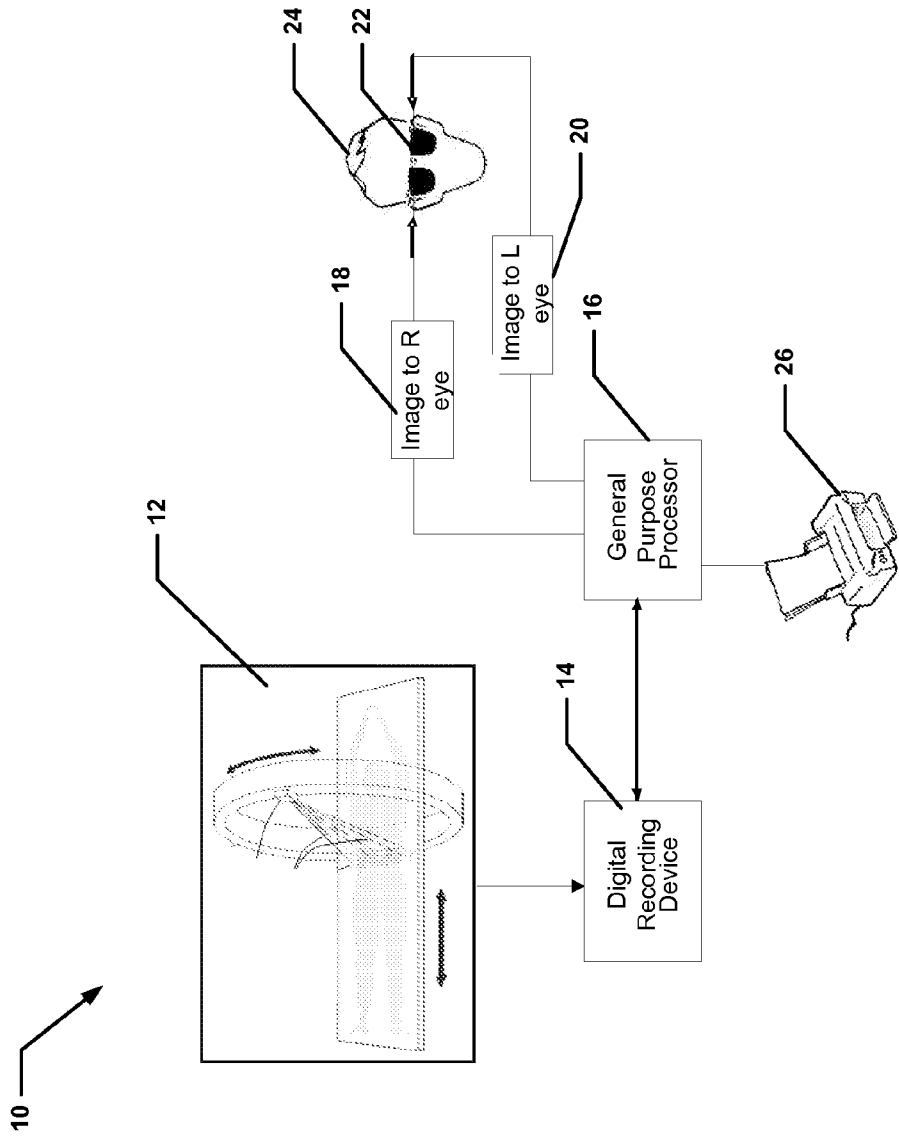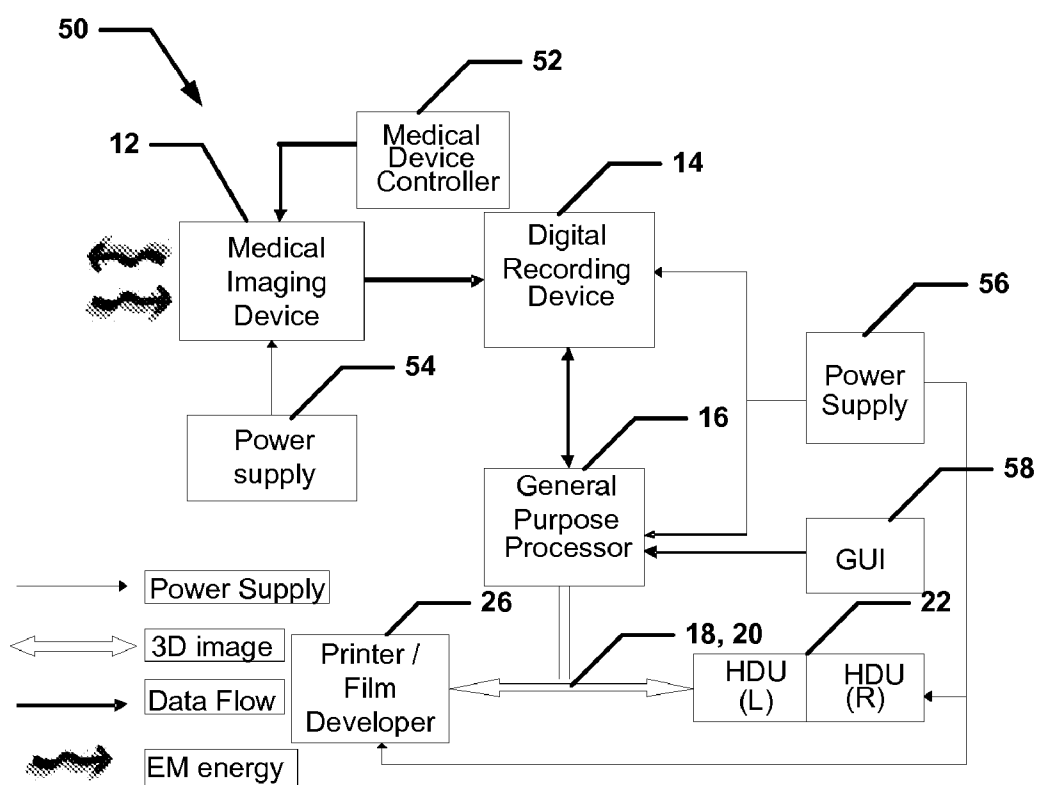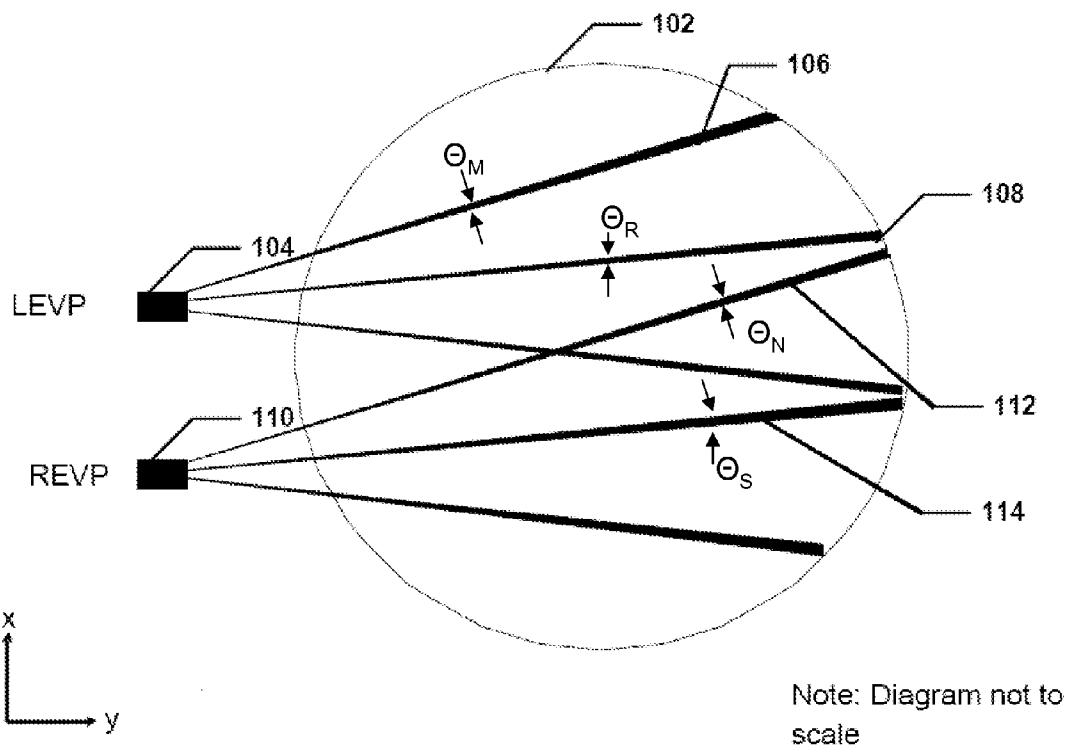
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