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(71) Applicant: **GE Medical Systems Global Technology Company LLC**
Waukesha, Wisconsin 53188 (US)

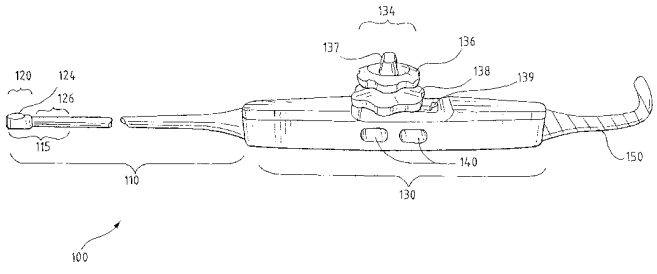
(72) Inventors:
- **Jordfald, Dag**
  3185 Horten (NO)
- **Ronander, Jon**
  3113 Tonsberg (NO)
- **Piel, Joseph E.,Jr.**
  Scotia, New York 12302 (US)
- **Chenk, Jiayu**
  Palo Alto, California 94303 (US)
- **Snyder, Jonathan E.**
  Park City, Utah 84098 (US)
- **Jonsberg, Karl**
  3112 Tonsberg (NO)

(74) Representative: **Pedder, James Cuthbert**
GE London Patent Operation,
Essex House,
12/13 Essex Street
London WC2R 3AA (GB)

(54) Transesophageal ultrasound probe with imaging element position sensor in scanhead

(57) A system and method for measuring a position of an imaging element (436) located within a scan head (120) of an imaging probe, such as transesophageal ultrasound probe (100), is provided. The imaging probe may be used in a medical imaging system and/or a three-dimensional imaging system. The probe includes an articulating portion (115) having a scan head (120). The scan head (120) includes an imaging element (436), such as a transducer, and a position sensor positioned within the scan head (120). Preferably, the position sensor is connected to the imaging element (436) via an axle (510). Therefore, the rotation of the position sensor is synchronized to the rotation of the imaging element (436). The location of the position sensor within the imaging element (436) provides accurate measurement of the position of the imaging element (436). The position sensor preferably includes a code disk having apertures (530) and a system of light emitters (524, 528) and detectors (514, 518). As the code disk rotates in synchronization with the imaging element (436), the pattern of detection of light through the apertures (530) measures the position of the imaging element (436). Various alternative position sensors, such as potentiometers, may be utilized within the scan head (120) of the probe. The probe also includes a control handle (130) having imaging and articulation controls.

FIG. 1



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PARTIAL EUROPEAN SEARCH REPORT

which under Rule 45 of the European Patent Convention shall be considered, for the purposes of subsequent proceedings, as the European search report

Application Number EP 02 25 1787

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 5 398 691 A (BASHEIN GERARD ET AL) 21 March 1995 (1995-03-21) * column 1, line 8 - line 25 * * column 10, line 9 - line 46 * * column 15, line 63 - column 16, line 53; figures *	1-4	A61B8/12
X	US 5 469 852 A (NAKAMURA HISASHI ET AL) 28 November 1995 (1995-11-28) * column 1, line 5 - line 30 * * column 5, line 15 - line 54 * * column 8, line 51 - column 9, line 8; figures 1,11,12 *	1-4	
A	US 4 977 898 A (SCHWARZSCHILD JACK ET AL) 18 December 1990 (1990-12-18) * column 6, line 15 - line 34 * * column 8, line 64 - column 9, line 43; figures 13,15 *	1-4	
A	US 5 419 334 A (MIYAGAWA TOYOMI) 30 May 1995 (1995-05-30) * column 4, line 47 - column 6, line 36 *	1-4	TECHNICAL FIELDS SEARCHED (Int.Cl.7) A61B

INCOMPLETE SEARCH

The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC to such an extent that a meaningful search into the state of the art cannot be carried out, or can only be carried out partially, for these claims.

Claims searched completely :

Claims searched incompletely :

1-4

Claims not searched :

5-10

Reason for the limitation of the search:

Article 52 (4) EPC - Method for treatment of the human or animal body by surgery and diagnostic method practised on the human or animal body

Place of search	Date of completion of the search	Examiner
THE HAGUE	3 October 2002	Manschot, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 02 25 1787

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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03-10-2002

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5398691 A	21-03-1995	AU 7679894 A	22-03-1995
		WO 9506436 A1	09-03-1995
US 5469852 A	28-11-1995	JP 3234032 B2	04-12-2001
		JP 6261901 A	20-09-1994
		JP 6261903 A	20-09-1994
		JP 6261904 A	20-09-1994
		JP 6269450 A	27-09-1994
US 4977898 A	18-12-1990	US 4834102 A	30-05-1989
US 5419334 A	30-05-1995	JP 6217978 A	09-08-1994

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

专利名称(译)	经食管超声探头与扫描头中的成像元件位置传感器		
公开(公告)号	EP1240869A3	公开(公告)日	2002-11-27
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申请(专利权)人(译)	GE医疗系统的全球技术公司LLC		
当前申请(专利权)人(译)	GE医疗系统的全球技术公司LLC		
[标]发明人	JORDFALD DAG RONANDER JON PIEL JOSEPH E JR CHENK JIAYU SNYDER JONATHAN E JONSBERG KARL		
发明人	JORDFALD, DAG RONANDER, JON PIEL, JOSEPH E.,JR. CHENK, JIAYU SNYDER, JONATHAN E. JONSBERG, KARL		
IPC分类号	G01B7/30 A61B8/12 G01B7/00 G01B11/00 G01B17/00 G01B17/06 G01B21/00		
CPC分类号	A61B8/12 A61B8/4254 A61B8/4461		
优先权	09/681318 2001-03-16 US		
其他公开文献	EP1240869A2 EP1240869B1		
外部链接	Espacenet		

摘要(译)

提供了一种用于测量位于成像探头（例如经食道超声探头（100））的扫描头（120）内的成像元件（436）的位置的系统和方法。成像探头可以用在医学成像系统和/或三维成像系统中。探针包括具有扫描头（120）的铰接部分（115）。扫描头（120）包括成像元件（436），例如换能器，以及位于扫描头（120）内的位置传感器。优选地，位置传感器经由轴（510）连接到成像元件（436）。因此，位置传感器的旋转与成像元件的旋转同步（436）。位置传感器在成像元件（436）内的位置提供了成像元件（436）的位置的精确测量。位置传感器优选地包括具有孔（530）的代码盘和光发射器（524,528）和检测器（514,518）的系统。当代码盘与成像元件（436）同步旋转时，通过孔（530）的光检测图案测量成像元件（436）的位置。可以在探头的扫描头（120）内使用各种替代位置传感器，例如电位计。探针还包括具有成像和关节控制的控制手柄（130）。