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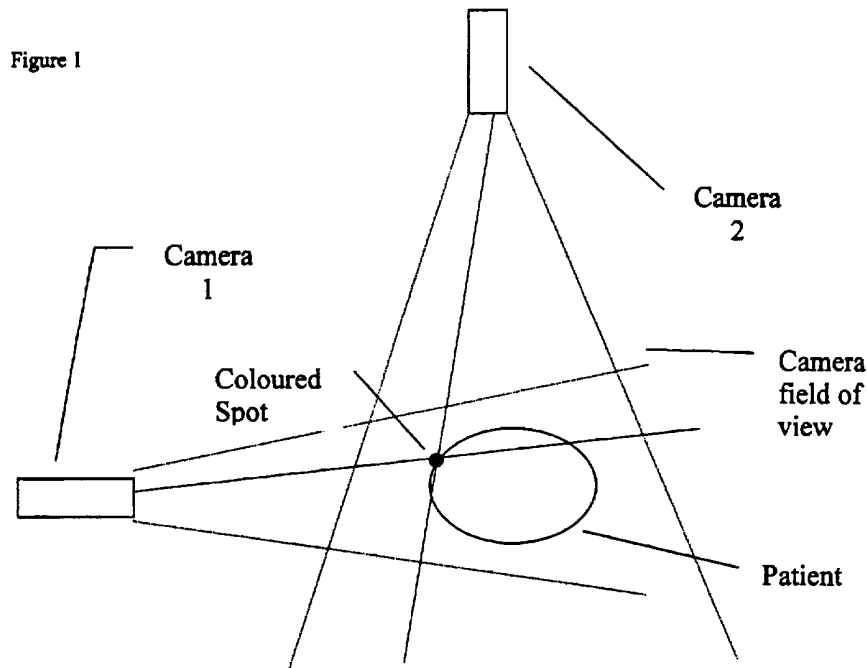
(52) UK CL (Edition R)
H5R REK REQ

(56) Documents Cited
GB 2317317 A GB 2287598 A EP 0737439 A2
WO 98/20795 A1 WO 98/11822 A1 WO 98/04194 A1

(58) Field of Search
UK CL (Edition Q) H5R REK REQ
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Online:WPI, EPODOC, JAPIO

(54) Abstract Title
Patient position monitoring system

(57) A set of flat coloured discs are attached to the patient. These are imaged via cameras and the XYZ position of each disc is defined in virtual space by triangulation. This information is recorded and used to position the patient accurately. In addition the position information of the patient is monitored and recorded during Radiotherapy treatment. The discs may also be used to give positional information about the position of a body surface, i.e. during breathing or respiration.



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Figure 1

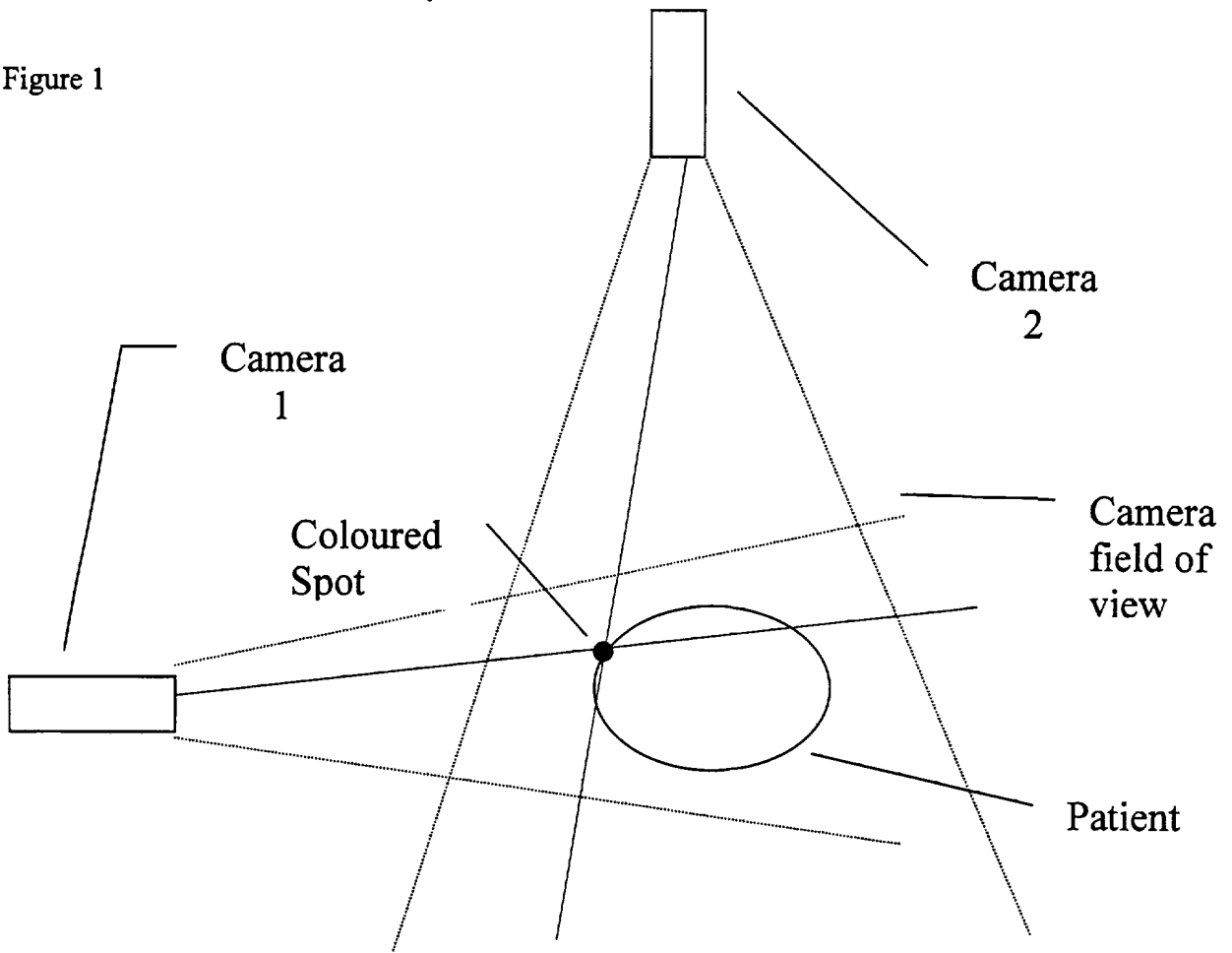


Figure 2

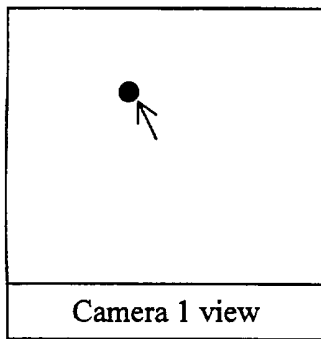
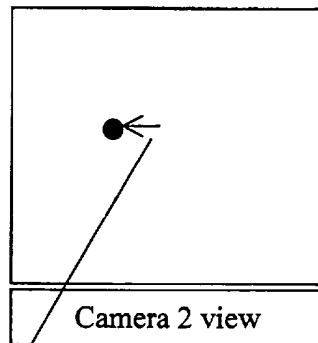
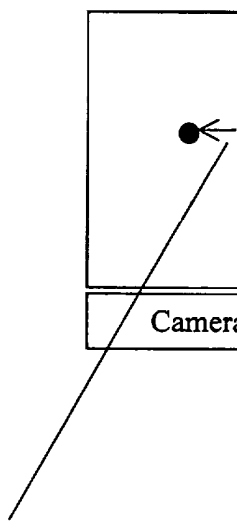


Figure 3



Xy offset



Title: Patient Position Monitoring System**Background:**

Radiotherapy applies a calculated amount of electron energy to tumours. In order to achieve this patients have to be aligned correctly in positions that can be accurately reproduced when required. As living beings patients have a tendency to move, and unless this is detected, the wrong areas are irradiated. Currently this is achieved by immobilising the patient with various physical restraints, however once positioned and physically checked the operator assumes that there will be no further movement.

Description:

The Patient Position Monitoring System monitors the position of marks or tattoos applied to the patient to assist with the alignment. This is carried out continuously in a non-contact method.

Highly coloured spots are stuck to the patient on top of the patient tattooed marks.

The area to be monitored is a cube of space.

Two or more cameras are mounted on the room walls or the simulator to provide coverage of the required spots. The camera field of view is adjusted to such that the width of the field of view is approximately the width of the cube of interest. By calibration the angle of position of the spot can be calculated.

In order to recognise the coloured spot and its position the image from all cameras is digitally frame grabbed and converted to hue and saturation. The pixels are filtered to accept only those with the correct hue. The result is integrated to provide a precise point of x and y co-ordinates. These x and y co-ordinates correspond to an angle offset from the direction the camera is pointing. By combining these angles from a combination of cameras a precise position in space can be defined.

By recording the original patient set-up the Patient Position Monitoring System can constantly check whether there has been any significant movement.

The system will also allow monitoring of breathing movement and could be used to synchronise radiation bursts to provide a more accurate dose field.

Applications also include use in Diagnostic imaging such as image fusion and subtraction.

Claims

1. A Patient Position Monitoring System comprising flat coloured discs on the patient surface to provide virtual space position information of a point(s) using electronic imaging.
2. Recording and electronic comparison of position information of claim 1 to align patient from previous position information.
3. Recording and electronic comparison of position information of claim 1 where information is obtained from another system as in claim 1 situated in another room.
4. Continuous position information acquisition to provide position information as in claim 1 to provide output to other systems.
5. Continuous position information obtained as in claim 1 to monitor patient movement during treatment or tests.
6. Use of coloured discs attached to the patient to provide reference points for position information.
7. Position information is on three sides of the patient.



Application No: GB 9817371.9
Claims searched: 1-7

Examiner: Eamonn Quirk
Date of search: 19 October 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): H5R(REK, REQ) G1A(AAMX, ABAX, ABGX, AAJP)

Int Cl (Ed.6): A61B (6/08)

Other: Online: WPI, EPODOC, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2 317 317 A (Seimens Medical Systems) Page 7 lines 19-24	1-6
X	GB 2 287 598 A (Roke Manor Research) Page 10 lines 8-19	1,5,6 at least
X	WO 98/20795 A1 (Glasgow Caledonian University) all figures	1,5,6,7 at least
X	WO 98/11822 A1 (University of Pittsburgh) figures & abstract	1,5,6 at least
X	WO 98/04194 A1 (University of Pittsburgh)whole document	1,5,6 at least
X	EP 0 737 439 A2 (Dornier Medizintechnik)	1,5, 6 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.