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(54) **Title**: ROBOTIC ARM FOR ACCURATE POSITIONING IN THREE-DIMENSIONAL SPACE, MEASUREMENT OF THREE-DIMENSIONAL COORDINATES, AND REMOTE TOOLING OPERATIONS IN THREE-DIMENSIONAL SPACE

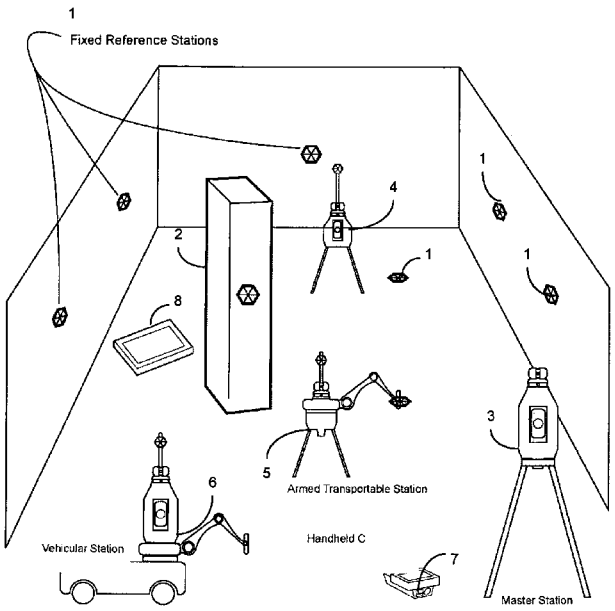


FIG. 1

(57) **Abstract**: CMM (coordinate measurement) functions are incorporated into robotic devices used a construction site system. The construction site system is capable of determining the absolute position of any physical point in three- dimensional space upon which the moving robot is to operate, that position is determined globally relative to monuments with known positions. A CMM determines the position of a point in three-dimensional space locally relative to itself. Combining the CMM functions with the global position determination functions improves the accuracy and precision of point location. The device disclosed in the Present Application comprises a motorized robotic arm having a plurality of moveable joints that give the arm the ability to reach out and touch any point in three-dimensional space within its reach. Attached to the robotic arm is a probe with a stylus having a sensor that will measure the coordinates of the point relative to itself. Coordinate information is then transmitted wirelessly to a control station. The device also transmits its absolute position wirelessly to a control station. Several different devices may be attached to the stylus. Coordinate measurement is only one function that can be performed. One device of significance would be an electronic distance measurement unit. This would enable the robot arm to be used either as a laser pointer and a distance measurement unit or as a total station. The arm can also be detected and seen by other robots and monuments on the site, and these other devices transmit the position of the Present Invention to the control station. The device has a locator device (such as a passive corner cube prism or an active wireless beacon) that can be seen by the other devices at the site.

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A. CLASSIFICATION OF SUBJECT MATTER

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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: B25J 9/02, B25J 13/08

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & keywords : positioning, 3-Dimensinal coordinate, robot, arm

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2005-014149 A (YASKAWA ELECTRIC CORP.) 20 January 2005 See the abstract; claims; and figures	1-22
A	KR 10-0621415 B1 (HANWOOL ROBOTICS CORP.) 31 August 2006 See the abstract; claims; and figures	1-22
A	JP 2005-186234 A (VICTOR CO OF JAPAN LTD.) 14 July 2005 See the abstract; claims; and figures	1-22
A	WO 2004/096502 A1 (CRAMPTON, STEPHEN, JAMES) 11 November 2004 See the abstract; claims; and figures	1-22

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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