

United States Patent [19]**Ueno et al.**[11] **Patent Number:** **6,076,025**[45] **Date of Patent:** **Jun. 13, 2000**[54] **MOBILE ROBOT STEERING METHOD AND CONTROL DEVICE**[75] Inventors: **Ichirou Ueno; Hironori Katou**, both of Saitama, Japan[73] Assignee: **Honda Giken Kogyo K.K.**, Tokyo, Japan[21] Appl. No.: **09/015,312**[22] Filed: **Jan. 29, 1998**[30] **Foreign Application Priority Data**

Jan. 29, 1997 [JP] Japan 9-029768

[51] **Int. Cl.⁷** **G06F 165/00**[52] **U.S. Cl.** **701/23; 701/25; 701/26**[58] **Field of Search** **701/23, 25, 26**[56] **References Cited****U.S. PATENT DOCUMENTS**4,939,650 7/1990 Nishikawa 364/424.02
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5,570,285 10/1996 Asaka et al. 364/424.02
5,925,080 6/1999 Shimbara et al. 701/23*Primary Examiner*—Tan Nguyen*Assistant Examiner*—Dalena Tran*Attorney, Agent, or Firm*—Armstrong, Westerman, Hattori, McLeland & Naughton[57] **ABSTRACT**

A robot is provided to run so that a trace of the robot efficiently covers a given area according to the detection of a boundary of the area. A spiral pattern running, wherein a radius of the spiral is gradually increased, is started at a desired location in the area and is paused upon the detection of a boundary wall by sensors. Then, a random pattern running, which includes turning to depart from the wall and running forward, is conducted. After the turning has been repeated a predetermined number of times through simulations, the spiral pattern running is resumed at a location spaced from the last turning spot by a predetermined distance or a predetermined length of running time.

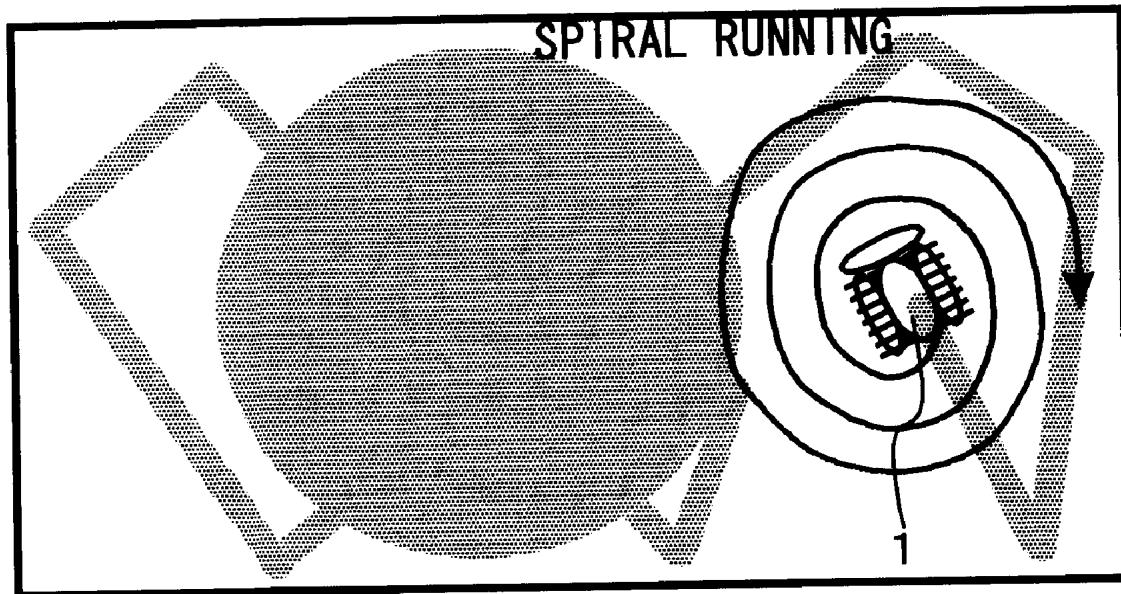
19 Claims, 13 Drawing Sheets

FIG. 1

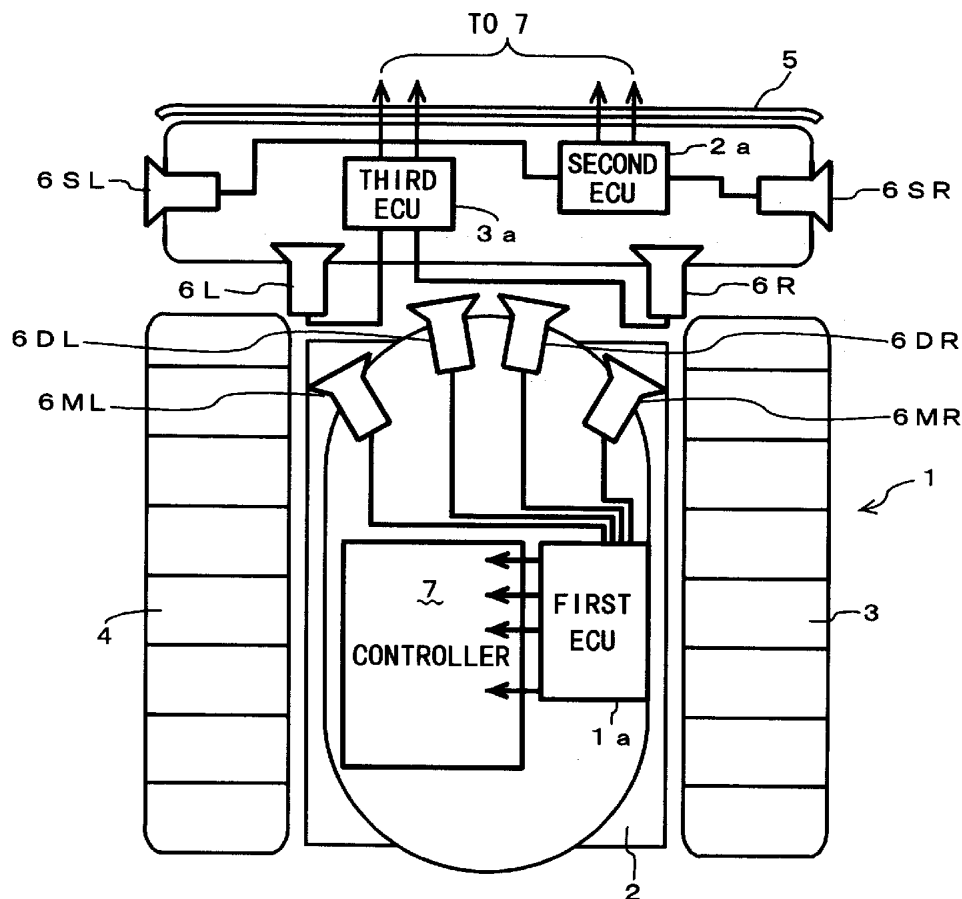


FIG. 2

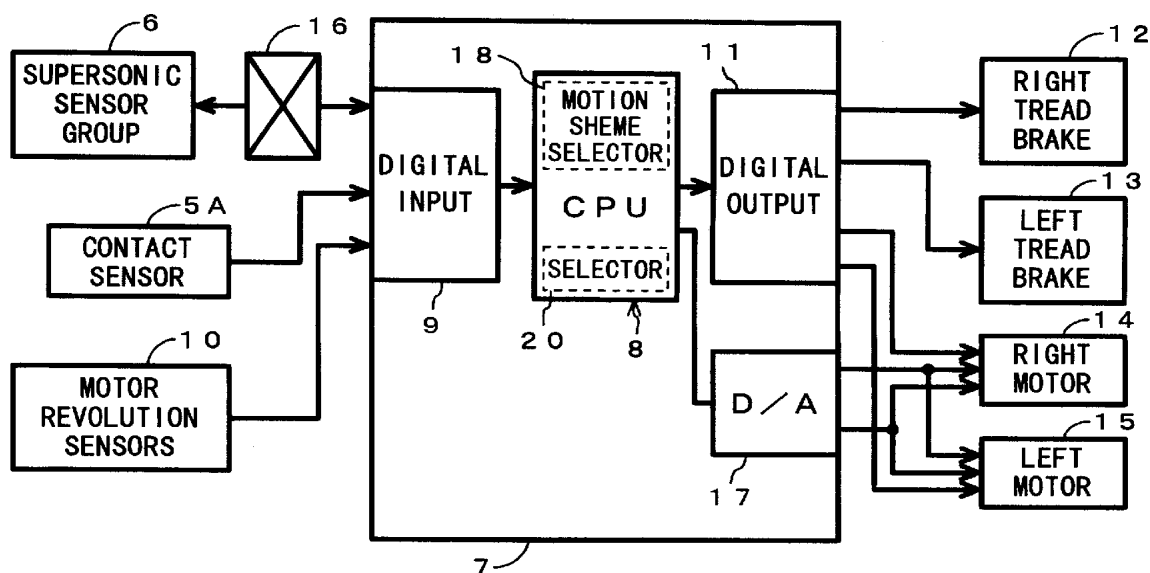


FIG. 3

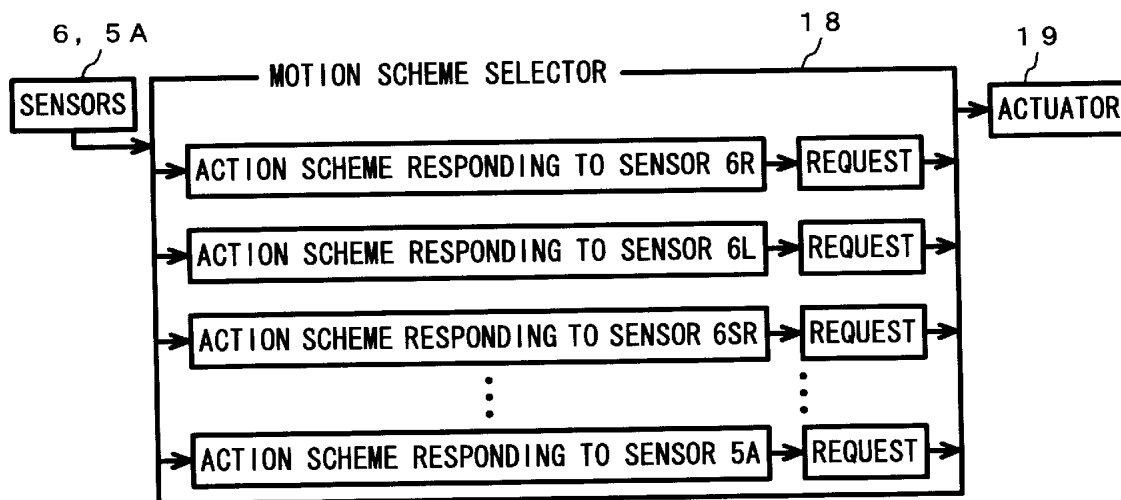


FIG. 4

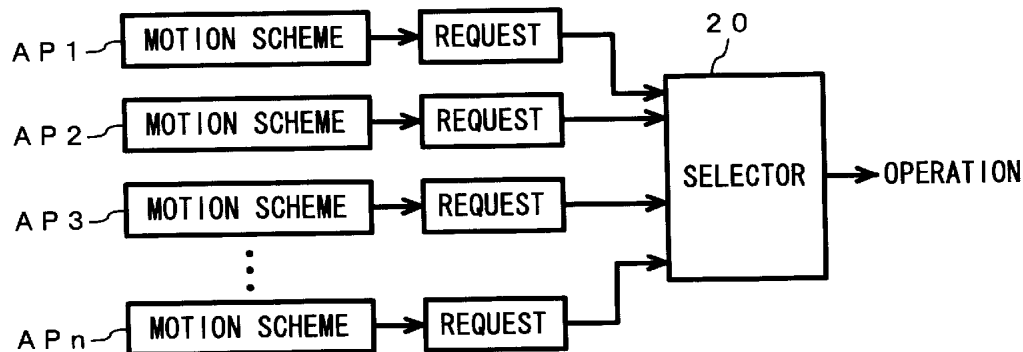


FIG. 5A

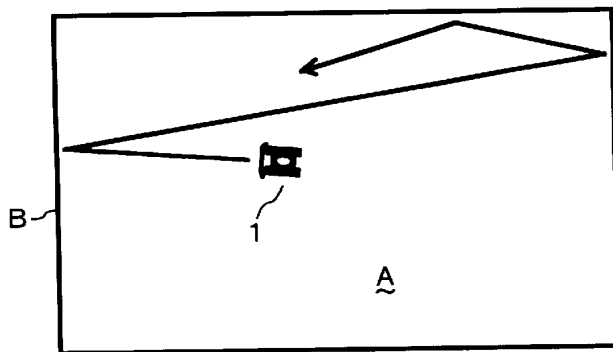


FIG. 5B

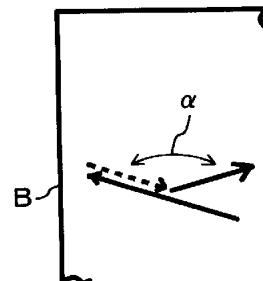


FIG. 6B

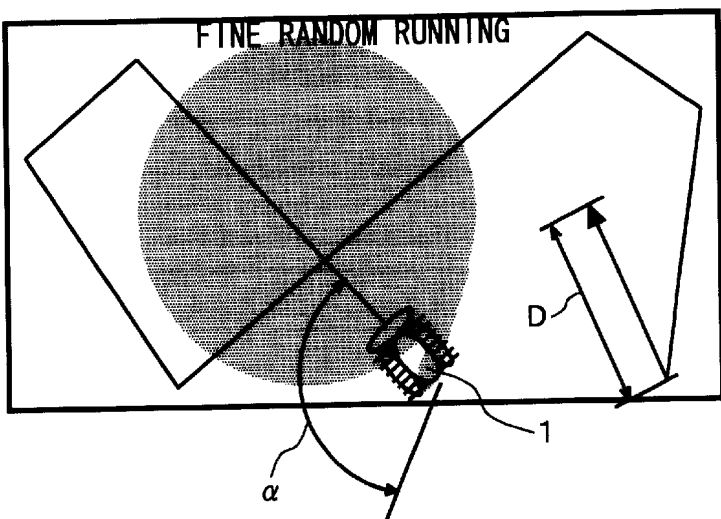


FIG. 6A

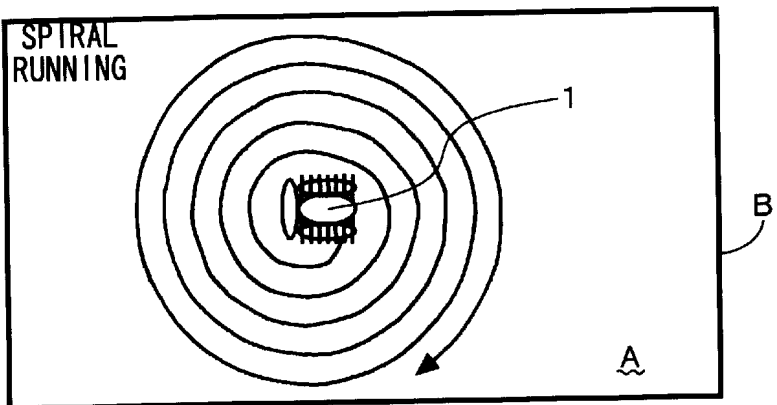


FIG. 6C

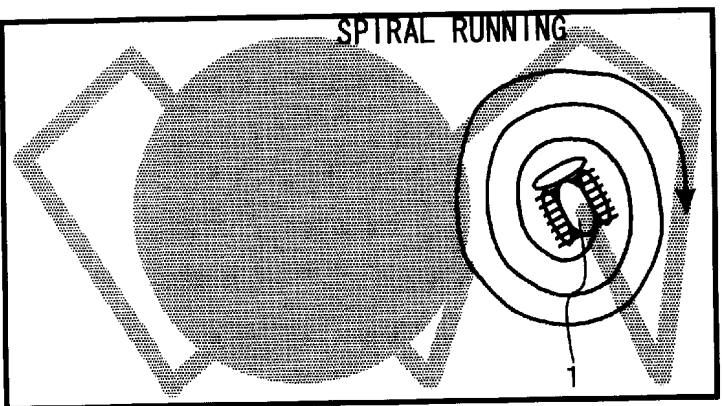


FIG. 7A

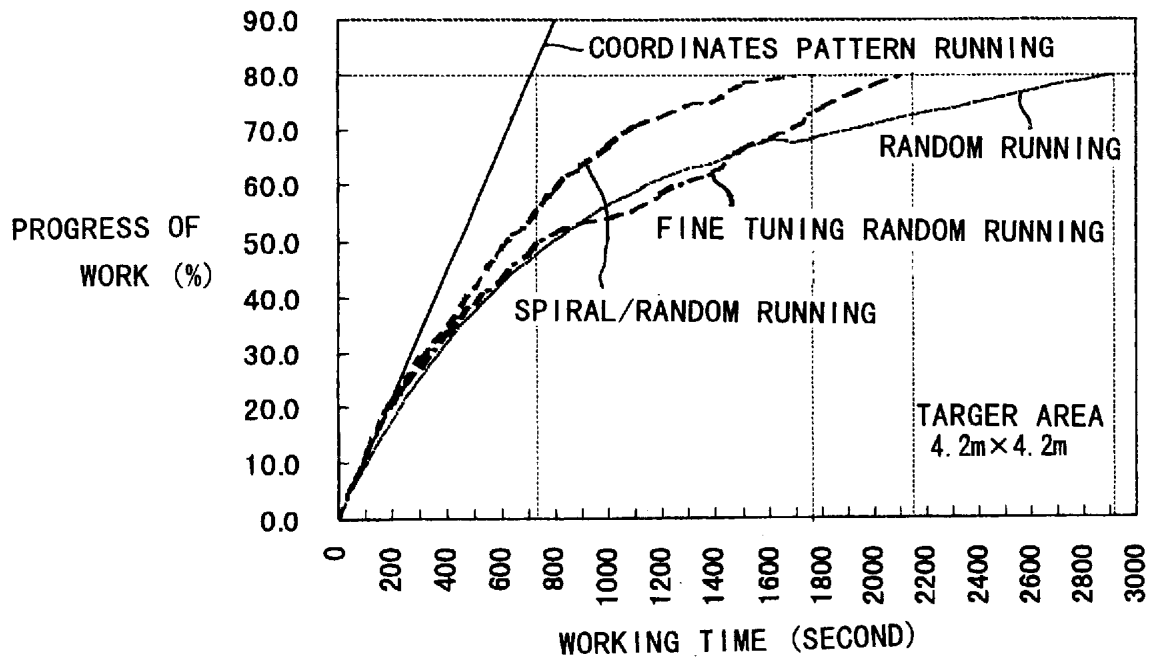
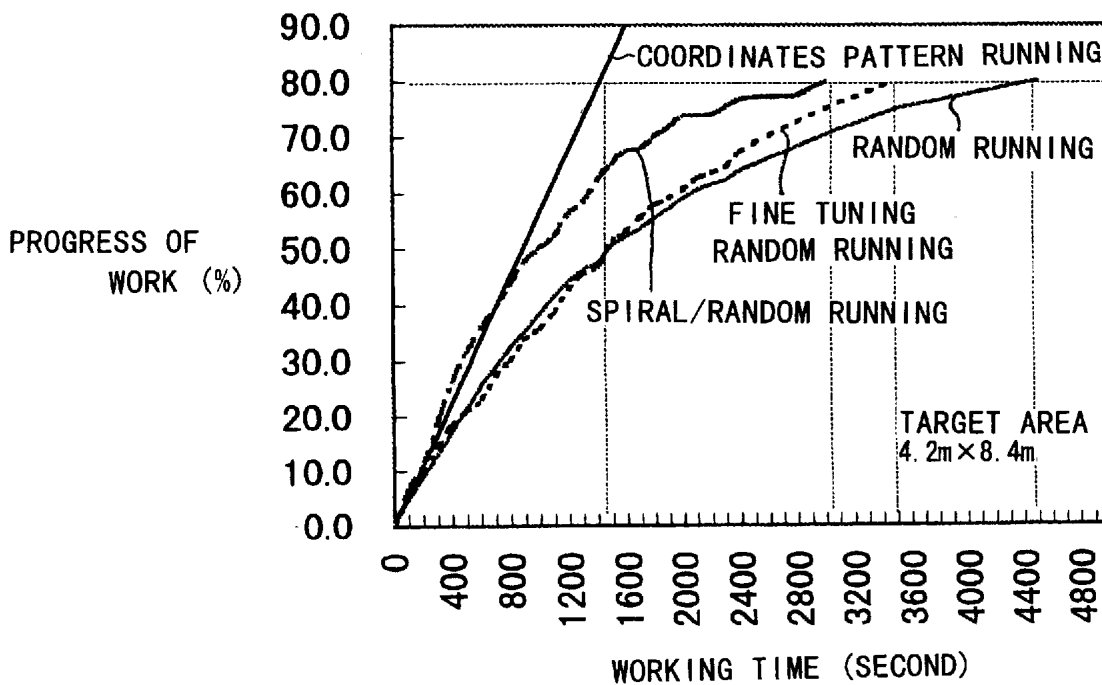


FIG. 7B



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