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United States Patent [19]

Amano et al.

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[54] **HEALTH MANAGEMENT DEVICE AND EXERCISE SUPPORT DEVICE**

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[73] Assignee: **Seiko Epson Corporation**, Tokyo, Japan

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[30] **Foreign Application Priority Data**

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Mar. 12, 1996 [JP] Japan 8-55115

[51] **Int. Cl.**^{6} **A61B 5/00**
[52] **U.S. Cl.** **600/595**; 600/503
[58] **Field of Search** 600/502, 503, 600/587, 595

[56] **References Cited**

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Primary Examiner—Max Hindenburg
Attorney, Agent, or Firm—Eric B. Janofsky

[57] **ABSTRACT**

A health management device is provided, which enables the user himself to make a determination of the quality of his state of health, without the presence of a physician or nurse specialist. However, this device may of course be employed to receive measurement directives from, or provide notification to, a third party. Pulse sensor **4** measures the user's fingertip pulse wave. Acceleration sensor calculates an acceleration value from the user's body. These outputs are converted to digital signals at sensor interface **6**. CPU**1** determines whether or not the user is exercising based on the acceleration value read out from sensor interface **6**. Based on this result, CPU**1** takes up the user's pulse waves before and after exercise, and determines the acceleration pulse wave. CPU**1** then calculates the amplitude ratio of inflection points included in the acceleration pulse waveform, evaluates the exercise performed by the user based on the pre-exercise and post-exercise amplitude ratios, and displays this result on display device **7**.

21 Claims, 27 Drawing Sheets
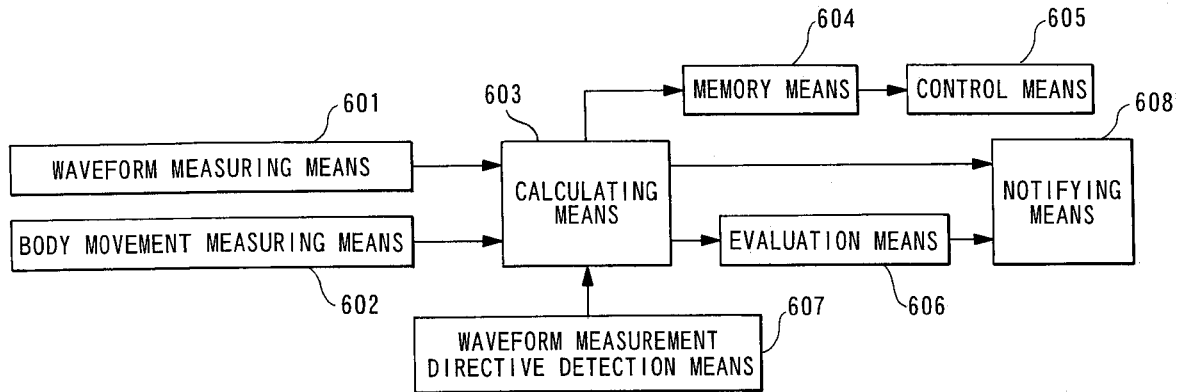
FIG. 1
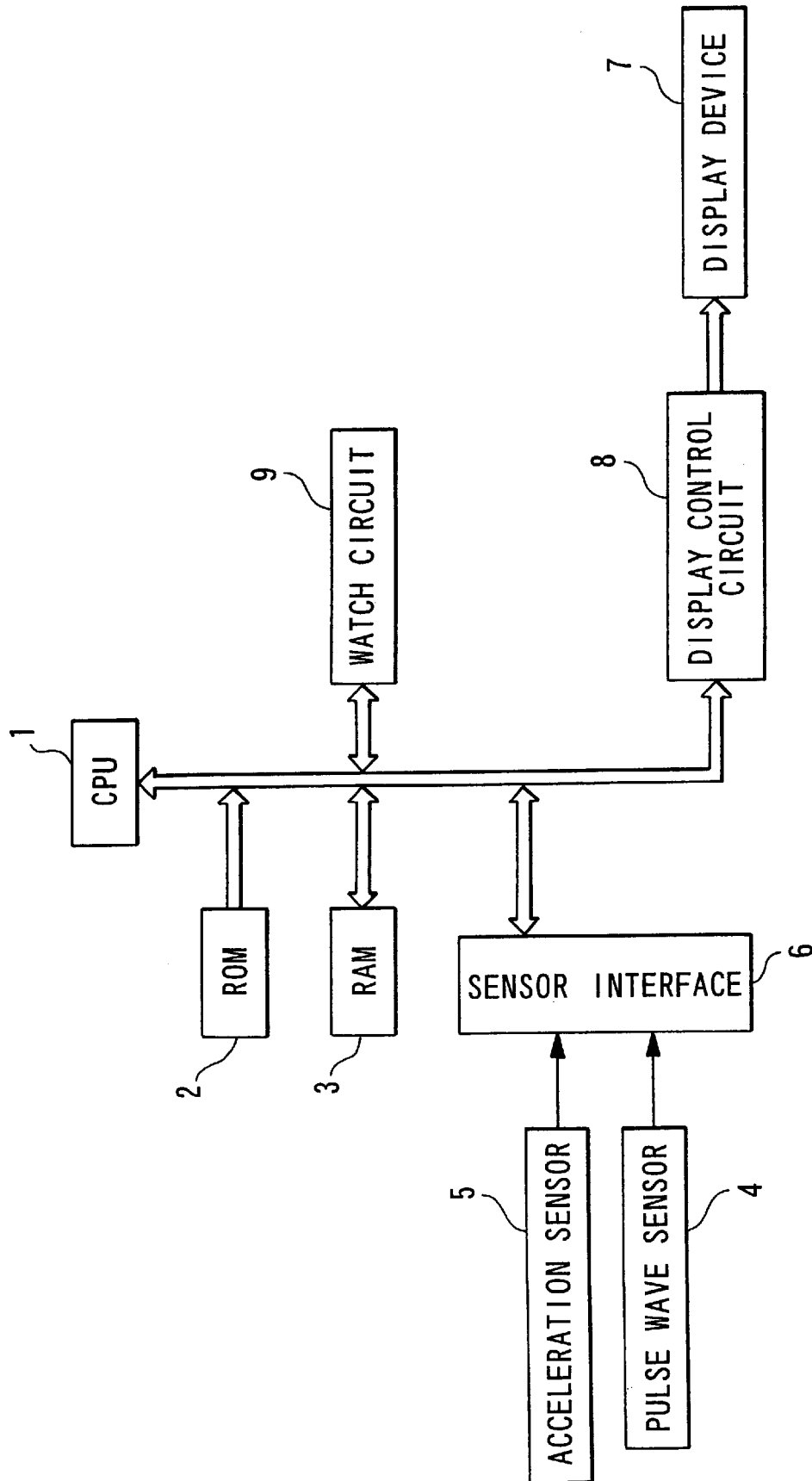
FIG. 2A
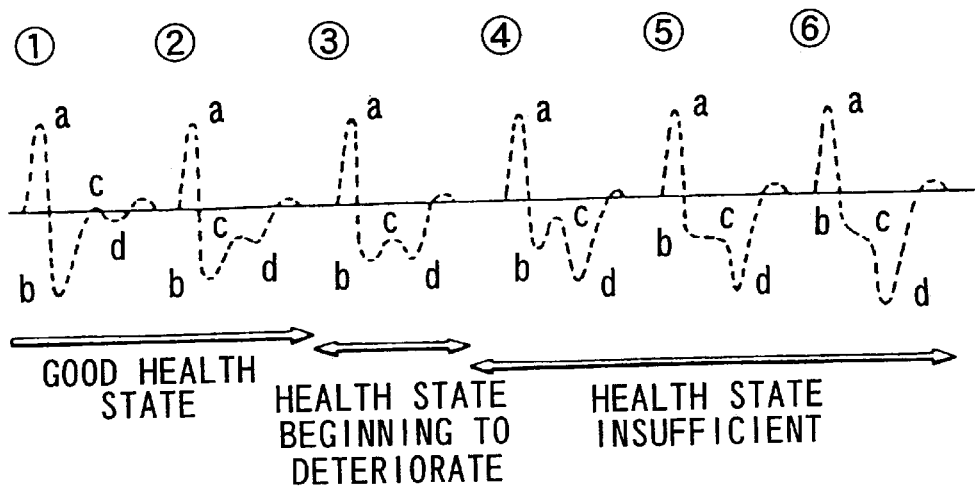
FIG. 2B

	①	②	③	④	⑤	⑥
$\dfrac{d}{a}$	WITHIN 10%	10～35%	35～60%	60～100%	60～100%	60～100%
$\dfrac{c}{a}$	WITHIN −10%	10～15%	WITHIN −15%	0～20%	20～40%	OVER 40%

FIG. 3A

FIG. 3B

FIG. 4

12:00

103

113

108-1

117

107

100

120

111

108-2

3:00

9:00

114

108-3

112

108-D

109

115

108

118

116

119

105

103

6:00

LAP
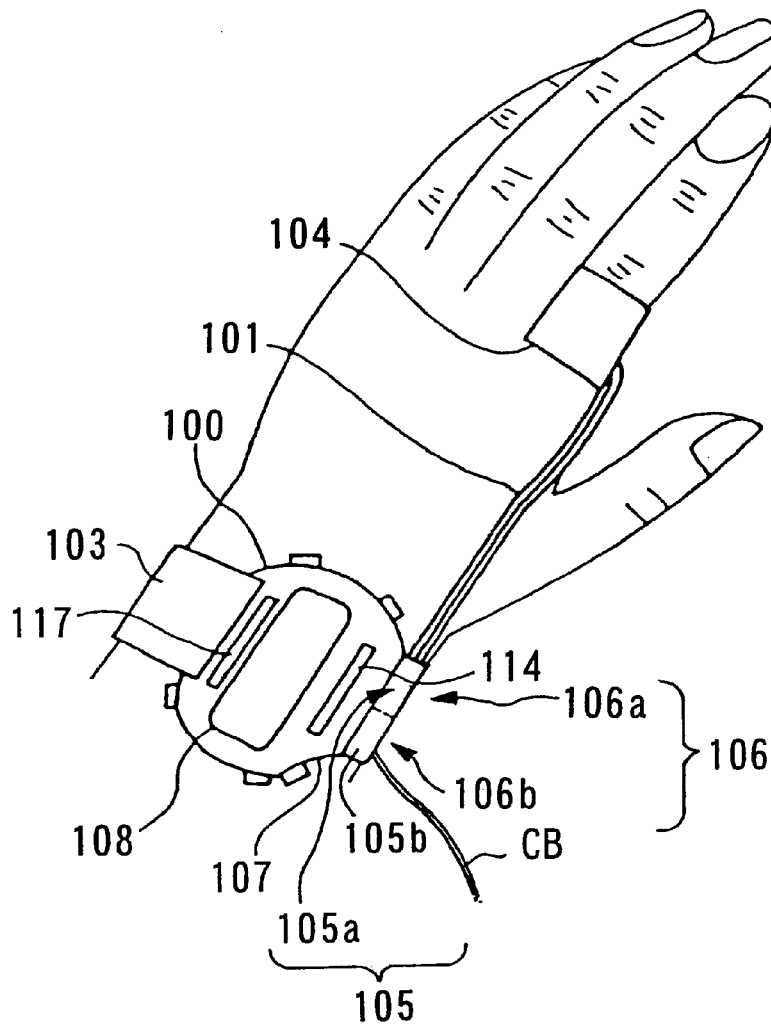
SPLT

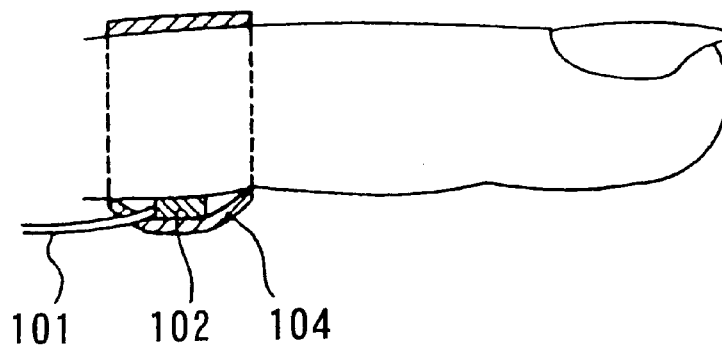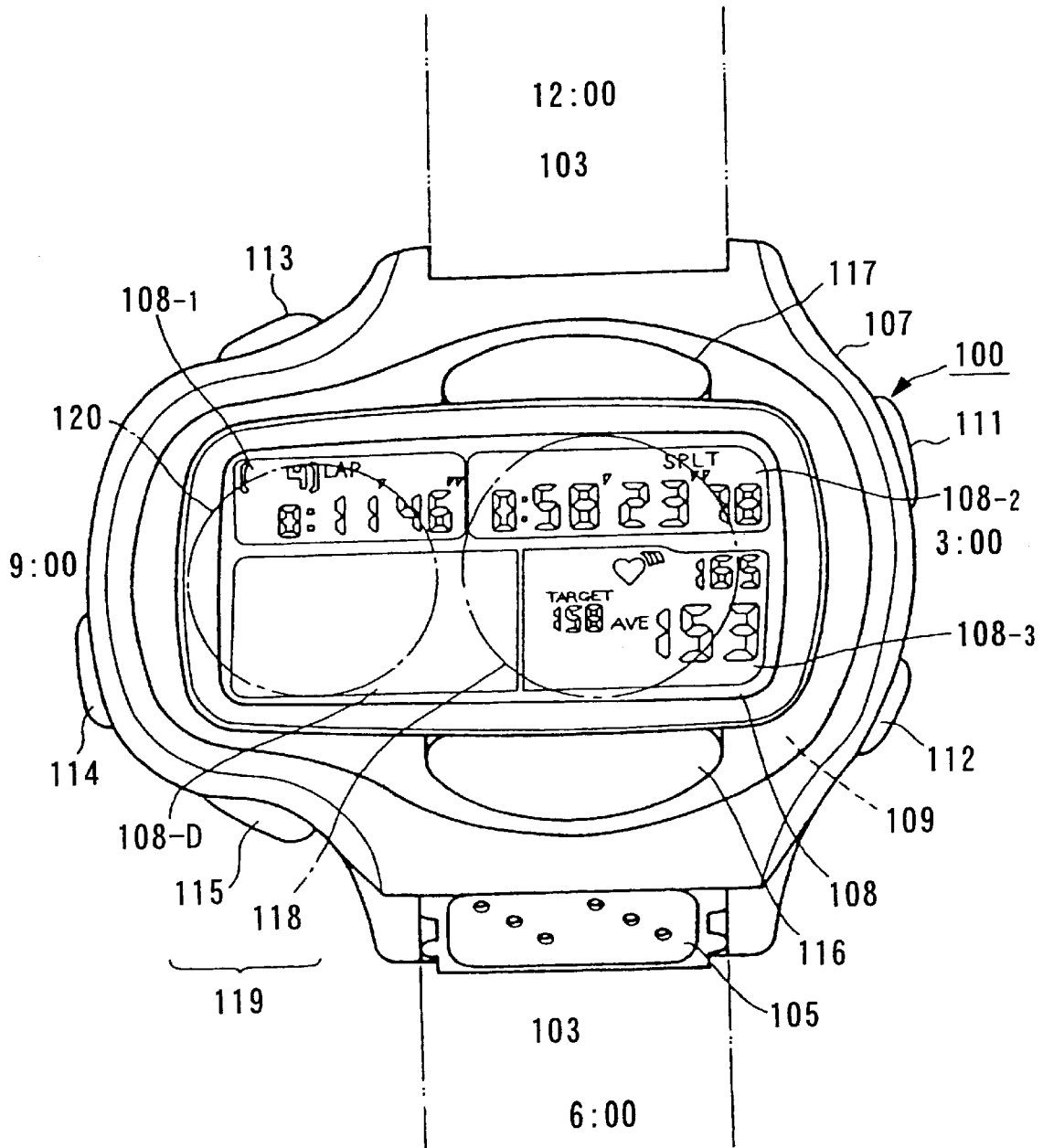8:1146

0:50'23'78

TARGET

165

150 AVE

153

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