

[54] METHOD AND APPARATUS FOR MEASURING THE AMOUNT OF EXERCISE

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Related U.S. Application Data

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[30] Foreign Application Priority Data

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Apr. 22, 1985 [JP] Japan ..... 60-85970

[51] Int. Cl.<sup>5</sup> ..... G01C 22/00

[52] U.S. Cl. .... 364/561; 235/105; 364/565; 364/413.01

[58] Field of Search ..... 364/565, 561, 556, 415, 364/413.01, 410, 143, 413.29; 340/323 R; 324/171, 168; 235/105; 36/136.1, 44, 72 B; 272/69, 70

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[57] ABSTRACT

A method and apparatus for accurately measuring an amount of exercise taken by a walker in terms of a walking speed, the distance traveled and the energy consumed. Impacts made by contacts of a foot of the walker with the ground are detected by a detector so as to produce corresponding contact signals. The number of the contact signals in a predetermined unit of time is counted by a processor to obtain a pitch in the unit of time, and a stride of the walker is calculated from said pitch and the height of the walker by the processor according to a predetermined empirical relationship of  $ST = (0.1688 \times HT) / (1 - 0.0174 \times PI \times HT)$ , where ST is the stride in meters, PI is the pitch in number of steps every 10 seconds, and HT is the walker's height in meters. The data on said height are inputted to the processor beforehand. Then the stride is multiplied by the pitch, to obtain and display a walking speed of the walker in said unit of time. The energy, e.g., in terms of calories consumed by the walker, is measured by the method of the present invention, utilizing an empirical relationship of  $C = (0.0005 \times PI \times WT)$  (when  $PI \leq 15$ ) or  $C = (0.0013 \times PI - 0.0126) \times WT$  (when  $PI > 15$ ), where C is the consumed energy in kcal in 10 seconds, PI is the pitch in number of steps every 10 seconds, and WT is the bodyweight of the walker in kg.

12 Claims, 10 Drawing Sheets

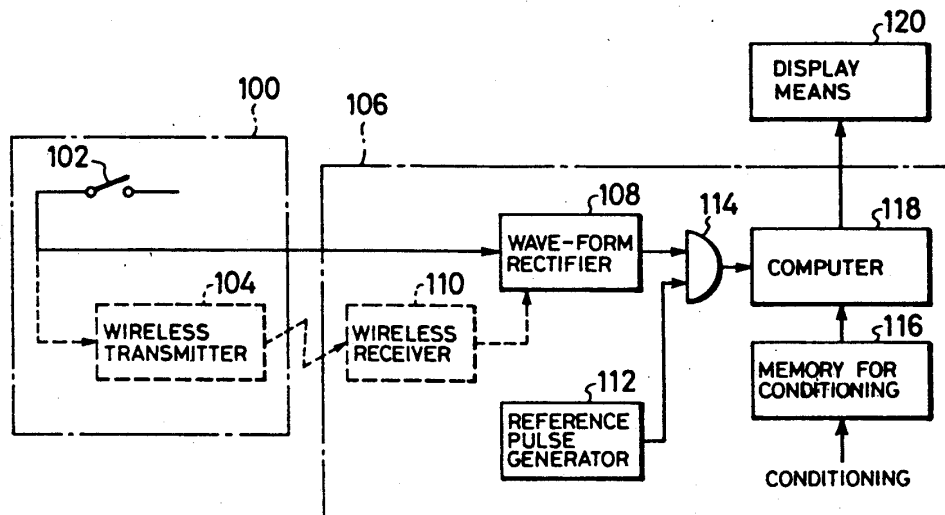


FIG. 1

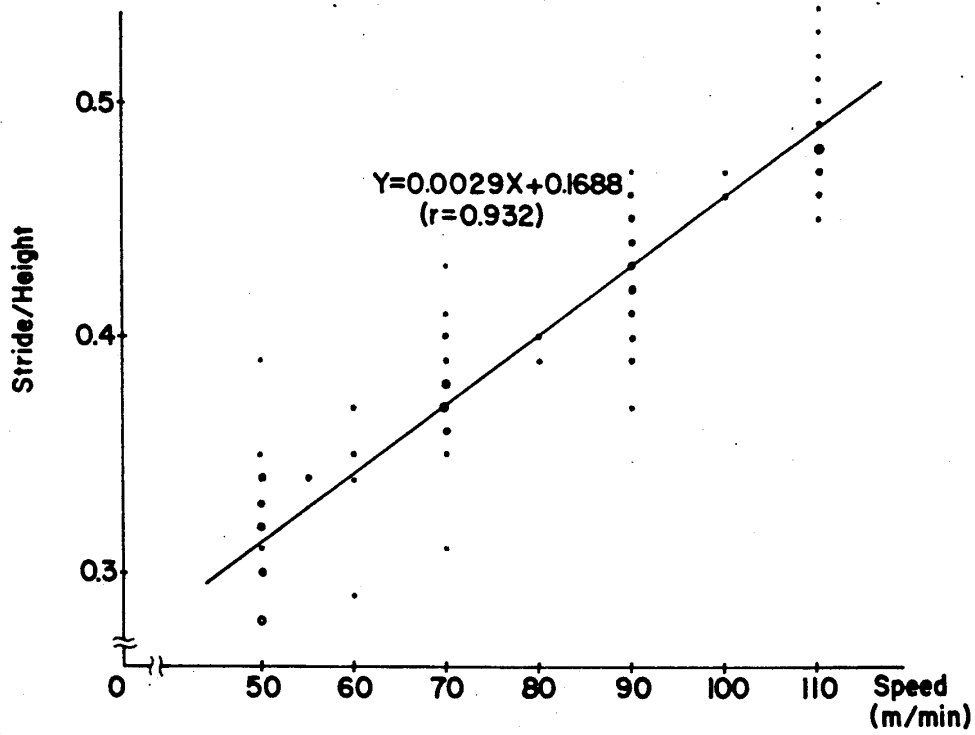


FIG. 2

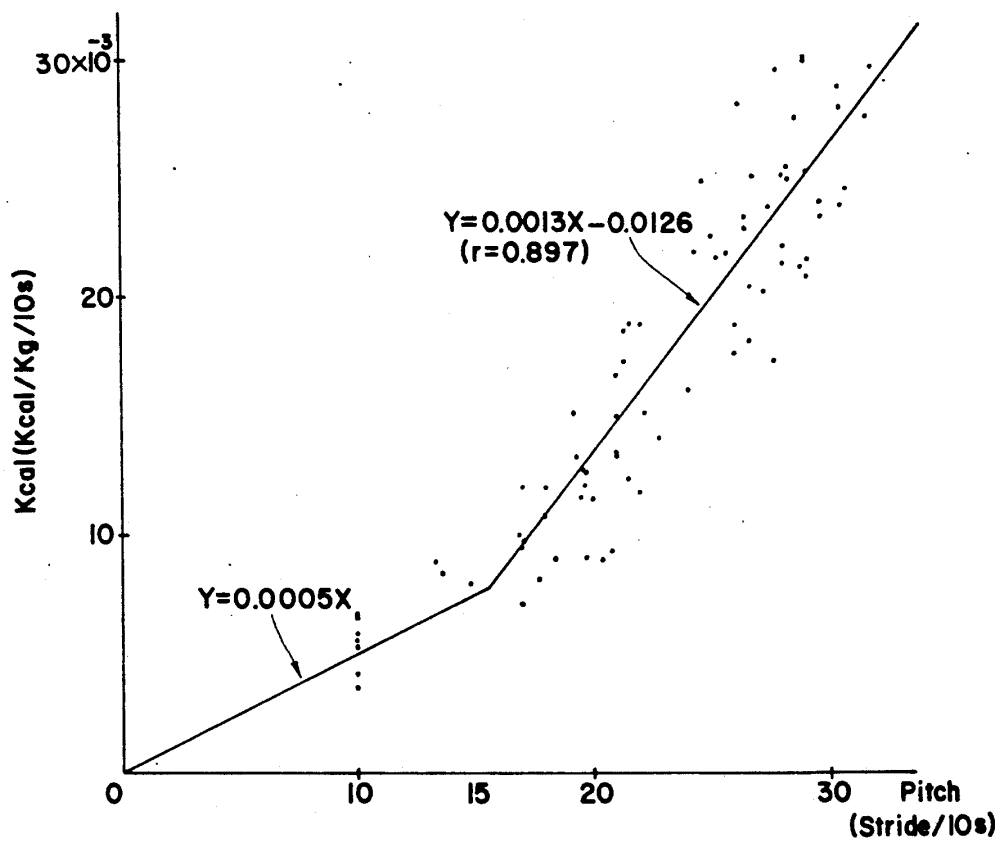


FIG. 3

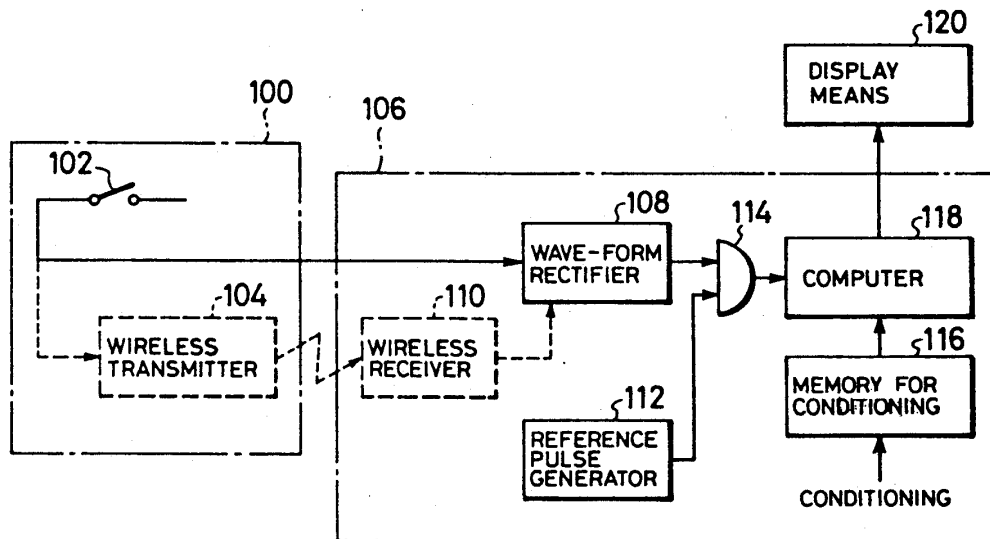


FIG. 4

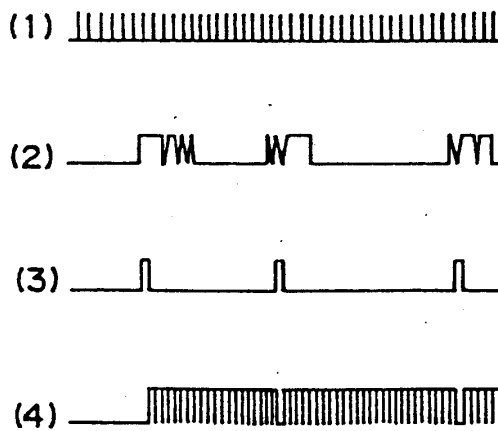


FIG. 5

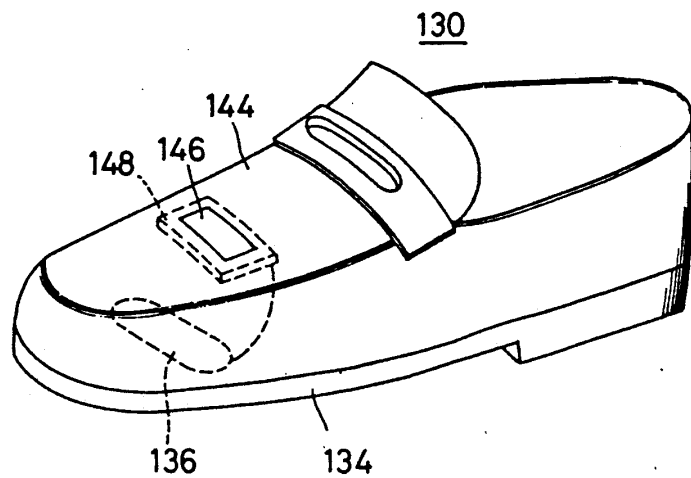
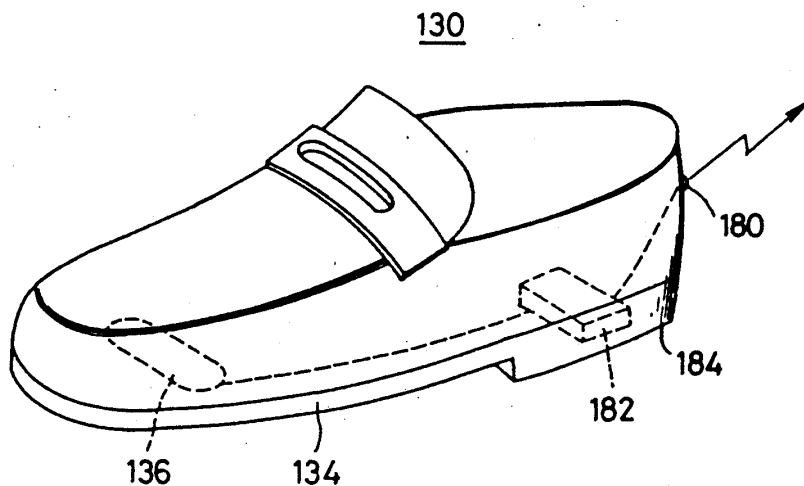


FIG. 8



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