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Vonk et al.

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[54] **SYSTEM AN METHOD FOR DETECTING TREMORS SUCH AS THOSE WHICH RESULT FROM PARKINSON'S DISEASE**

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[52] U.S. Cl. **128/782;** 364/508; 364/413.05

[58] Field of Search 128/782, 779, 784, 739; 364/508, 413.01, 413.02, 413.05; 604/50; 73/570, 579

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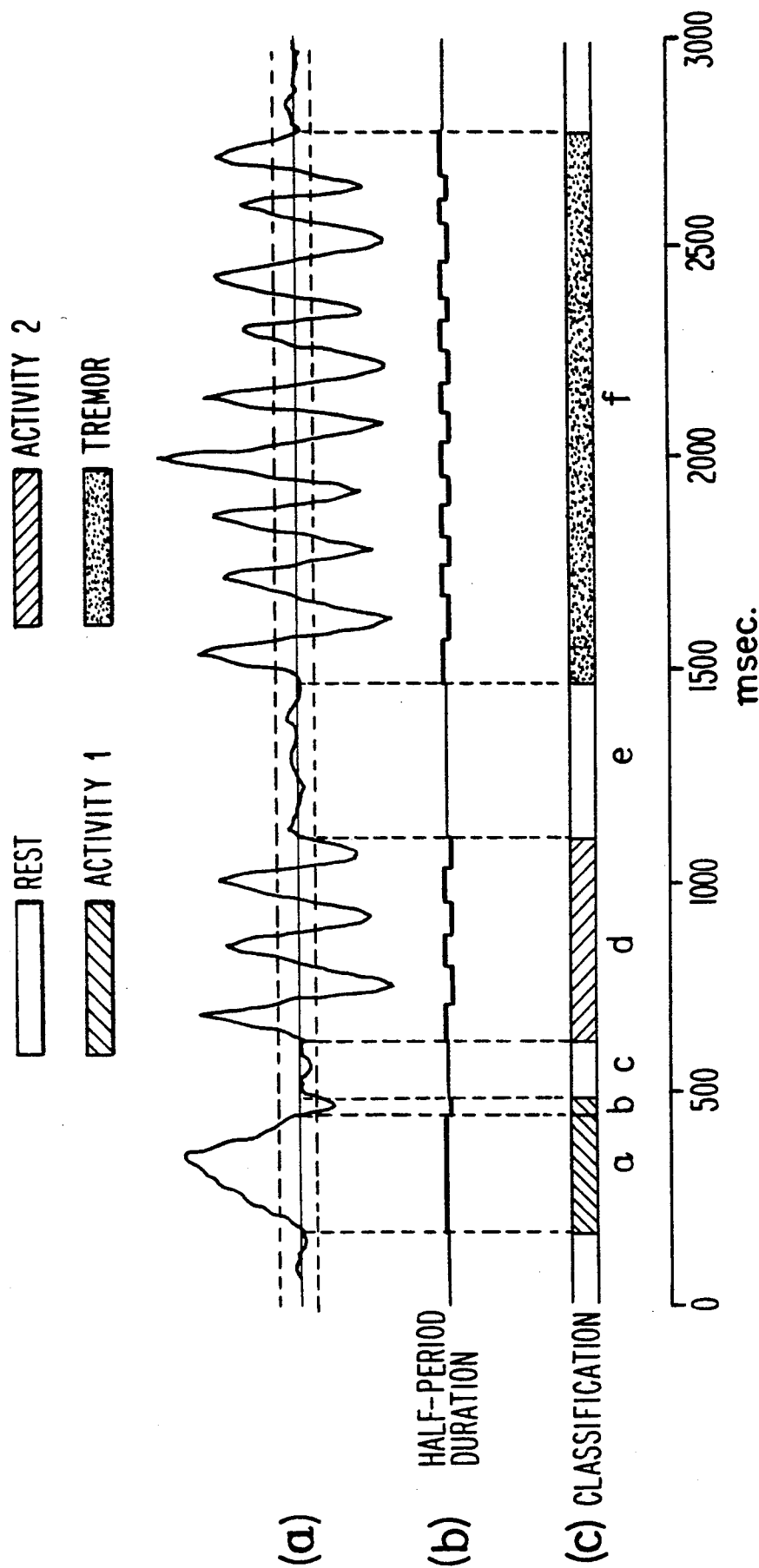*Attorney, Agent, or Firm*—Woodcock, Washburn, Kurtz, Mackiewicz & Norris

[57] **ABSTRACT**

A system and method are provided for accurate determination of various tremors and movements derived from Parkinson's Disease and other causes. Movement signals are generated by an accelerometer, the movement signals being analyzed to determine whether they are in a predetermined frequency range, and when there occurs an uninterrupted series of such movement signals that are within the frequency range. By determining when these two criteria are met, tremor signals are reliably discriminated from other activity signals. The system includes circuitry for collecting and storing data concerning the timing of tremor occurrences, the timing of other activity occurrences, and amplitude data concerning tremor occurrences.
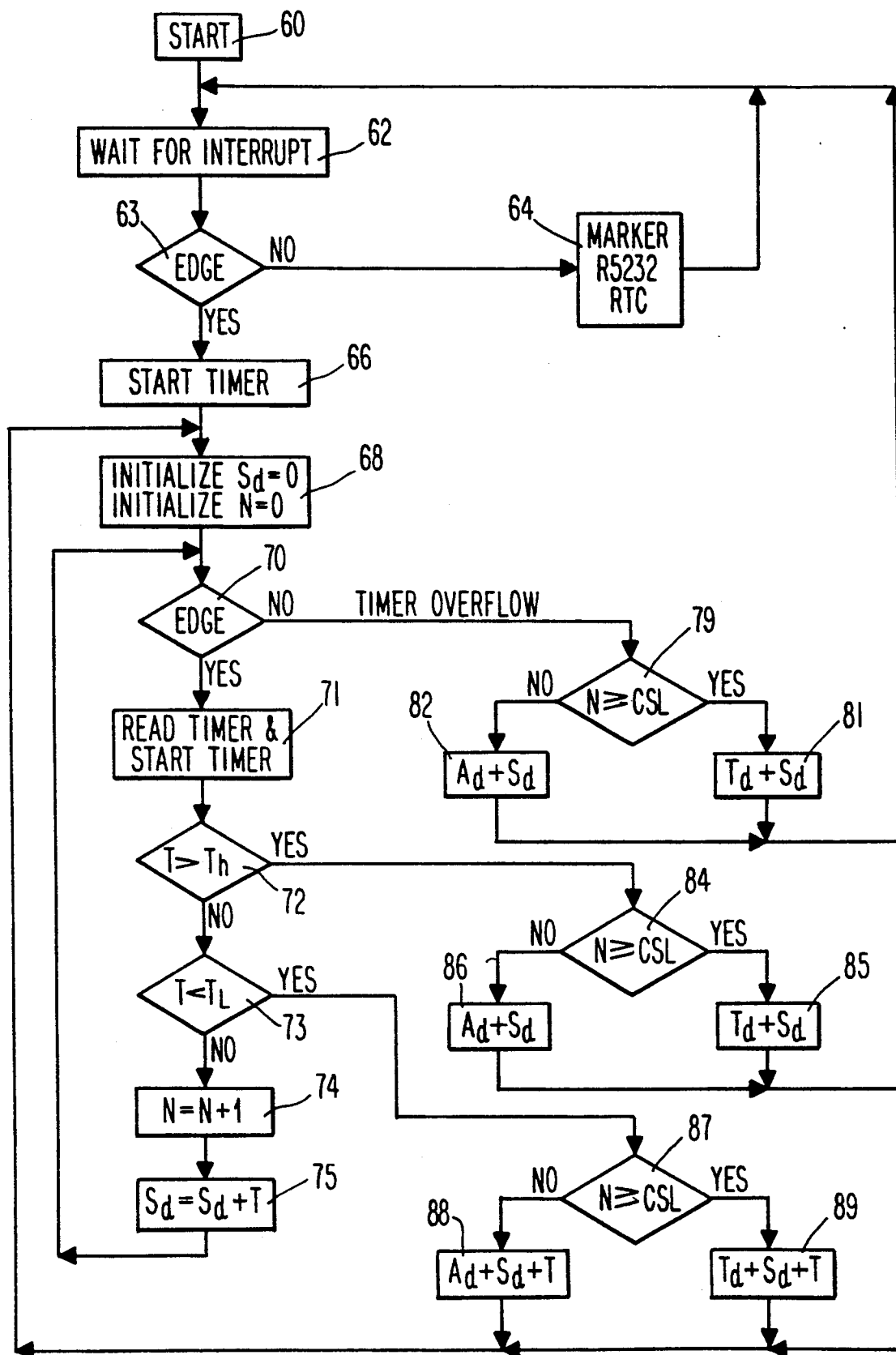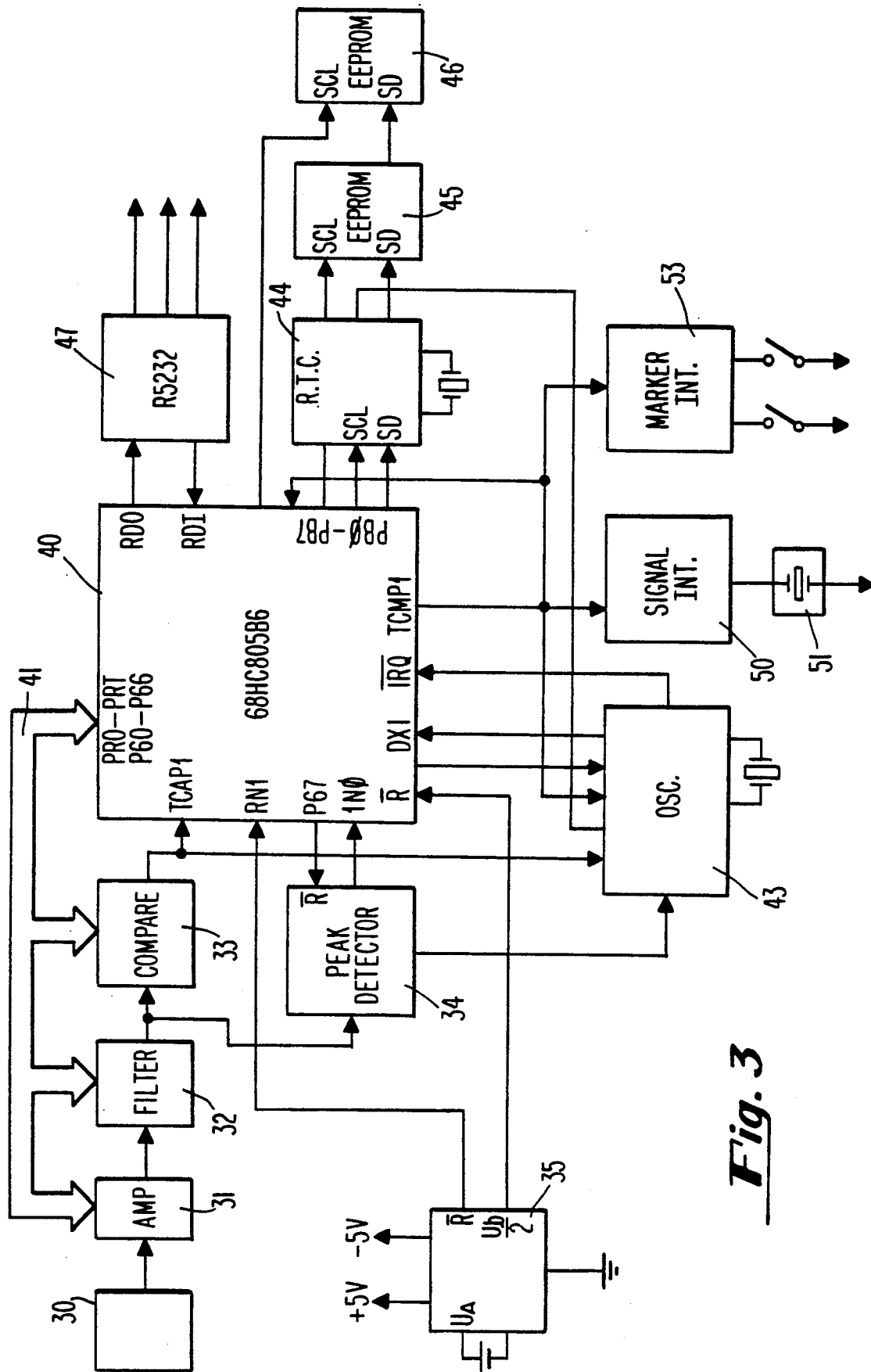
20 Claims, 6 Drawing Sheets

Fig. 1

Fig. 2A

START — 60

WAIT FOR INTERRUPT — 62

63 — EDGE — NO → MARKER R5232 RTC — 64

YES

START TIMER — 66

INITIALIZE $S_d = 0$
INITIALIZE $N = 0$ — 68

70 — EDGE — NO — TIMER OVERFLOW → 79 — $N \geq CSL$

YES — READ TIMER & START TIMER — 71

$T > T_h$ — YES — 72

NO

$T < T_L$ — YES — 73

NO

$N = N + 1$ — 74

$S_d = S_d + T$ — 75

79 — $N \geq CSL$
NO → $A_d + S_d$ — 82
YES → $T_d + S_d$ — 81

84 — $N \geq CSL$
NO → $A_d + S_d$ — 86
YES → $T_d + S_d$ — 85

87 — $N \geq CSL$
NO → $A_d + S_d + T$ — 88
YES → $T_d + S_d + T$ — 89
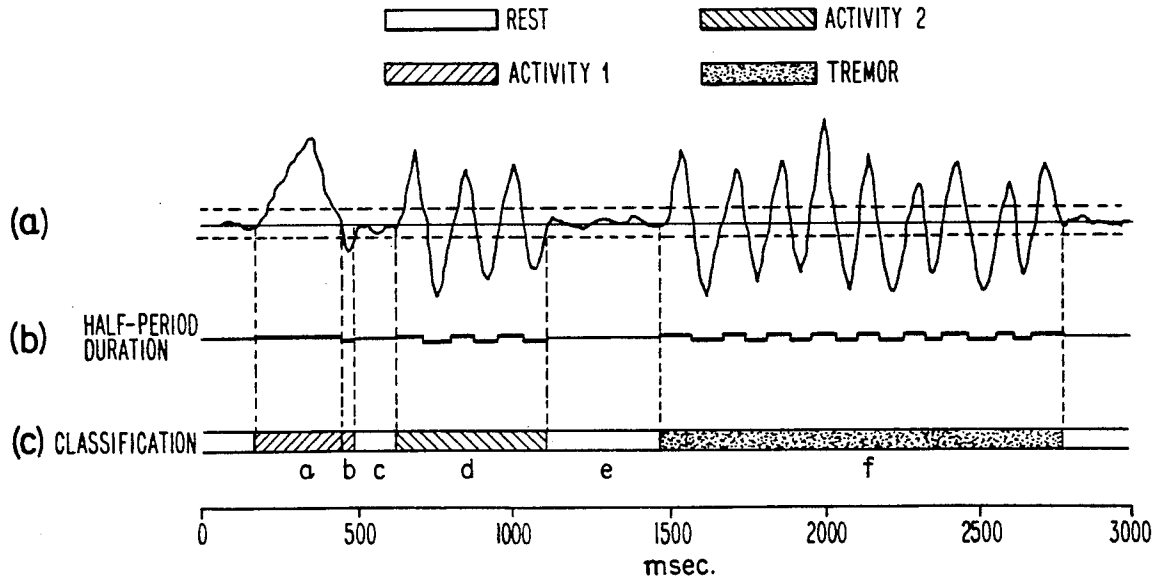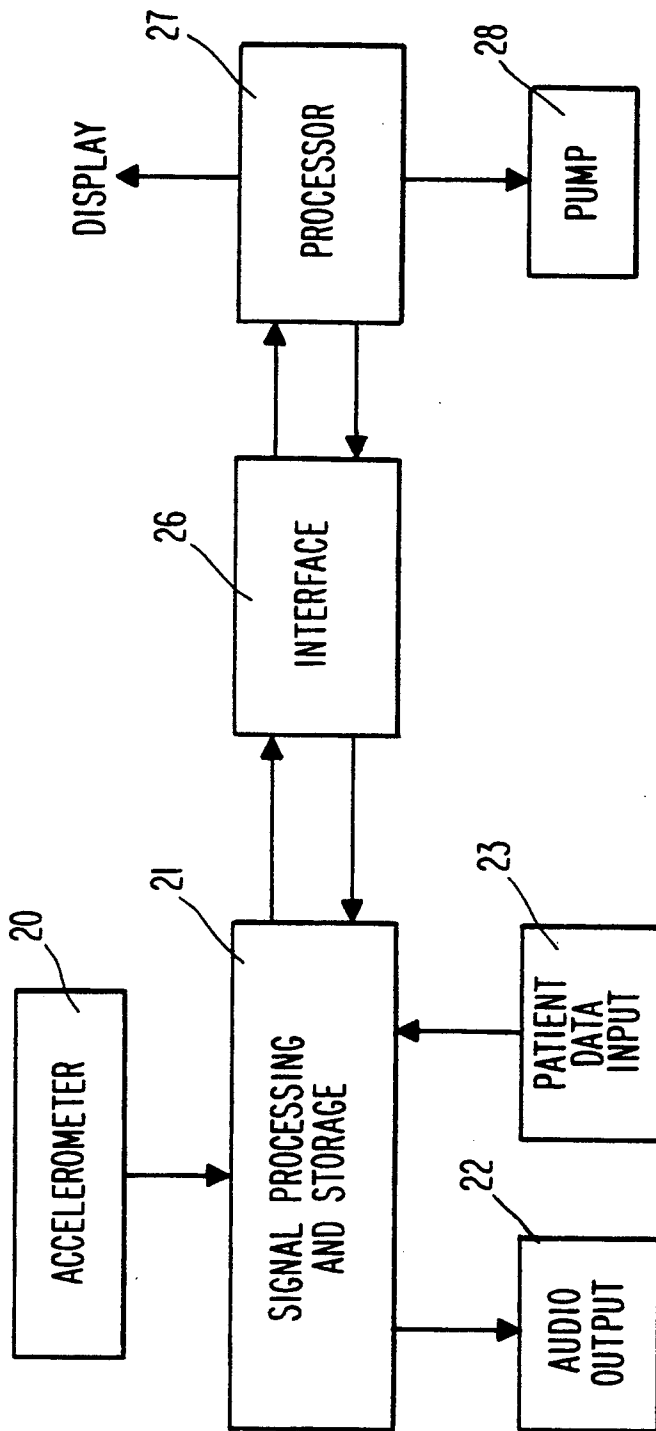
Fig. 2B

Fig. 3

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