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# United States Patent [19]

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Conlan

[45] Date of Patent: **\*Nov. 12, 1996**

[54] **METHOD OF MONITORING BODY MOVEMENTS USING ACTIVITY MONITORING APPARATUS**

[75] Inventor: **Robert W. Conlan**, Niceville, Fla.

[73] Assignee: **Precision Control Design, Inc.**, Fort Walton Beach, Fla.

[\*] Notice: The portion of the term of this patent subsequent to Jun. 17, 2011, has been disclaimed.

[21] Appl. No.: **479,822**

[22] Filed: **Jun. 7, 1995**

### Related U.S. Application Data

[63] Continuation of Ser. No. 341,316, Nov. 16, 1994, abandoned, which is a continuation of Ser. No. 38,629, Mar. 29, 1993, abandoned, which is a continuation of Ser. No. 716,853, Jun. 17, 1991, Pat. No. 5,197,489.

[51] Int. Cl.<sup>6</sup> ..... **A61B 5/103**

[52] U.S. Cl. .... **128/782**

[58] Field of Search ..... 128/782, 774, 128/721, 722, 670, 671, 687, 713, 714, 340/573

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Primary Examiner—Guy V. Tucker

Attorney, Agent, or Firm—Lockwood, Alex, Fitzgibbon & Cummings

### [57] ABSTRACT

An activity monitor adapted to be worn on the non-dominant wrist of a subject includes a bimorphous beam motion sensor. The output signal of the sensor is amplified in an amplifier circuit having a selectable amplification factor, and filtered by highpass and lowpass filter circuits having individually selectable cut-off frequencies to obtain an analog signal for processing having a bandpass and amplitude characteristic corresponding to a particular body activity under observation. A control and processing circuit within the monitor includes a microprocessor which responds to either resident internal operating instructions or to externally supplied operating instructions, or to designated data signal parameters, to provide configuration control signals to the amplifier and filter circuits, and processing of the collected data, appropriate to the particular activity being monitored. The processed data is digitally stored in an internal memory for subsequent transfer through a data port to an associated computer for display or further processing.

**7 Claims, 8 Drawing Sheets**

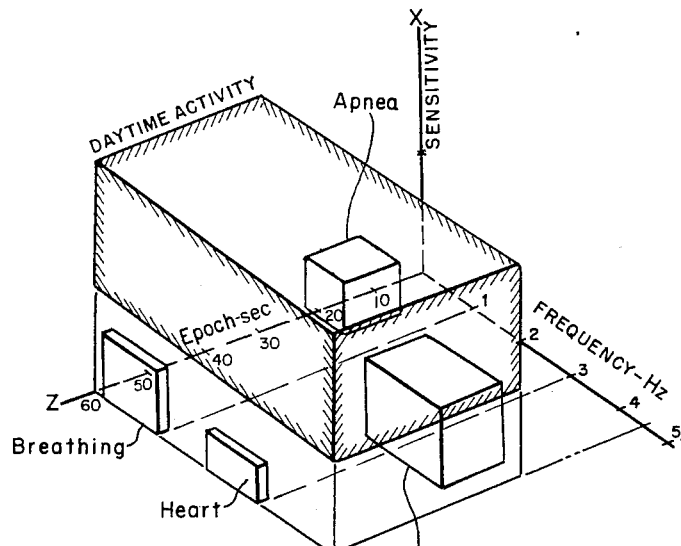


FIG. 1

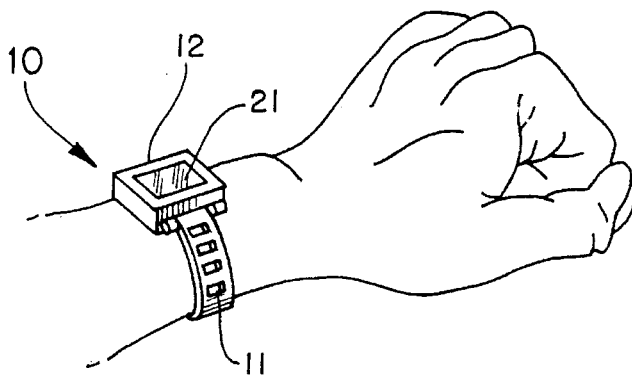


FIG. 2

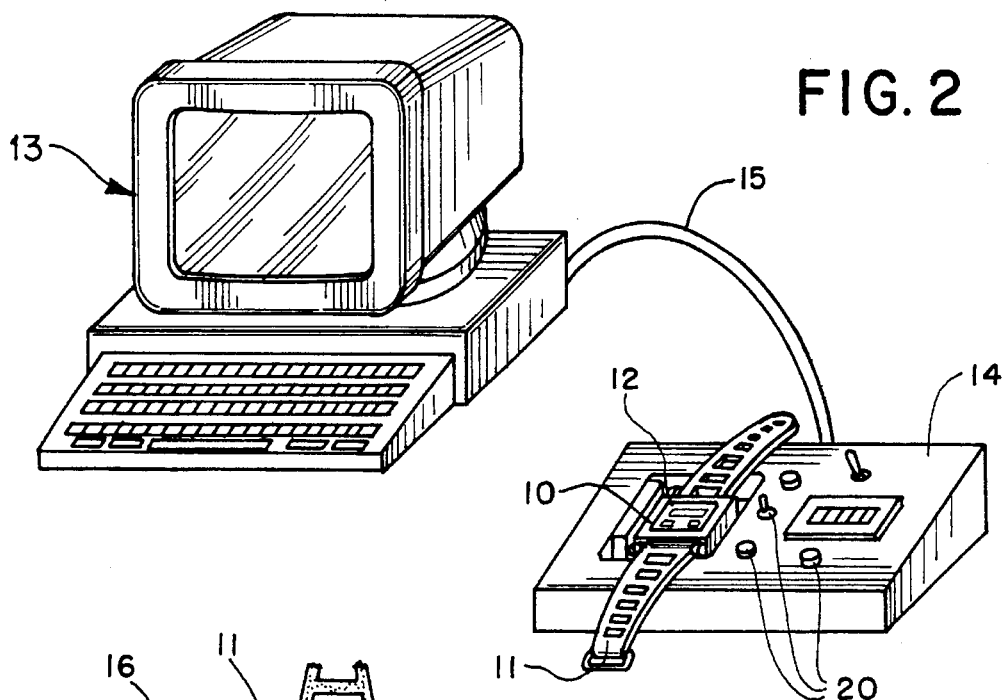


FIG. 3

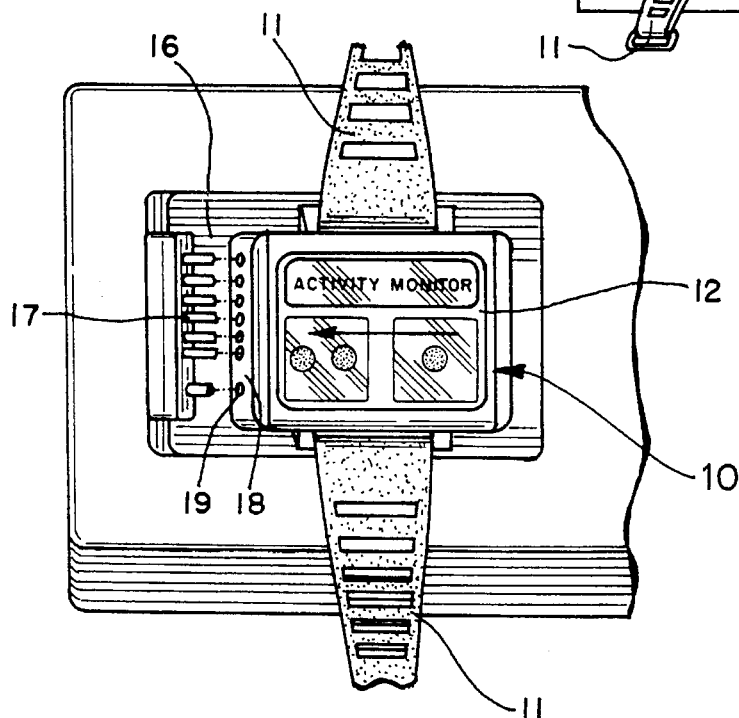


FIG. 4

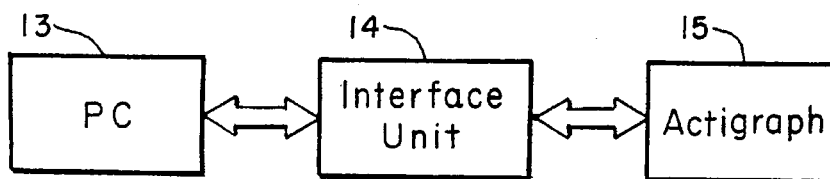


FIG. 5

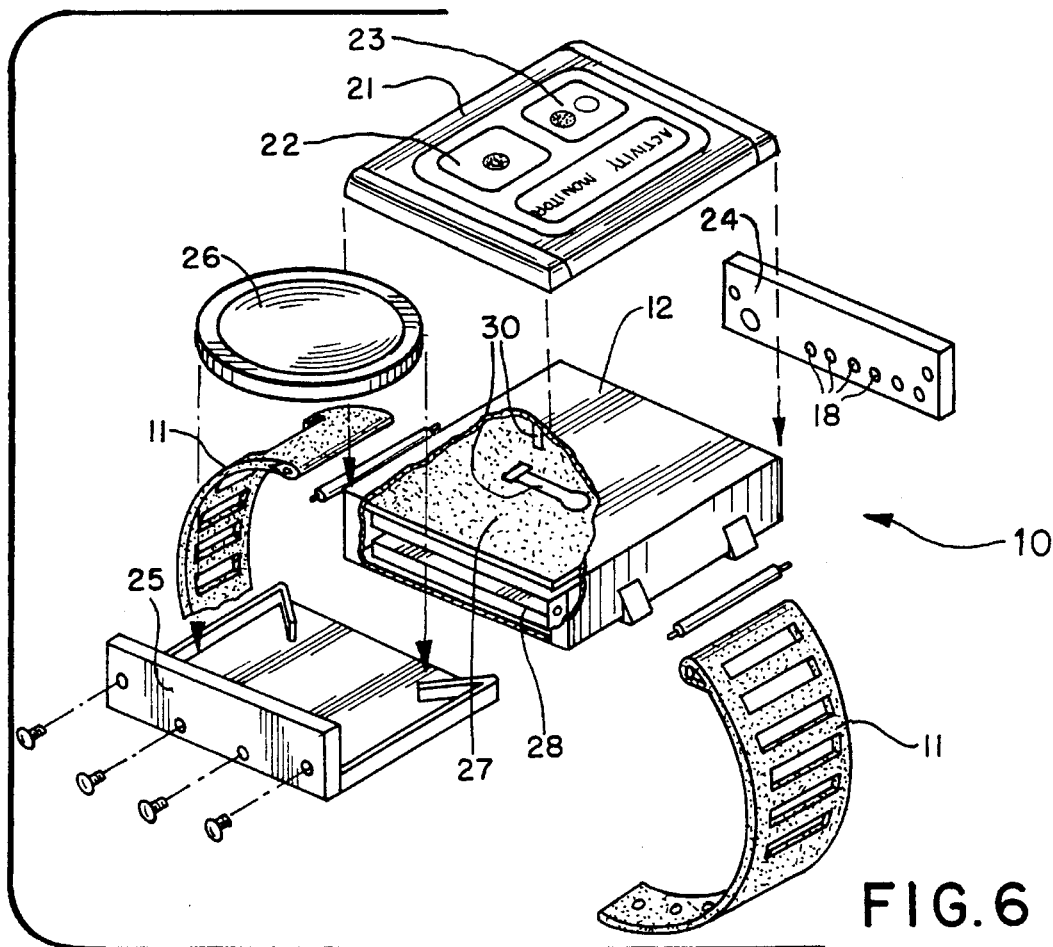
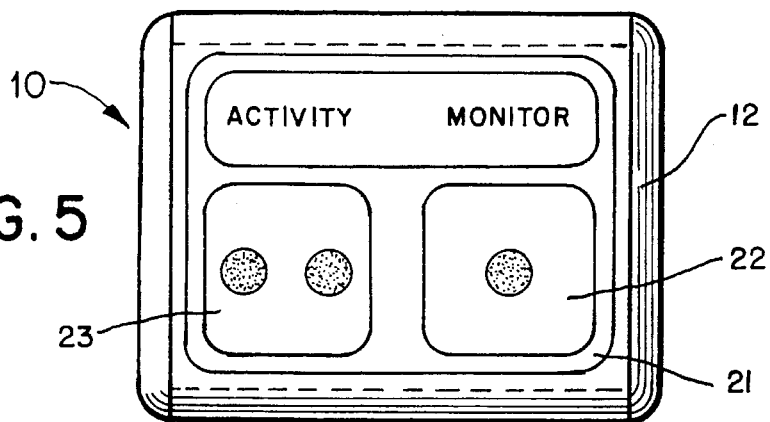


FIG. 6

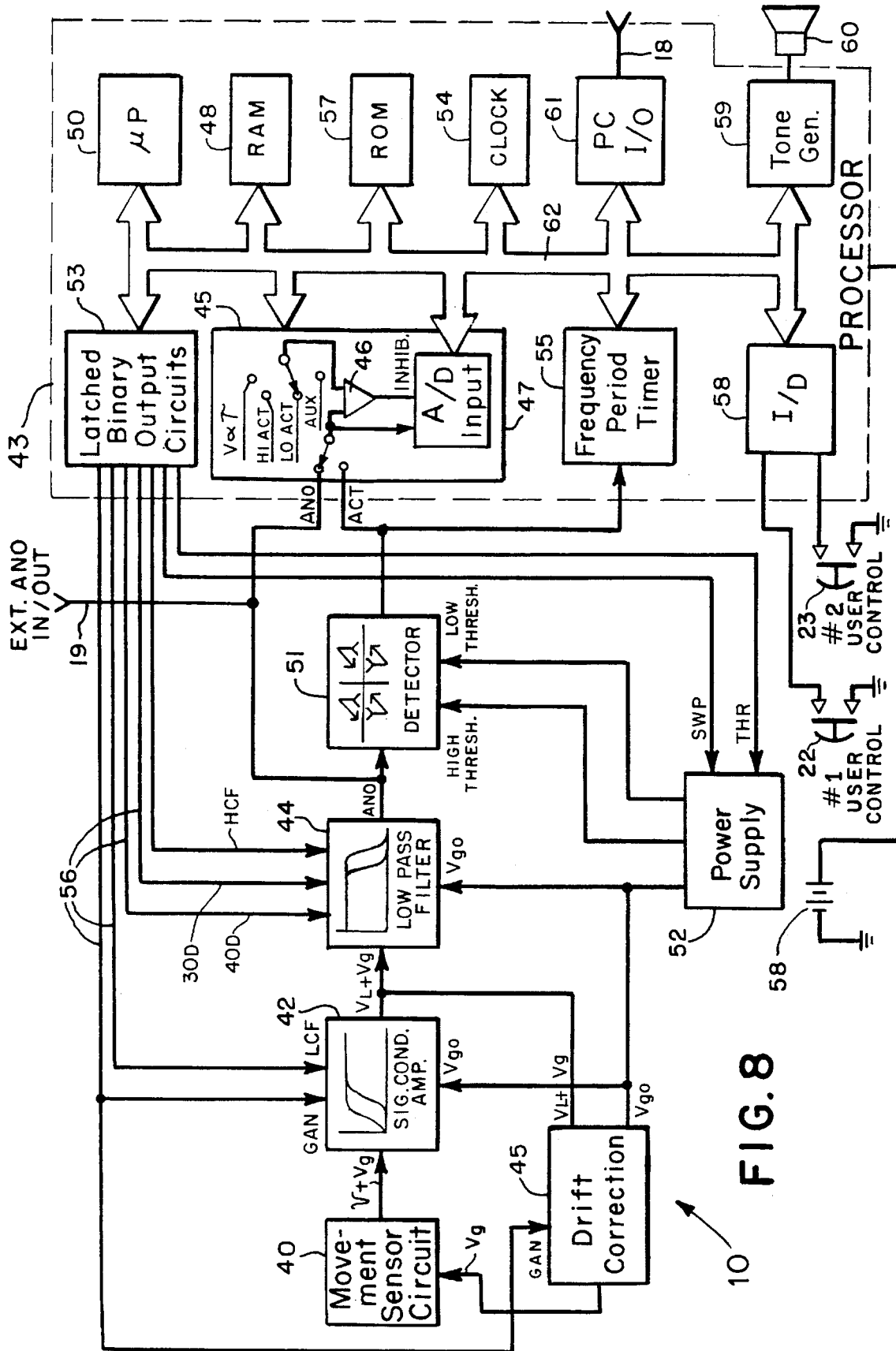


FIG. 8

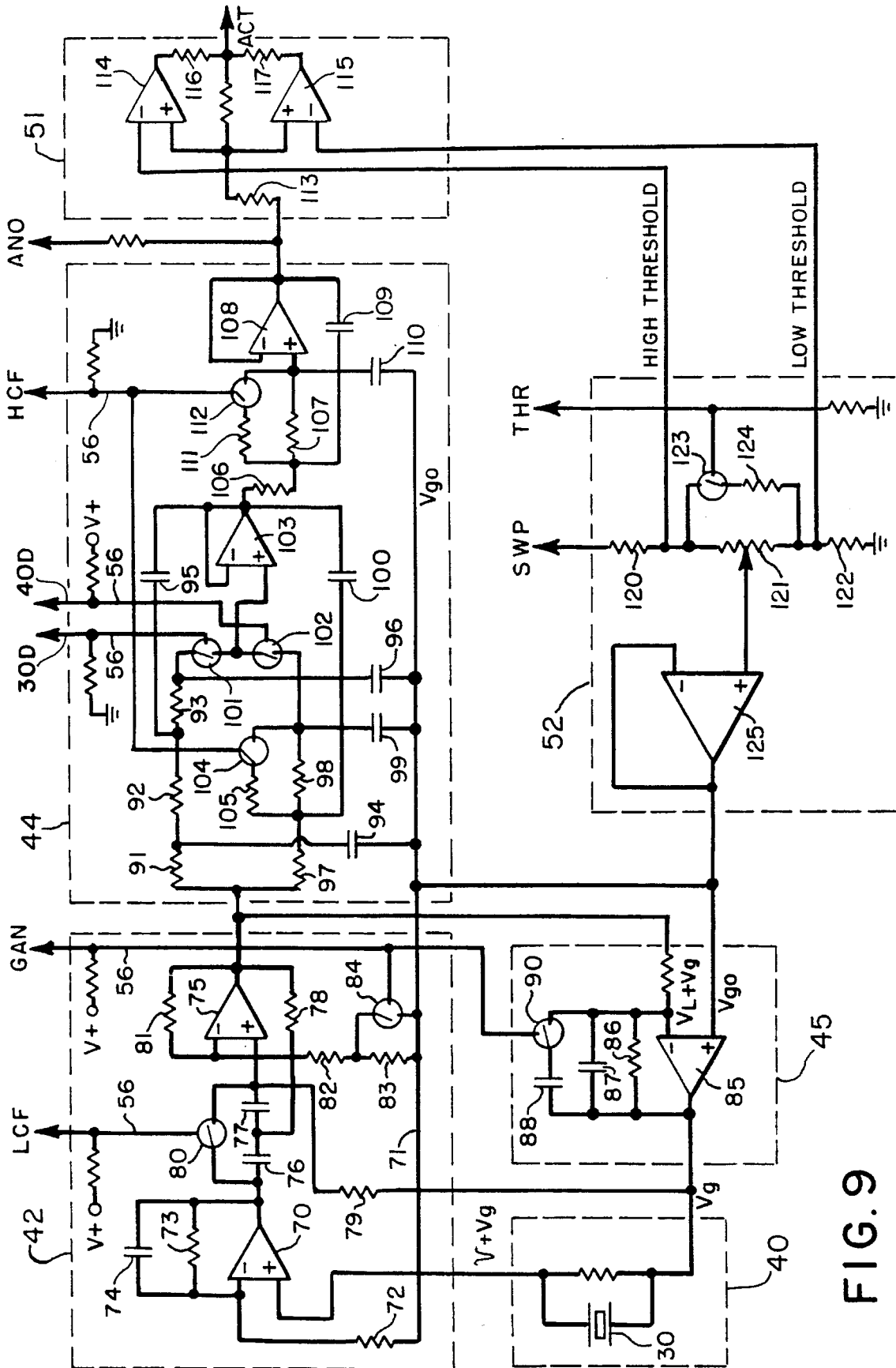


FIG. 9

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