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Kalogeropoulos et al.

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(54) **LIFE CYCLE CHARGING FOR BATTERIES**

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patent is extended or adjusted under 35
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(51) **Int. Cl.**⁷ **H02J 7/00**

(52) **U.S. Cl.** **320/160; 320/125**

(58) **Field of Search** 320/160, 125,
320/130, 162

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19, 2001; *Date of Mailing:* Jun. 25, 2001.

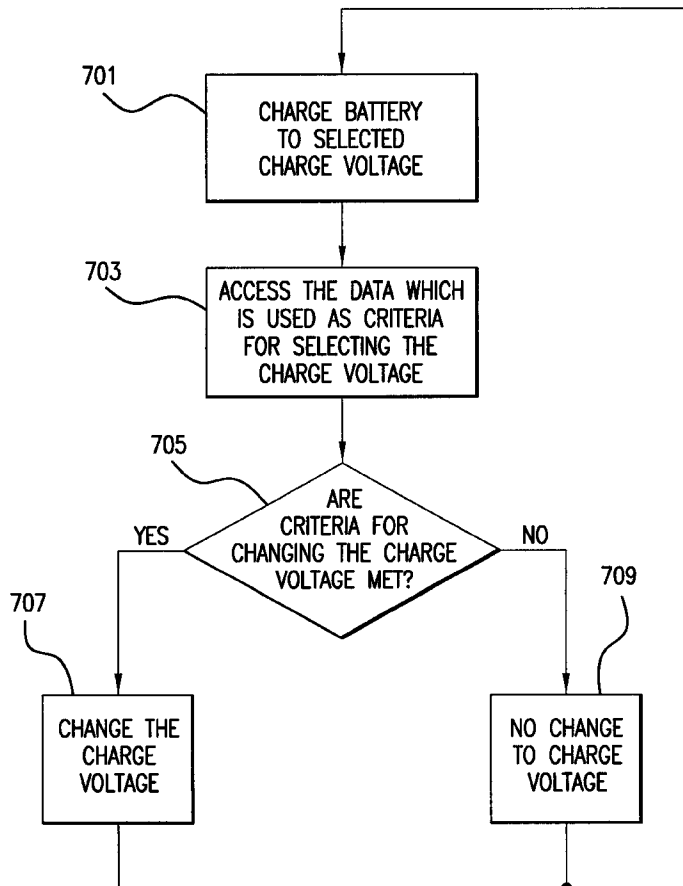
* cited by examiner

Primary Examiner—Gregory J. Toatley, Jr.
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Mathis, L.L.P.

(57) **ABSTRACT**

A method and apparatus for extending the cycle life of a
battery by using different charge voltages or different current
cut-offs to recharge the battery during the course of the
battery's life. The capacity of a battery is gradually depleted
as the battery is repeatedly charged and discharged. The rate
at which the battery capacity is depleted varies in accor-
dance to the charge voltage, or the current cut-off, used to
recharge the battery. For example, higher charge voltages
cause the capacity to be more rapidly depleted than lower
charge voltages. A battery may be charged using a high
charge voltage, e.g., its rated charge voltage, during periods
of expected high usage. To extend the battery's cycle life,
the battery may be charged using a low charge voltage
during periods of expected low usage.

31 Claims, 9 Drawing Sheets



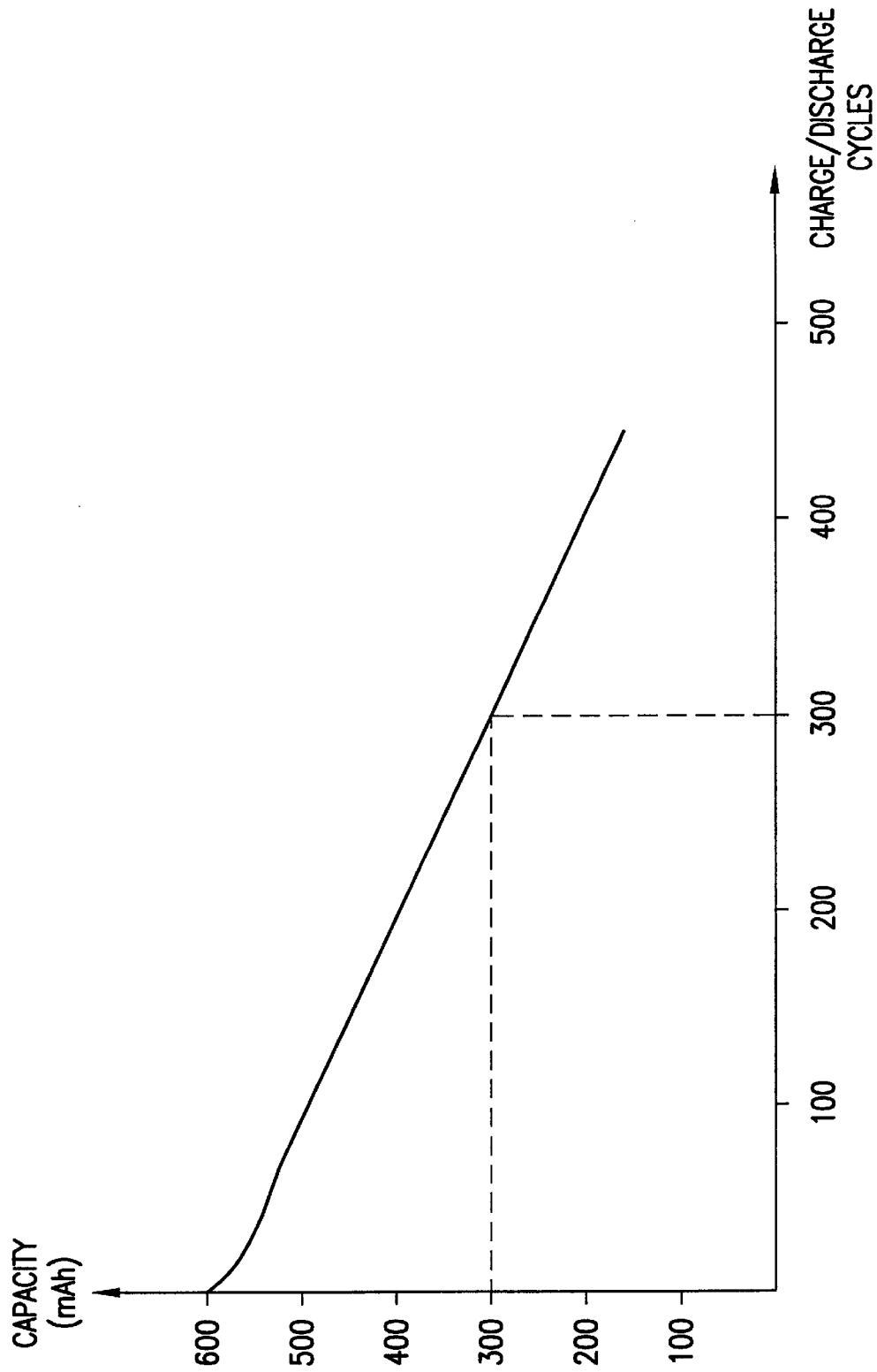


FIG.1

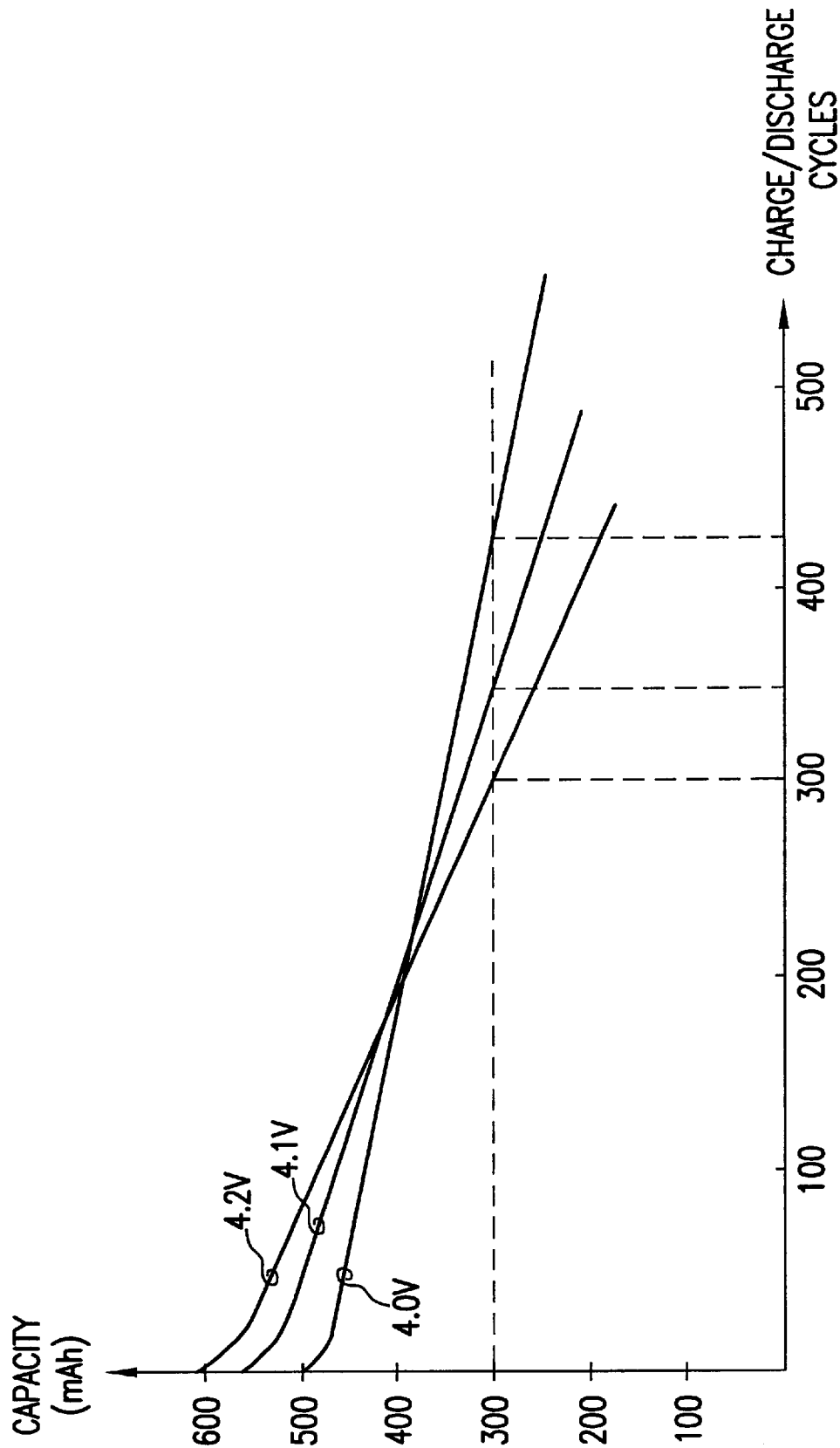


FIG.2

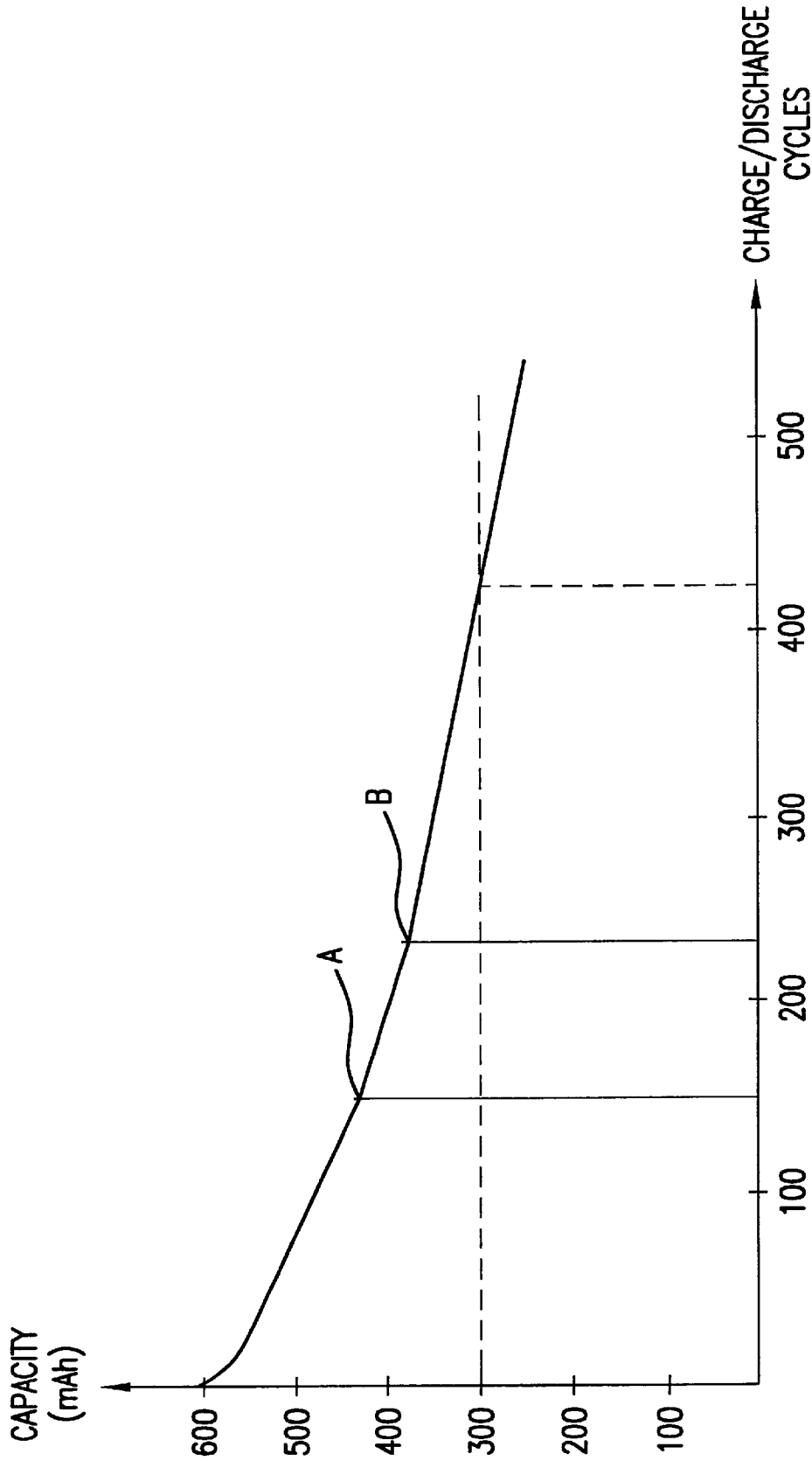


FIG.3

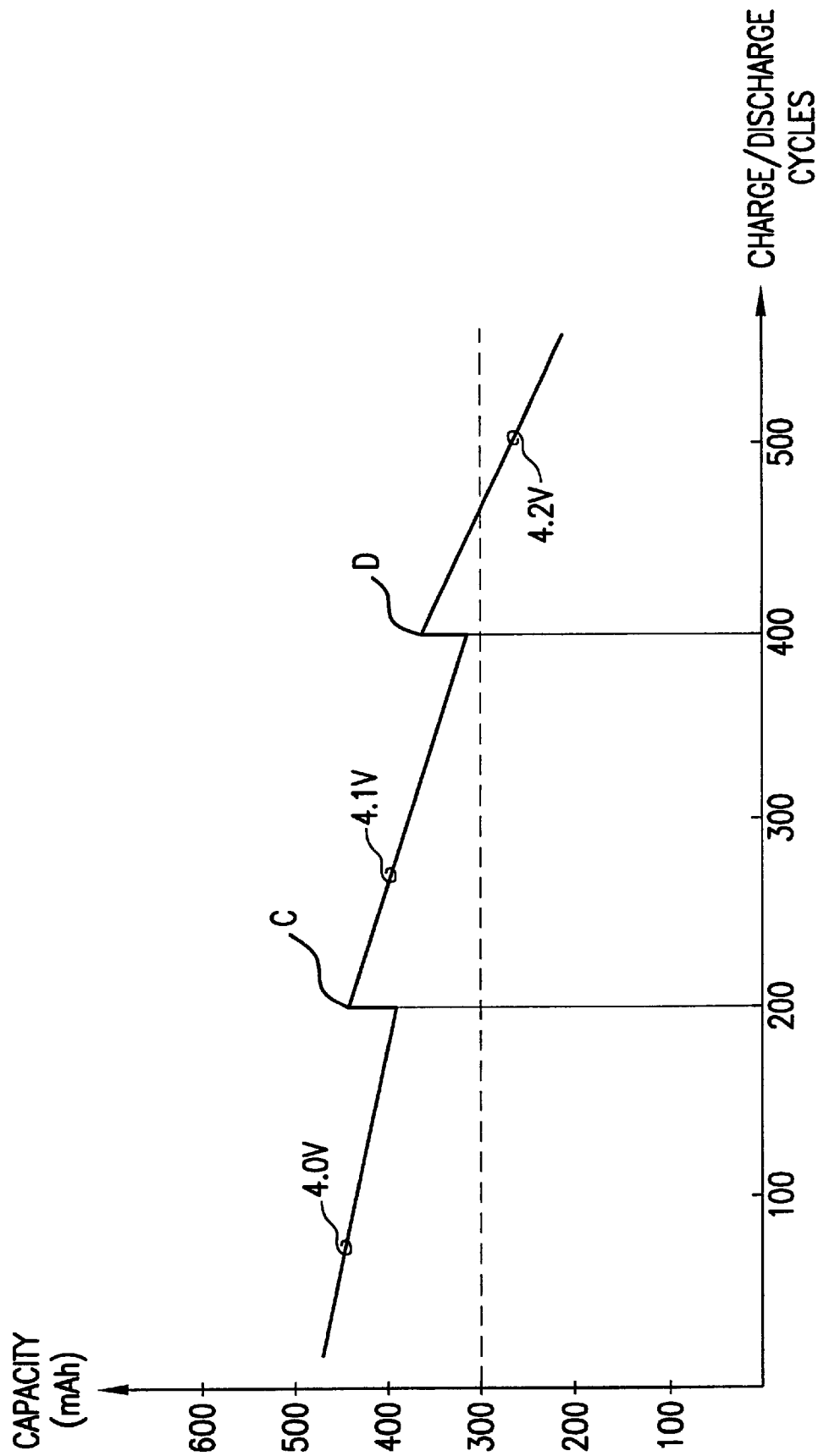


FIG. 4

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