

(12) **United States Patent**
Reid

(10) **Patent No.:** **US 8,285,940 B2**
(45) **Date of Patent:** **Oct. 9, 2012**

(54) **METHOD AND APPARATUS FOR HIGH SPEED CACHE FLUSHING IN A NON-VOLATILE MEMORY**

2006/0072369 A1* 4/2006 Madter et al. 365/232
2007/0016719 A1* 1/2007 Ono et al. 711/103
2007/0168698 A1* 7/2007 Coulson et al. 714/5
2009/0193193 A1* 7/2009 Kern 711/128

* cited by examiner

(75) Inventor: **Robert Alan Reid**, Superior, CO (US)

(73) Assignee: **Cadence Design Systems, Inc.**, San Jose, CA (US)

Primary Examiner — Tuan Thai

Assistant Examiner — Ngoc Dinh

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 555 days.

(74) *Attorney, Agent, or Firm* — Sawyer Law Group, P.C.

(21) Appl. No.: **12/040,782**

(22) Filed: **Feb. 29, 2008**

(57) **ABSTRACT**

An invention is provided for performing flush cache in a non-volatile memory. The invention includes maintaining a plurality of free memory blocks within a non-volatile memory. When a flush cache command is issued, a flush cache map is examined to obtain a memory address of a memory block in the plurality of free memory blocks within the non-volatile memory. The flush cache map includes a plurality of entries, each entry indicating a memory block of the plurality of free memory blocks. Then, a cache block is written to a memory block at the obtained memory address within the non-volatile memory. In this manner, when a flush cache command is received, the flush cache map allows cache blocks to be written to free memory blocks in the non-volatile memory without requiring a non-volatile memory search for free blocks or requiring erasing of memory blocks storing old data.

(65) **Prior Publication Data**

US 2009/0222627 A1 Sep. 3, 2009

(51) **Int. Cl.**
G06F 12/00 (2006.01)

(52) **U.S. Cl.** **711/135; 711/144**

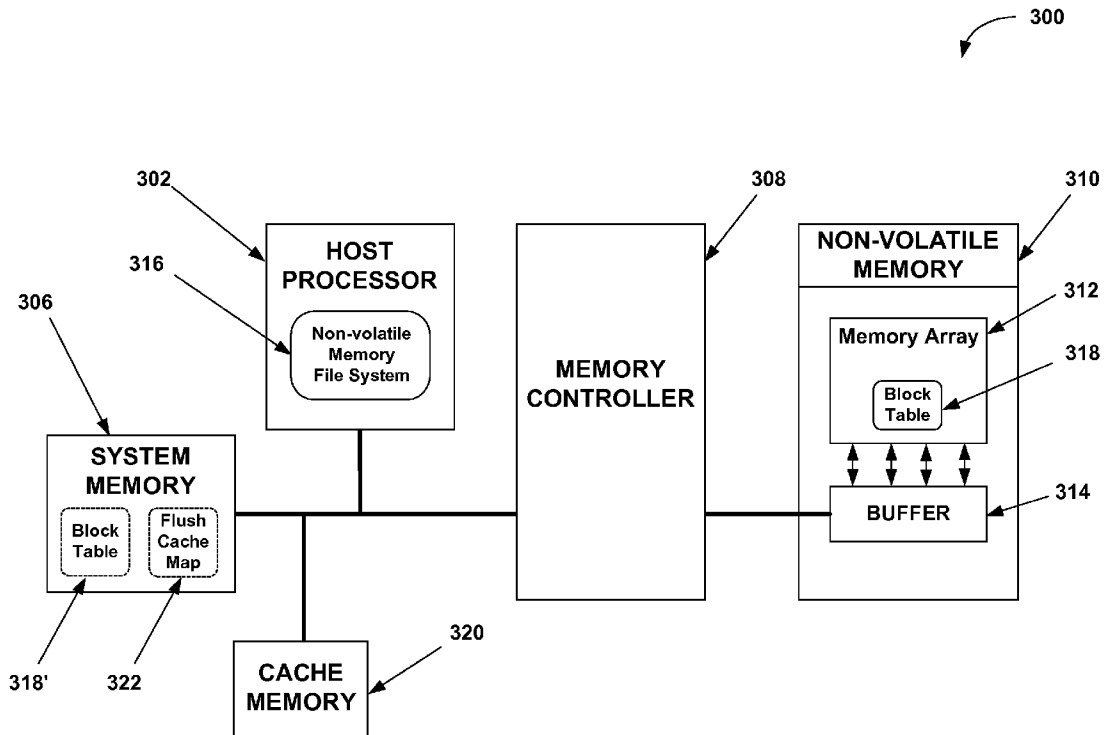
(58) **Field of Classification Search** 711/135
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2004/0085849 A1* 5/2004 Myoung et al. 365/232
2006/0064556 A1* 3/2006 Aasheim et al. 711/156

14 Claims, 7 Drawing Sheets



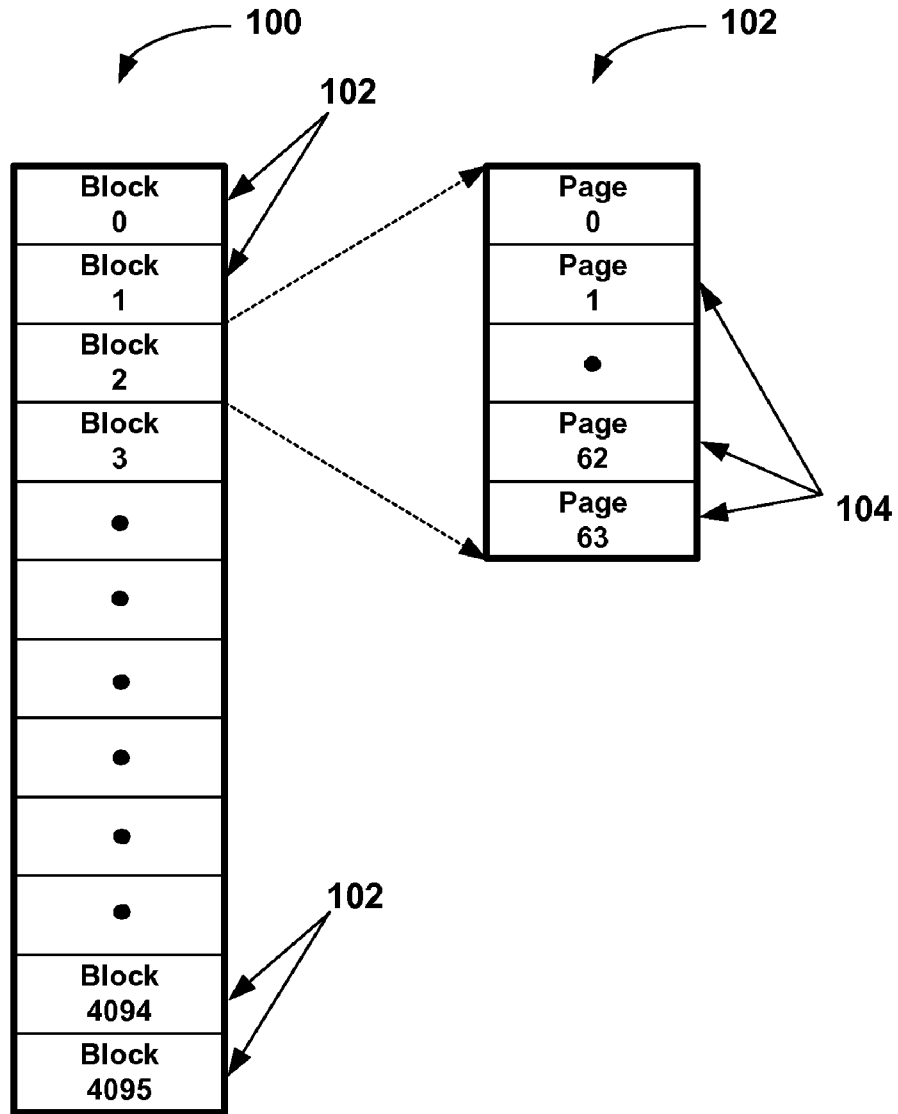


FIG. 1
(Prior Art)

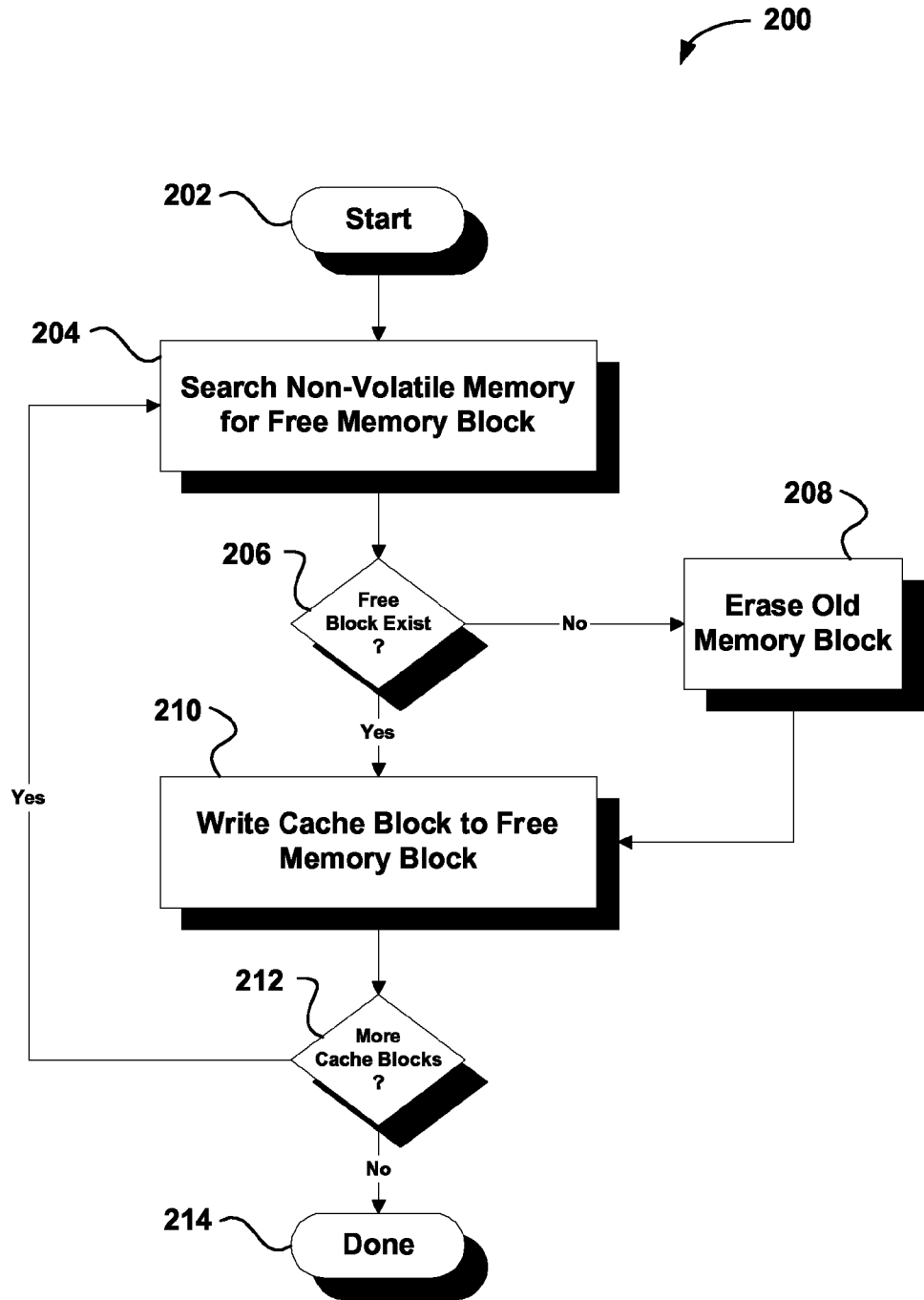


FIG. 2
(Prior Art)

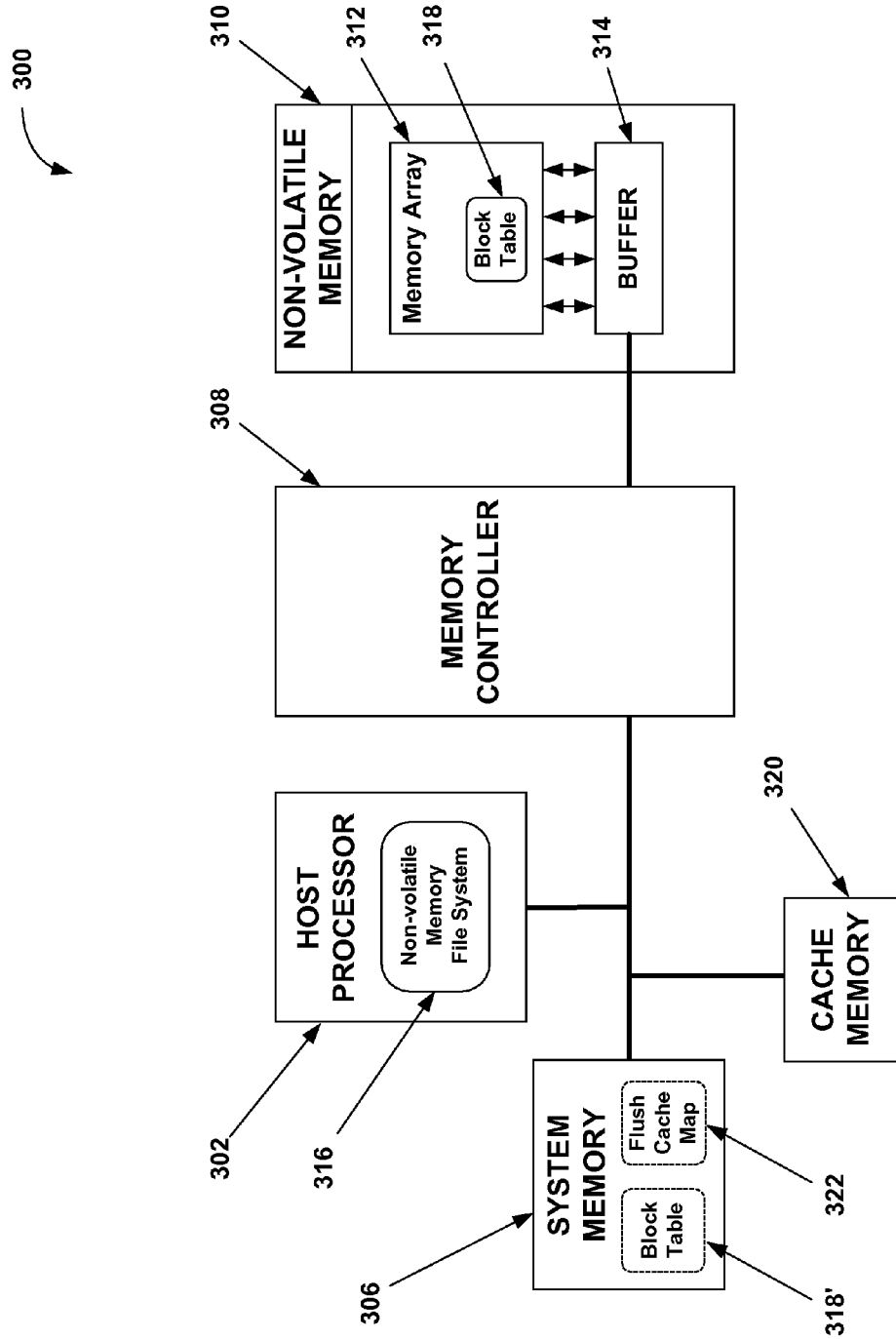


FIG. 3

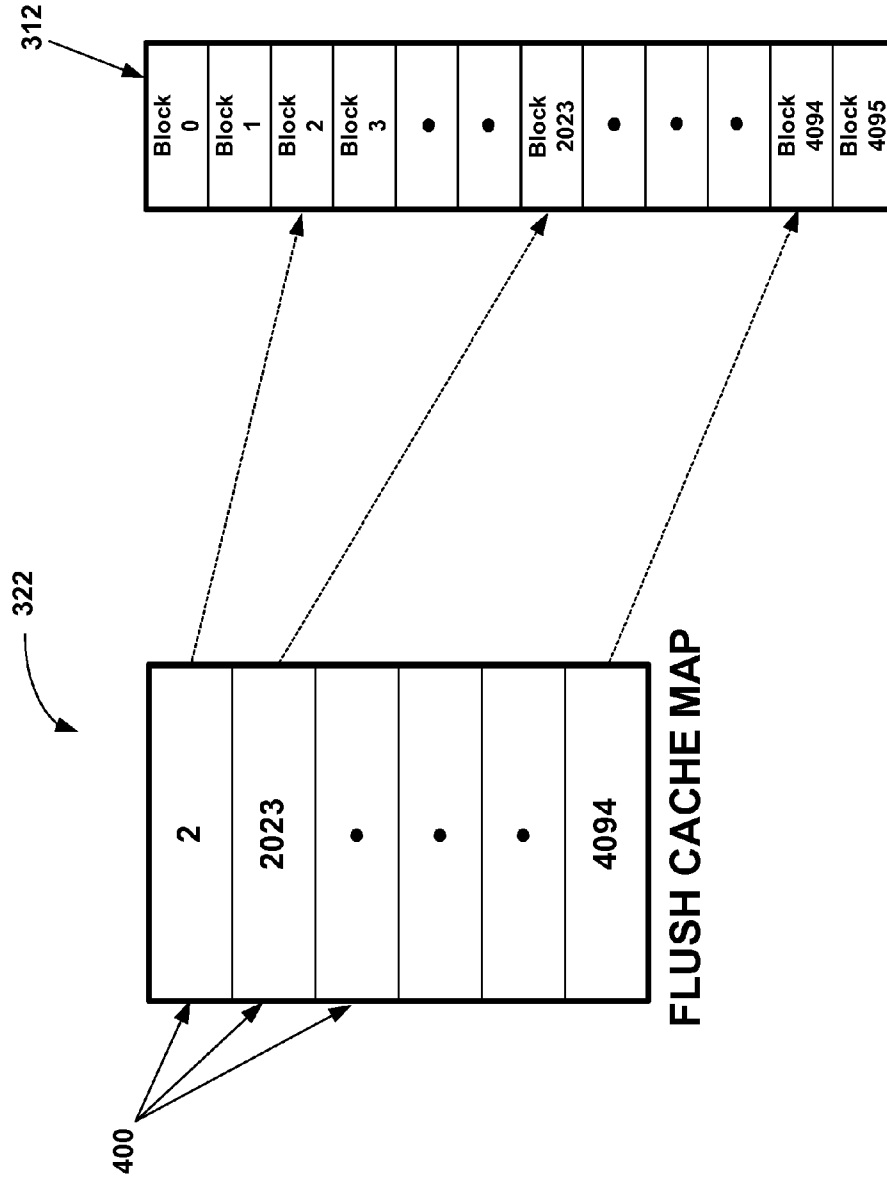


FIG. 4

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.