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Jung et al.

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(54) **METHOD OF STORING DATA IN A NON-VOLATILE MEMORY AND APPARATUS THEREFOR**

2003/0131023 A1* 7/2003 Bassett et al. 707/200

FOREIGN PATENT DOCUMENTS

JP 2001-092713 4/2001
JP 2001-147855 5/2001

OTHER PUBLICATIONS

Jung, Im Y., et al., "A Transaction Implementation Method for Devices with Restricted Resources", The 12th Joint Conference in Communications and Information, Apr. 24, 2002 (with English translation).

Jung, Im Y., et al., "A Proposal to Implement Vew-Value Logging in Java Card Transaction", The 6th World Multiconference on Systemics, Cybernetics and Informatics, Jul. 14, 2002, pp. 229-233.

* cited by examiner

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(30) **Foreign Application Priority Data**

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(51) **Int. Cl.**⁷ **G06F 12/00**

(52) **U.S. Cl.** **711/103; 711/167; 707/202**

(58) **Field of Search** **707/100, 200, 707/202; 711/103, 167, 169**

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,721,765 B2* 4/2004 Ghosh et al. 707/202
6,732,124 B1* 5/2004 Koseki et al. 707/202
2002/0059275 A1* 5/2002 Schofield 707/100
2002/0184436 A1* 12/2002 Kim et al. 711/103

(57) **ABSTRACT**

Provided is a method of storing data in a non-volatile memory, including generating and storing logs including data to be stored and an address of the non-volatile memory in response to a data-writing request, and comparing addresses of the logs and storing data corresponding to the same page by the unit of page in a corresponding area of the non-volatile memory. The method makes it possible to minimize delay in storing data, reduce the number of accesses to the non-volatile memory and uniformly write data in the whole non-volatile memory, thereby minimizing a response time of the non-volatile memory and increasing the lifetime of the non-volatile memory.

13 Claims, 9 Drawing Sheets

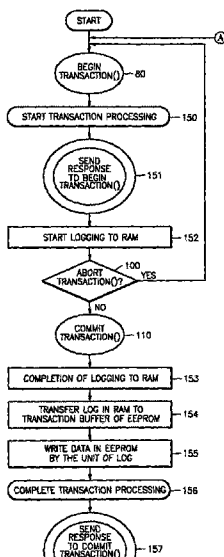


FIG. 1

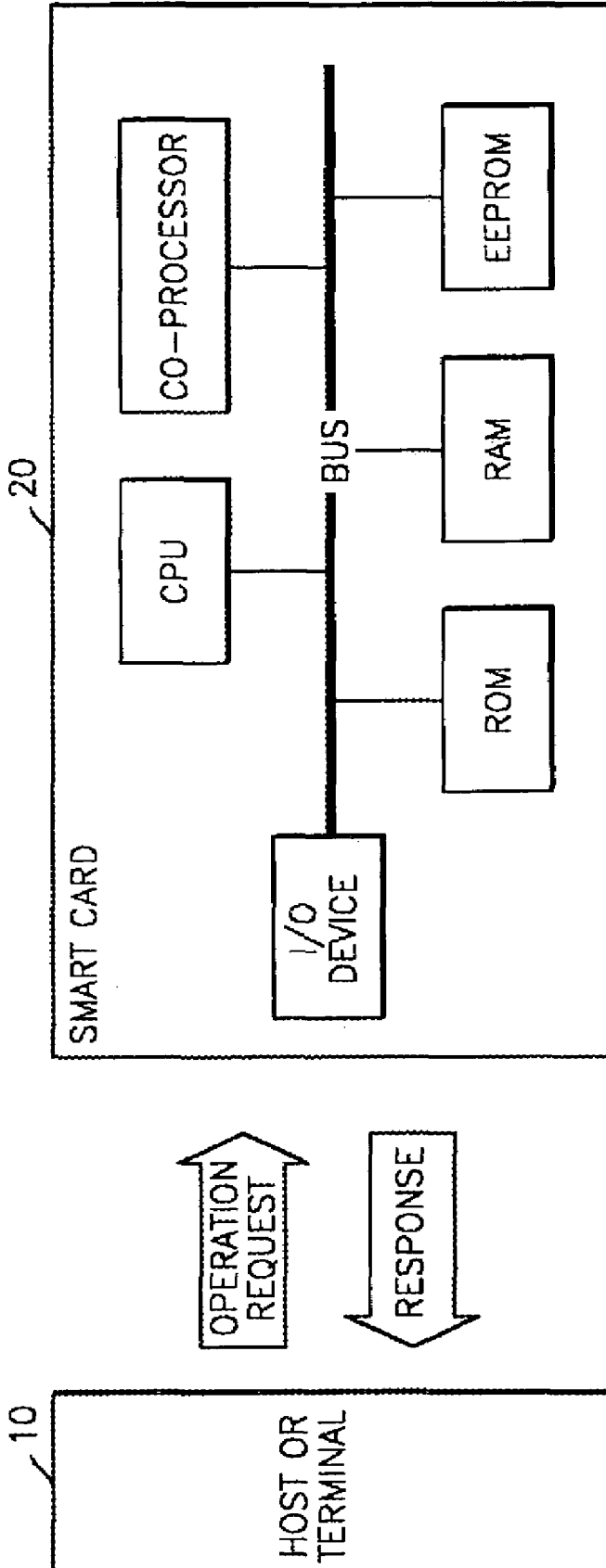


FIG. 2

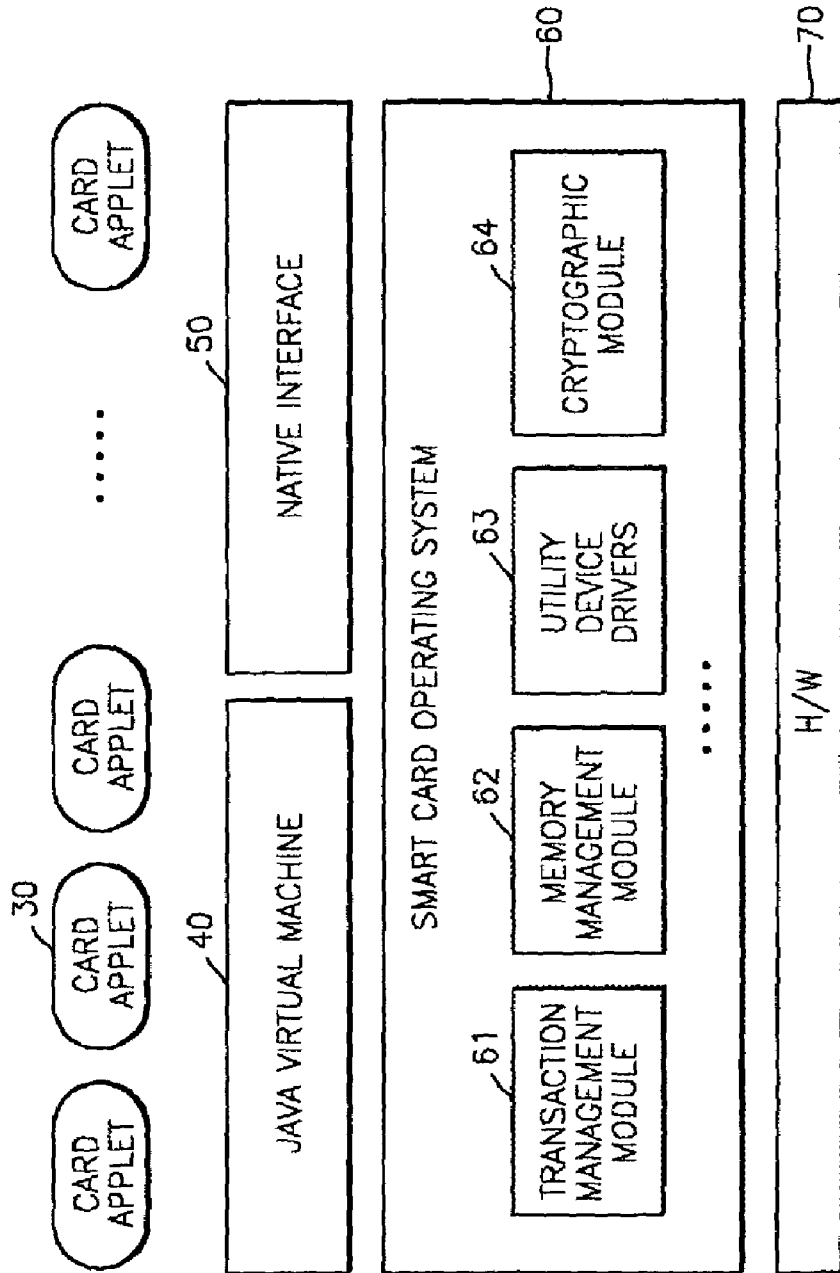


FIG. 3

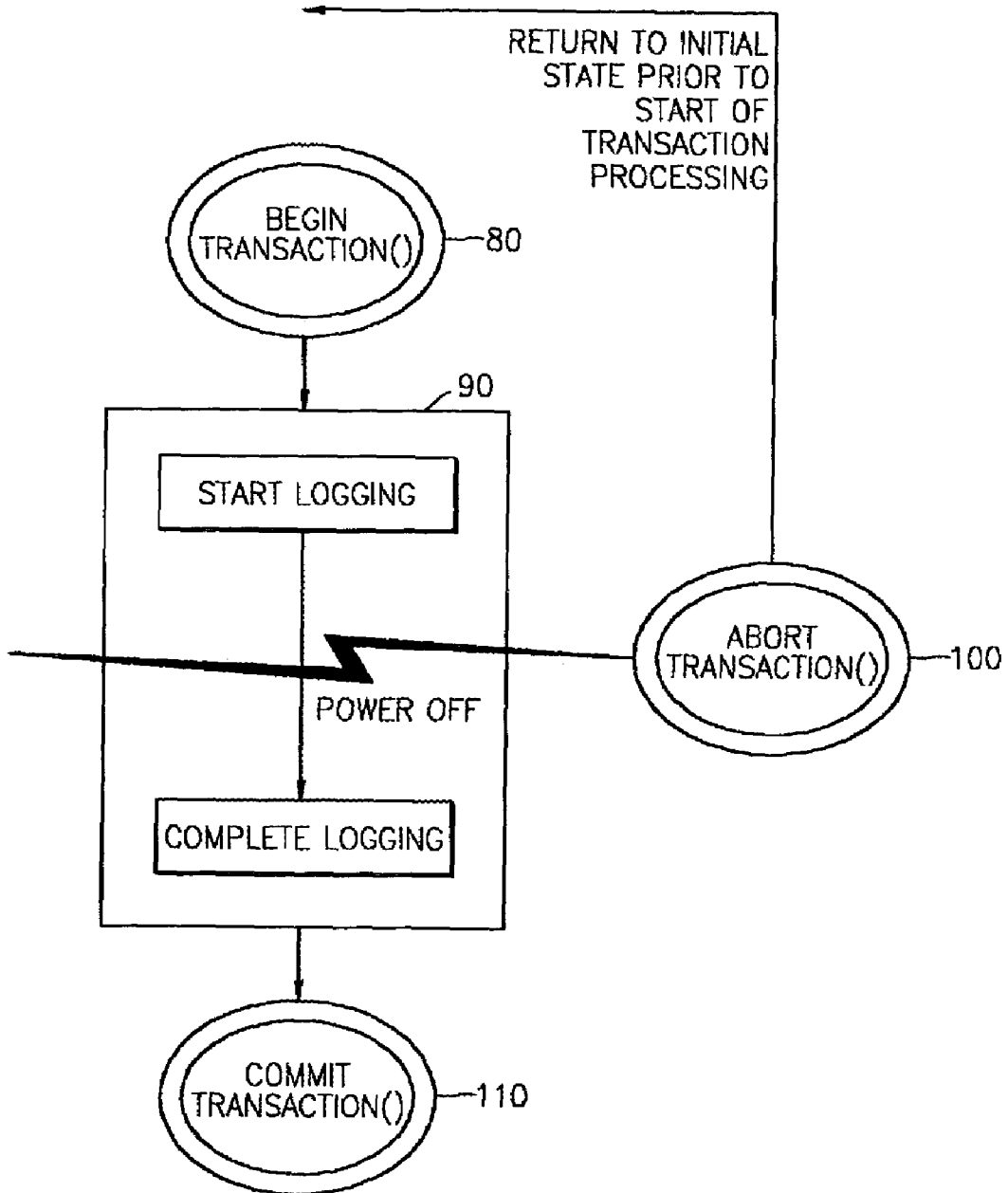
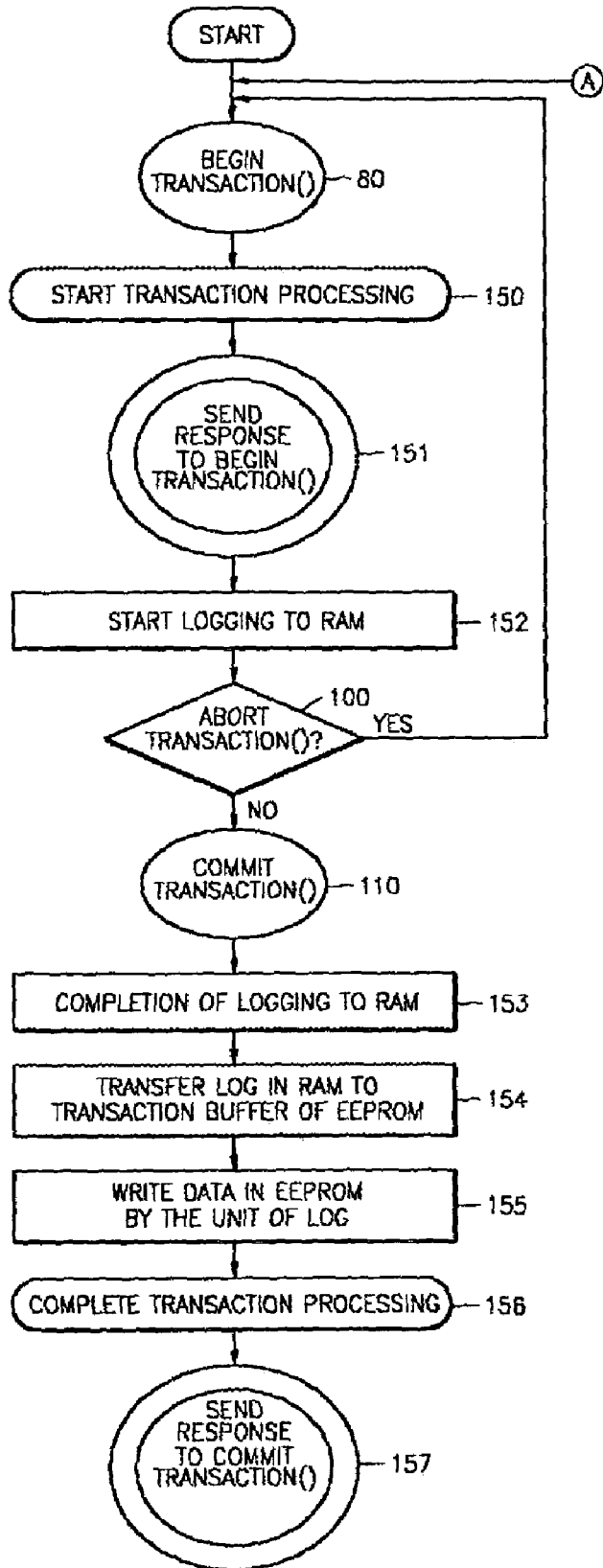


FIG. 4A



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