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(12) **United States Patent**  
**Baumgartner et al.**

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(54) **NON-UNIFORM MEMORY ACCESS (NUMA) DATA PROCESSING SYSTEM THAT SPECULATIVELY FORWARDS A READ REQUEST TO A REMOTE PROCESSING NODE**

**FOREIGN PATENT DOCUMENTS**

EP 0379771 A2 8/1990  
EP 0608638 A1 8/1994  
EP 0817072 A2 1/1998

\* cited by examiner

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(57) **ABSTRACT**

(\*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

A non-uniform memory access (NUMA) computer system includes at least a local processing node and a remote processing node that are each coupled to a node interconnect. The local processing node includes a local interconnect, a processor and a system memory coupled to the local interconnect, and a node controller interposed between the local interconnect and the node interconnect. In response to receipt of a read request from the local interconnect, the node controller speculatively transmits the read request to the remote processing node via the node interconnect. Thereafter, in response to receipt of a response to the read request from the remote processing node, the node controller handles the response in accordance with a resolution of the read request at the local processing node. For example, in one processing scenario, data contained in the response received from the remote processing node is discarded by the node controller if the read request received a Modified Intervention coherency response at the local processing node.

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(22) **Filed: Dec. 15, 1998**

(51) **Int. Cl.<sup>7</sup>** ..... **G06F 12/00; G06F 13/00**

(52) **U.S. Cl.** ..... **711/141; 711/100; 711/124; 711/147; 711/154**

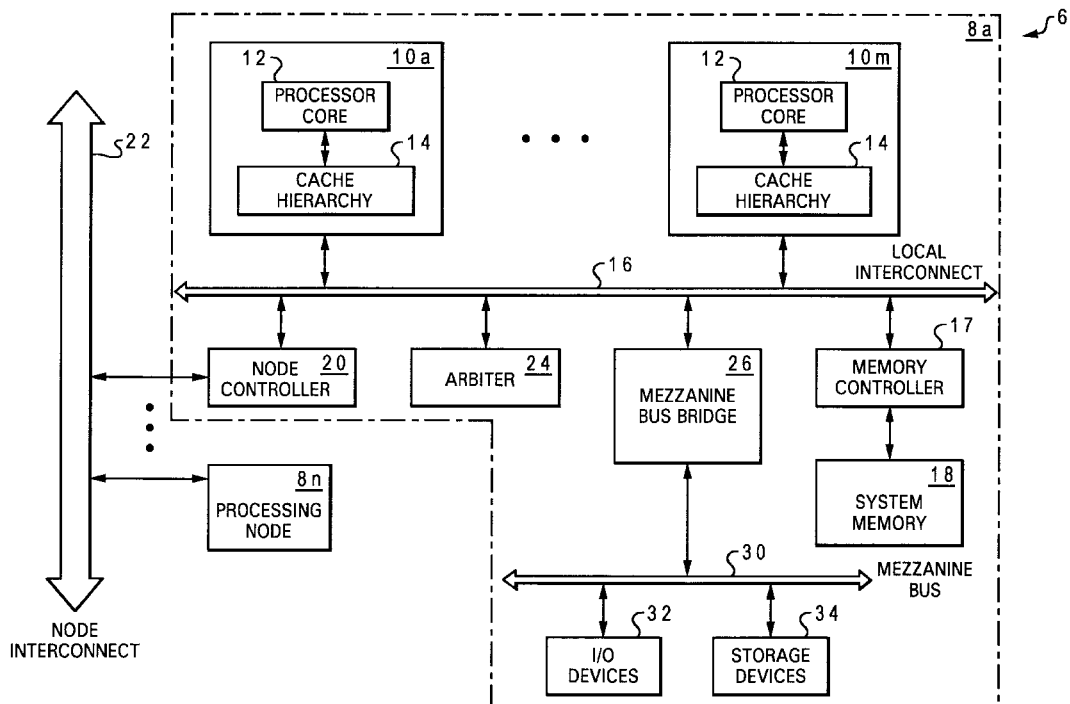
(58) **Field of Search** ..... **711/124, 122, 711/154, 141, 100, 147**

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

5,754,877 A \* 5/1998 Hagersten et al. .... 712/29  
5,892,970 A \* 4/1999 Hagersten ..... 710/5  
5,950,226 A \* 9/1999 Hagersten et al. .... 711/124  
5,958,019 A \* 9/1999 Hagersten et al. .... 709/400

**24 Claims, 8 Drawing Sheets**



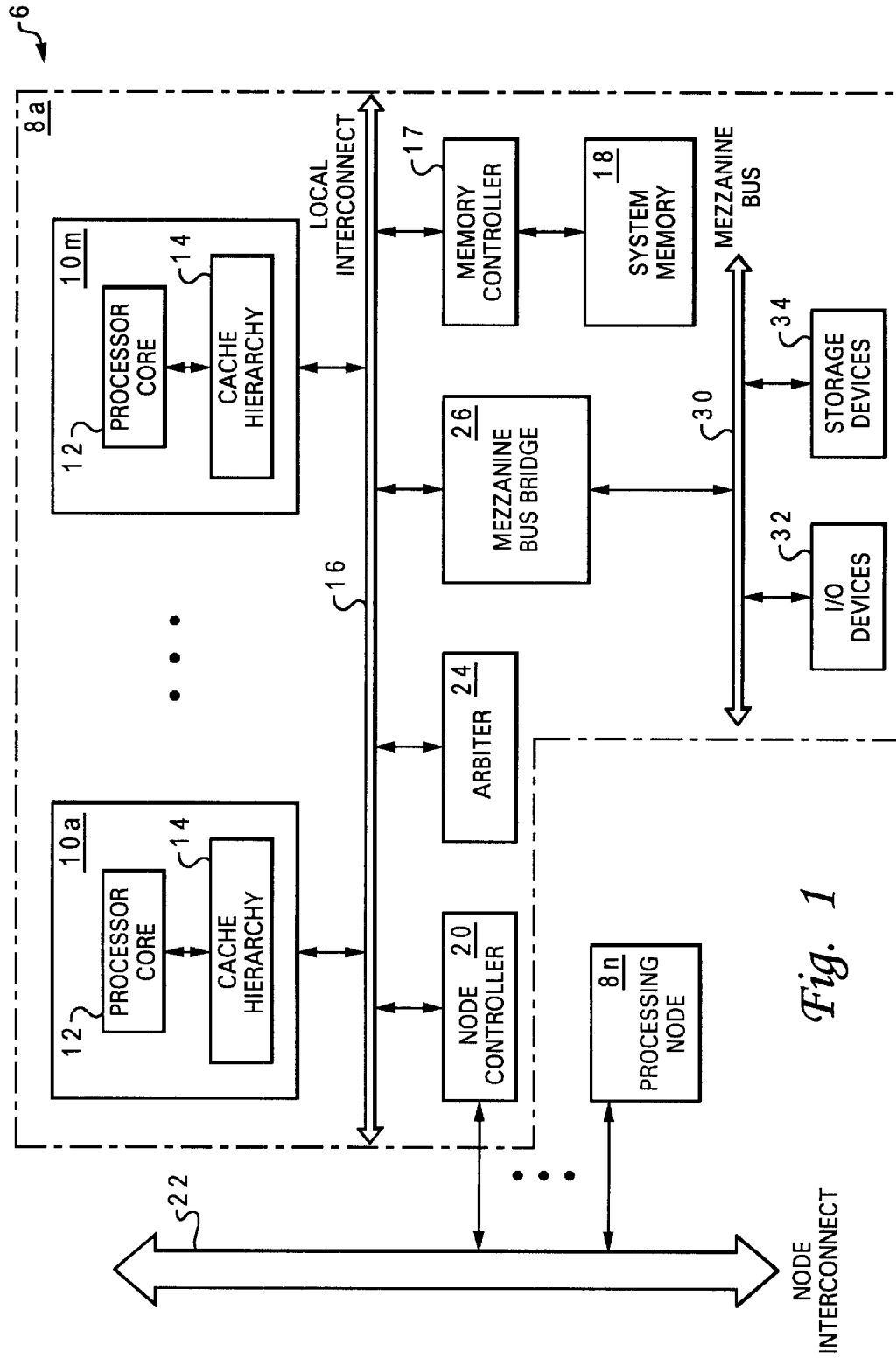


Fig. 1

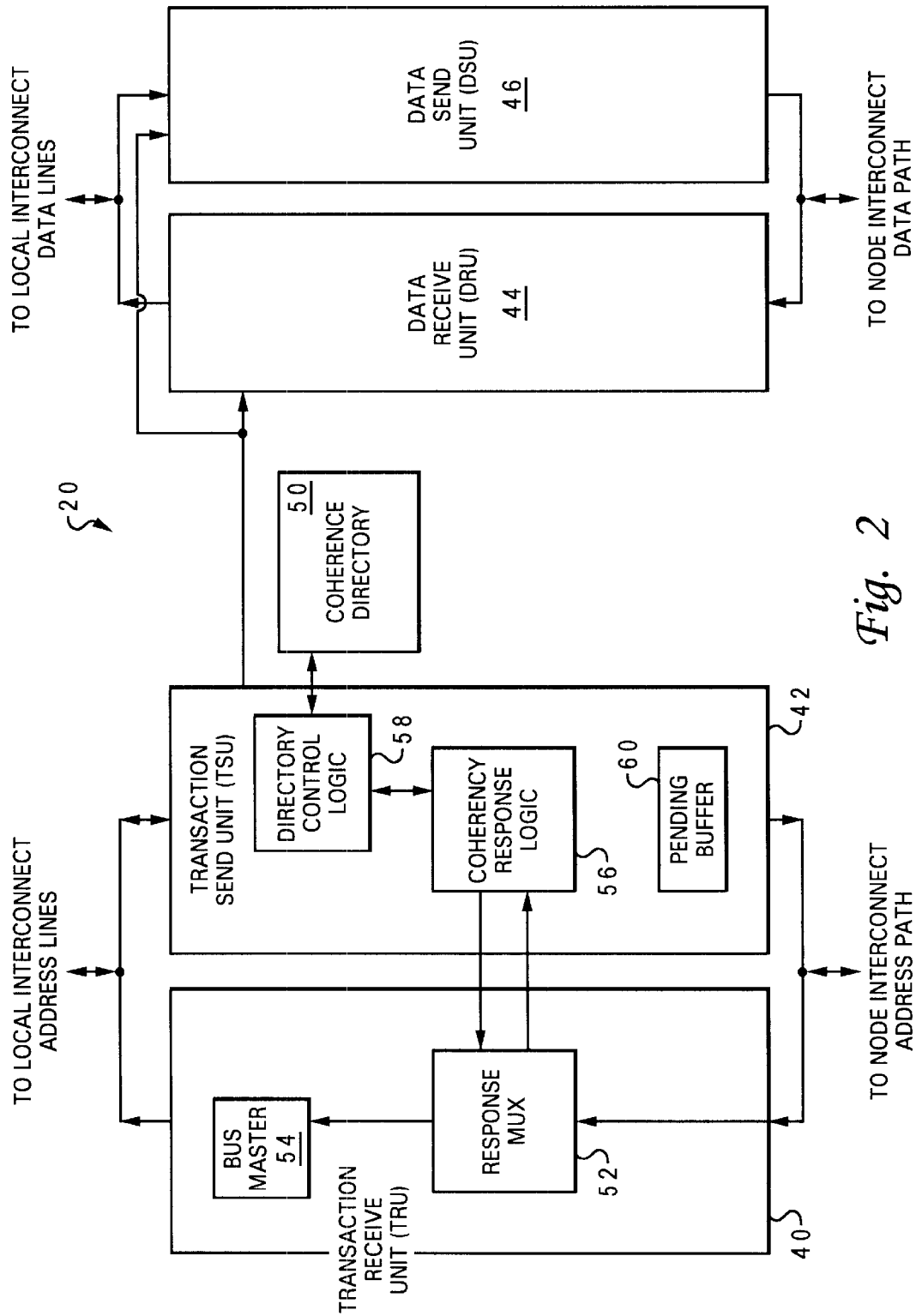
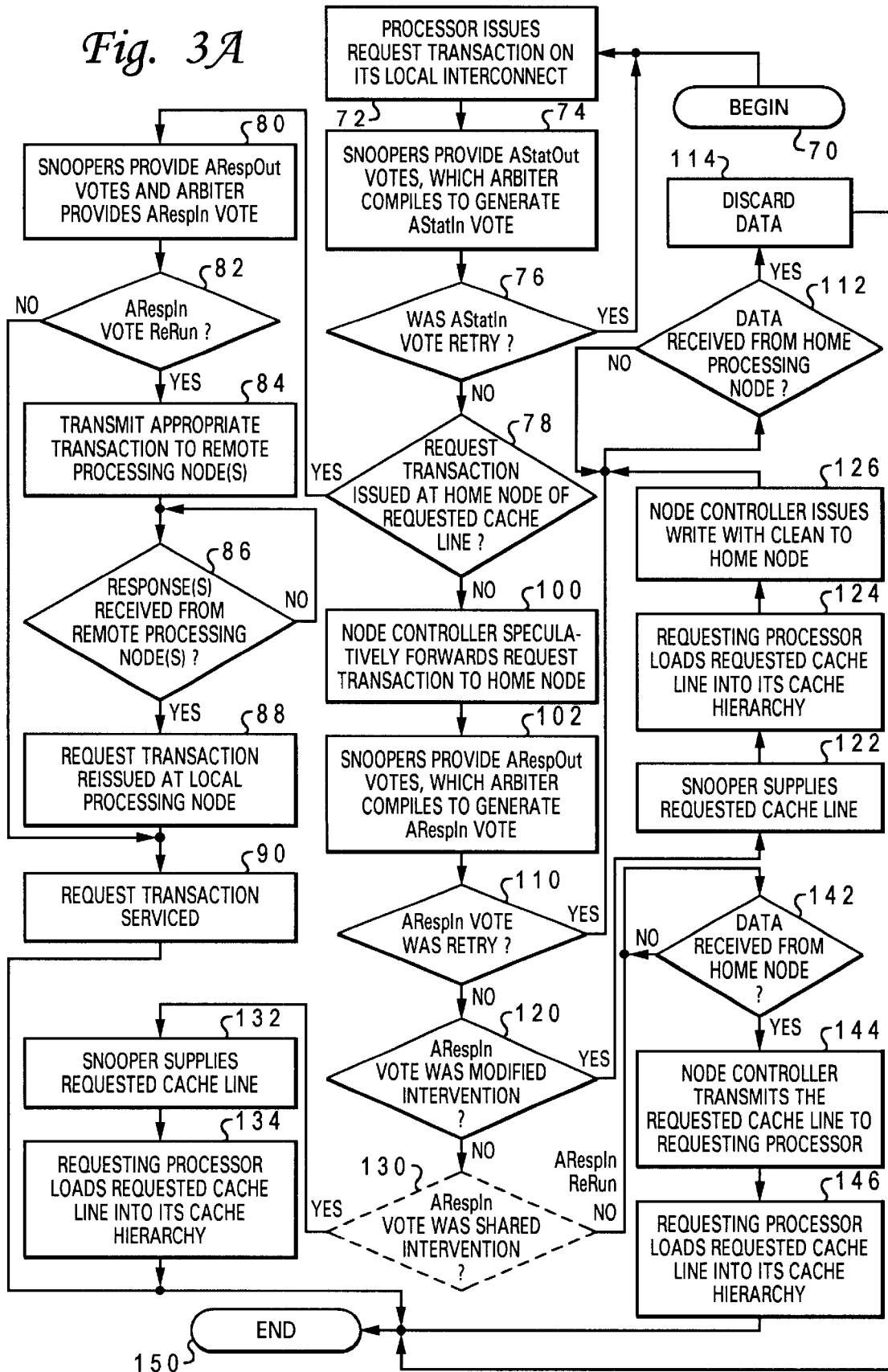


Fig. 2

Fig. 3A



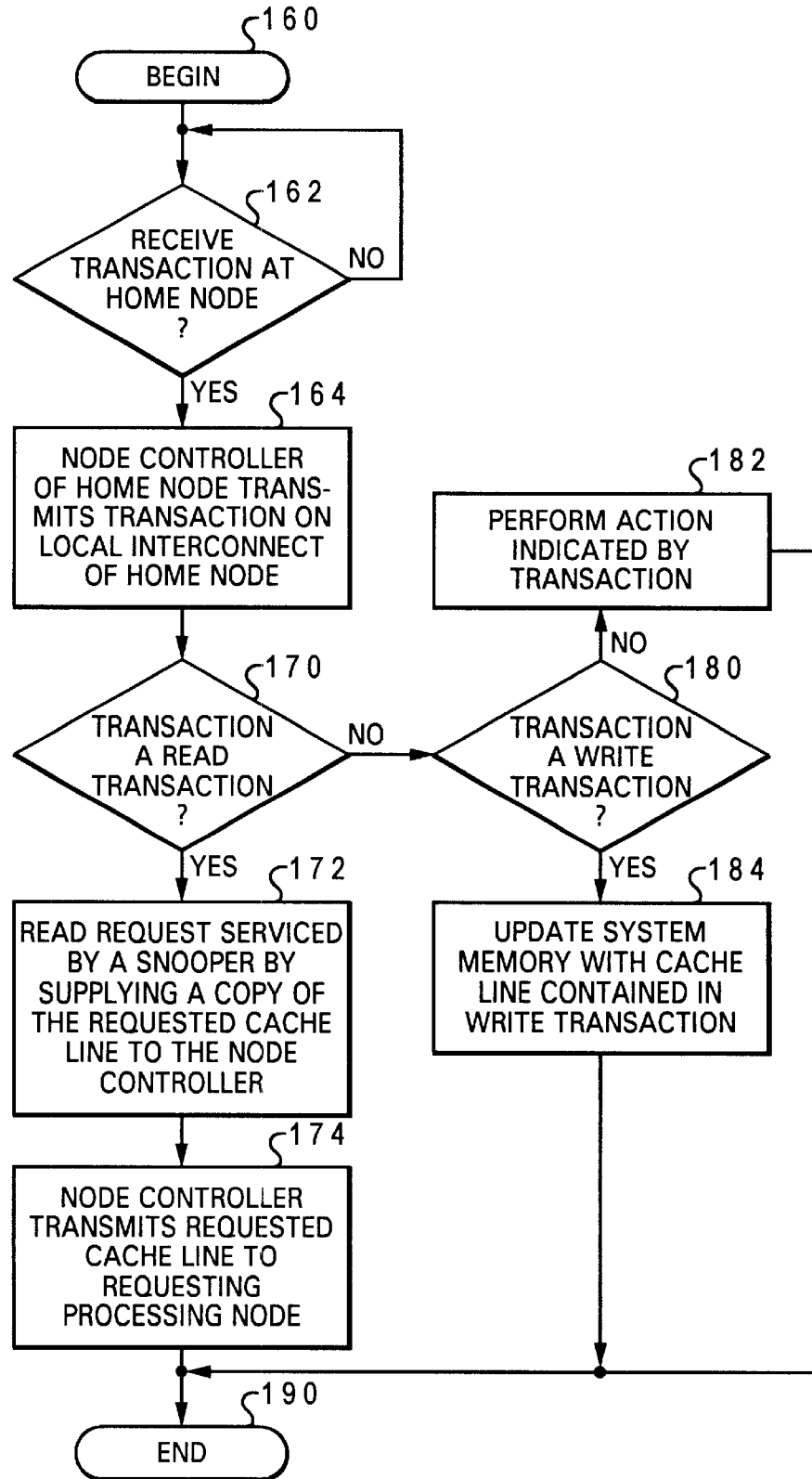


Fig. 3B

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