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**Conley**

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(54) **ZONE BOUNDARY ADJUSTMENT FOR DEFECTS IN NON-VOLATILE MEMORIES**

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(51) **Int. Cl.**<sup>7</sup> ..... **G06F 12/10**

(52) **U.S. Cl.** ..... **711/173**

(58) **Field of Search** ..... 711/103, 173, 711/201; 714/7, 8; 365/230.01

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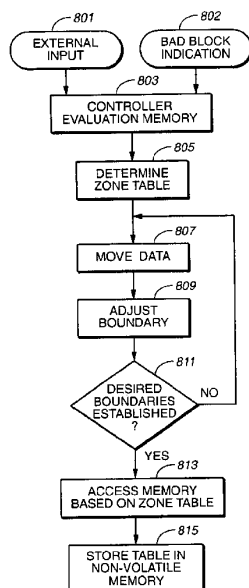
*Primary Examiner*—Kevin L. Ellis

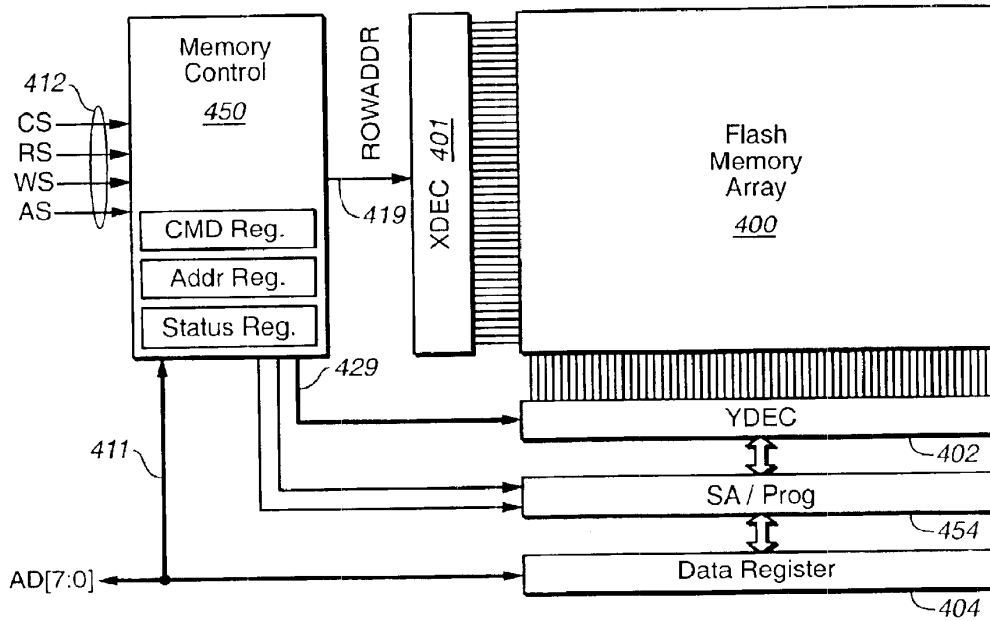
(74) *Attorney, Agent, or Firm*—Parsons Hsue & de Runtz LLP

(57) **ABSTRACT**

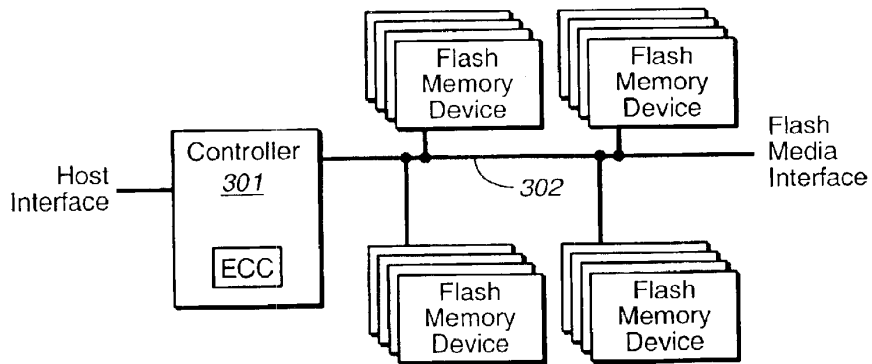
A non-volatile memory is divided into logical zones by the card controller in order reduce the size of the data structures it uses for address translation. Zone boundaries are adjusted to accommodate defects allowed by memory test to improve card yields and to adjust boundaries in the field to extend the usable lifetime of the card. Firmware scans for the presence of defective blocks on the card. Once the locations of these blocks are known, the firmware calculates the zone boundaries in such a way that good blocks are equally distributed among the zones. Since the number of good blocks meets the card test criteria by the memory test criteria, defects will reduce card yield fallout. The controller can perform dynamic boundary adjustments. When defects occur, the controller can perform the analysis again and, if needed, redistributes the zone boundaries, moving any user data.

**52 Claims, 6 Drawing Sheets**





**FIG. 1**  
(PRIOR ART)



**FIG. 2**  
(PRIOR ART)

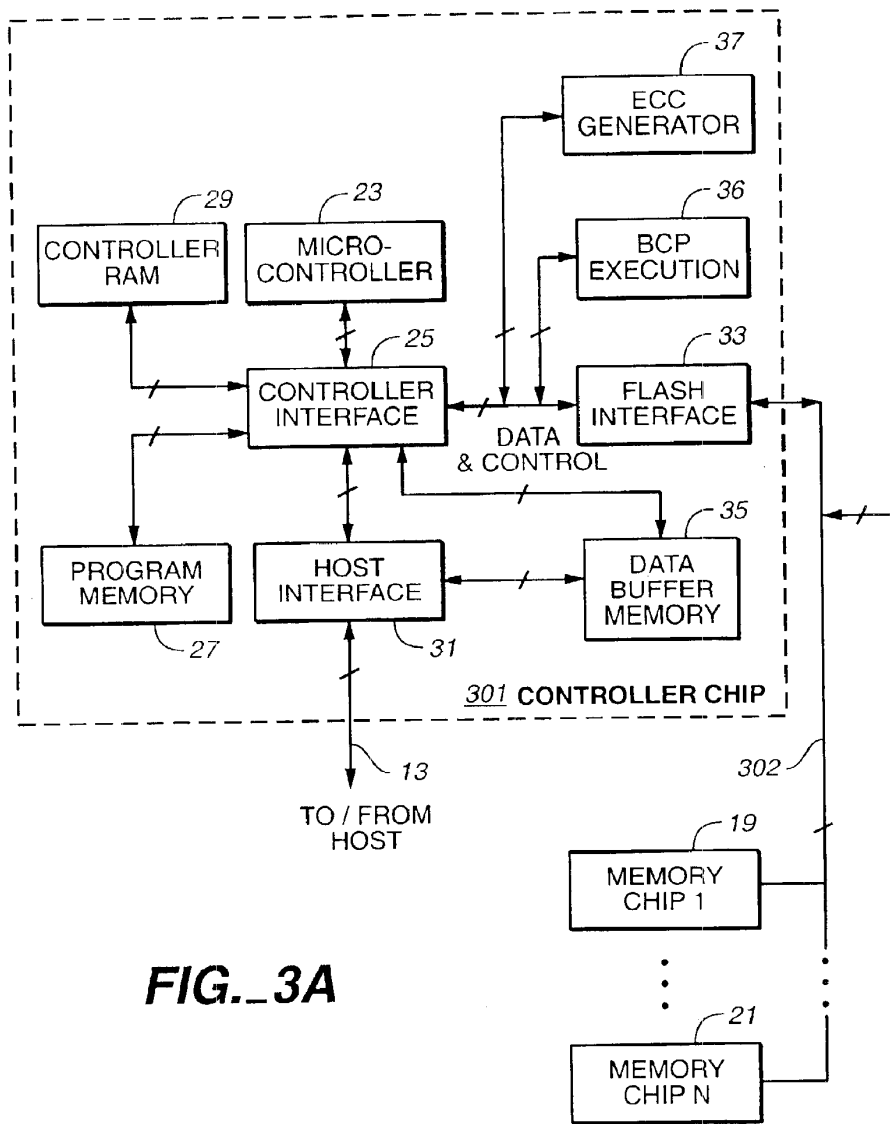


FIG. 3A

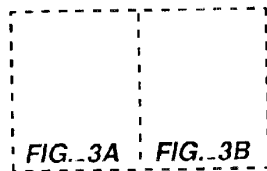


FIG. 3

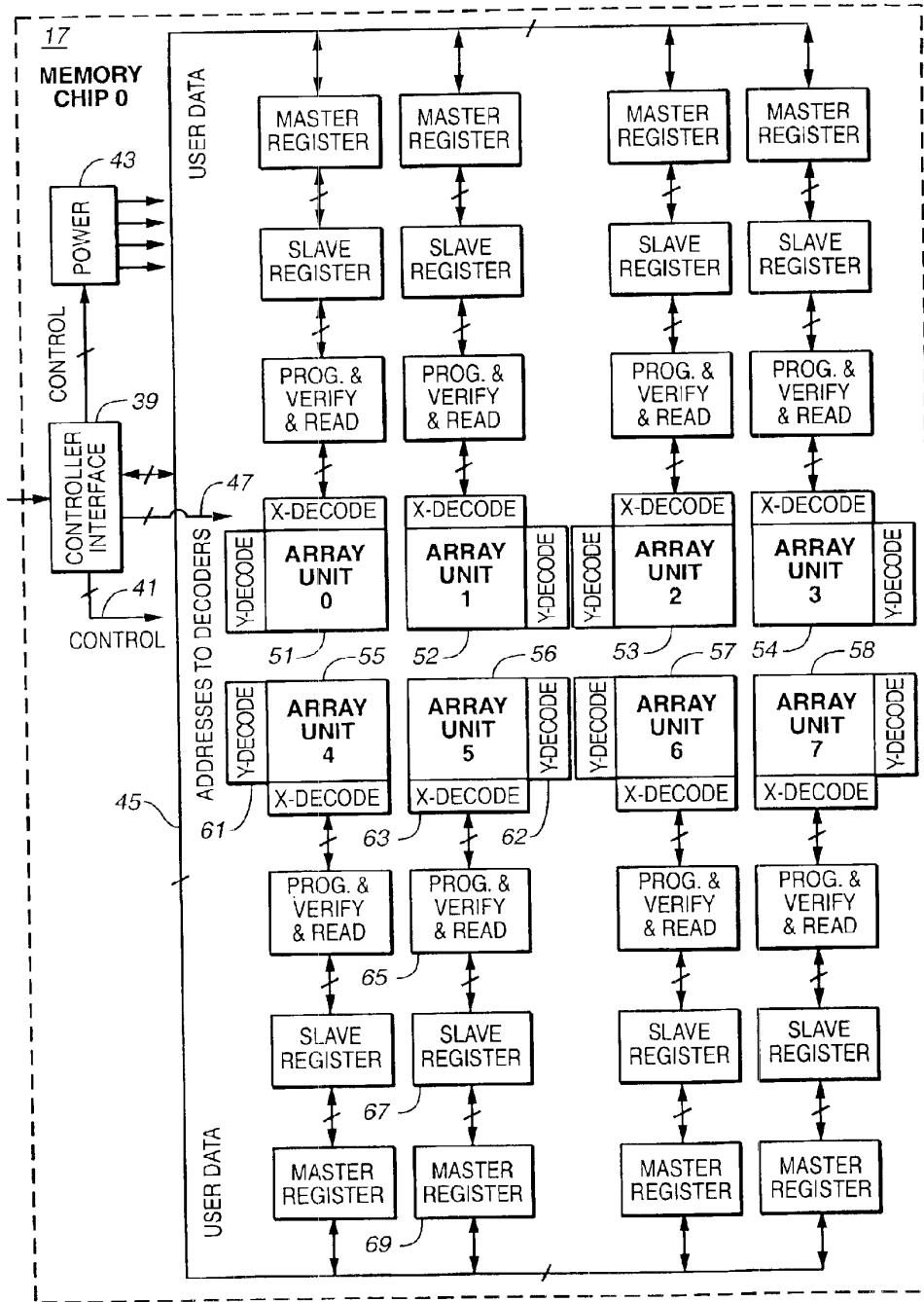


FIG. 3B

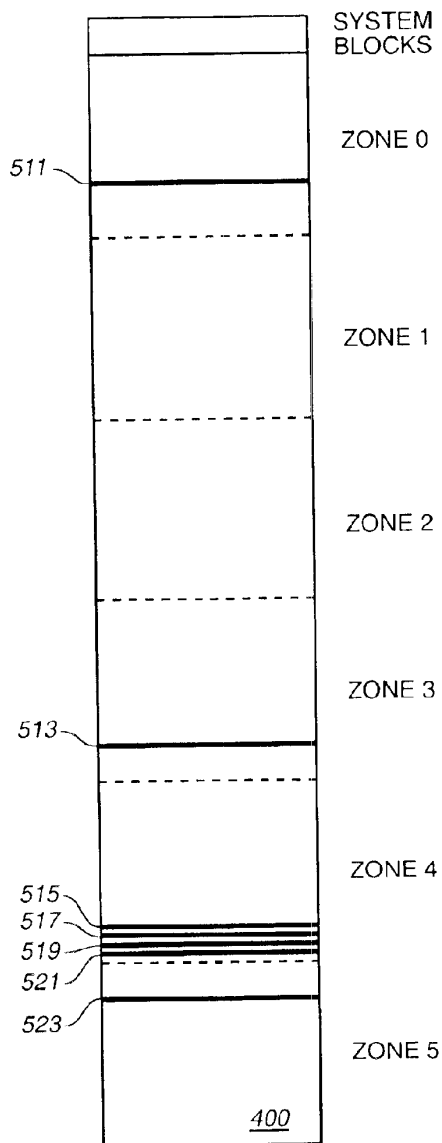


FIG.\_4

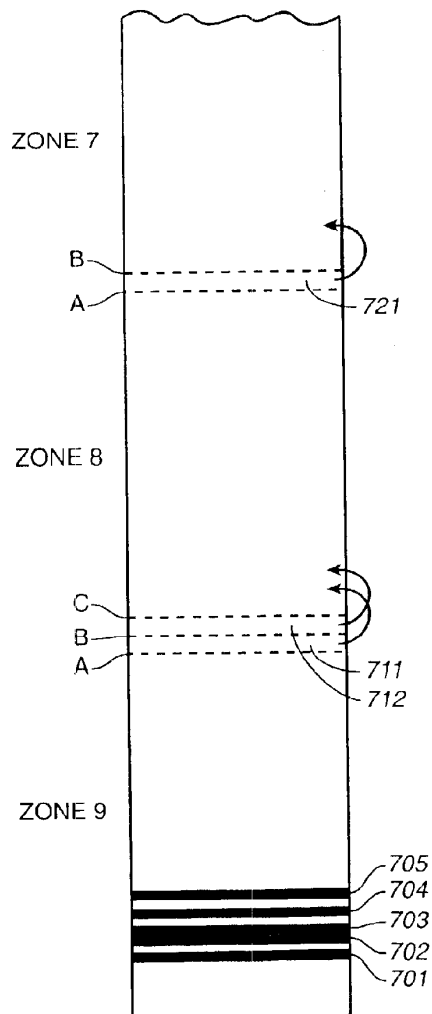


FIG.\_6

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