



US005293427A

United States Patent [19]

[11] Patent Number: **5,293,427**

Ueno et al.

[45] Date of Patent: **Mar. 8, 1994**

[54] EYE POSITION DETECTING SYSTEM AND METHOD THEREFOR

[75] Inventors: **Hiroshi Ueno, Yokohama; Kazuhiko Yoshida, Yokosuka, both of Japan**

[73] Assignee: **Nissan Motor Company, Ltd., Yokohama, Japan**

[21] Appl. No.: **805,143**

[22] Filed: **Dec. 11, 1991**

[30] Foreign Application Priority Data

Dec. 14, 1990 [JP] Japan 2-402512

[51] Int. Cl.⁵ **G06K 9/00**

[52] U.S. Cl. **382/1; 382/6; 382/48**

[58] Field of Search 351/208, 209, 210; 382/1, 2, 48, 28, 6; 340/575, 576

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Primary Examiner—Joseph Mancuso
Assistant Examiner—Jon Chang
Attorney, Agent, or Firm—Lowe, Price, LeBlanc & Becker

[57] ABSTRACT

The invention detects the position of an eye in image of a driver's face quickly and with high reliability, even if the density of the driver's face image is not uniform on the right and left sides due to direct sunlight. Only one eye detection area is obtained on the dark side of the face image when the density of the face image is not uniform on the right and left sides. One eye window is detected in the one eye detection area, and an iris center is detected within the eye window to discriminate an inattentive driver who is dozing.

9 Claims, 15 Drawing Sheets

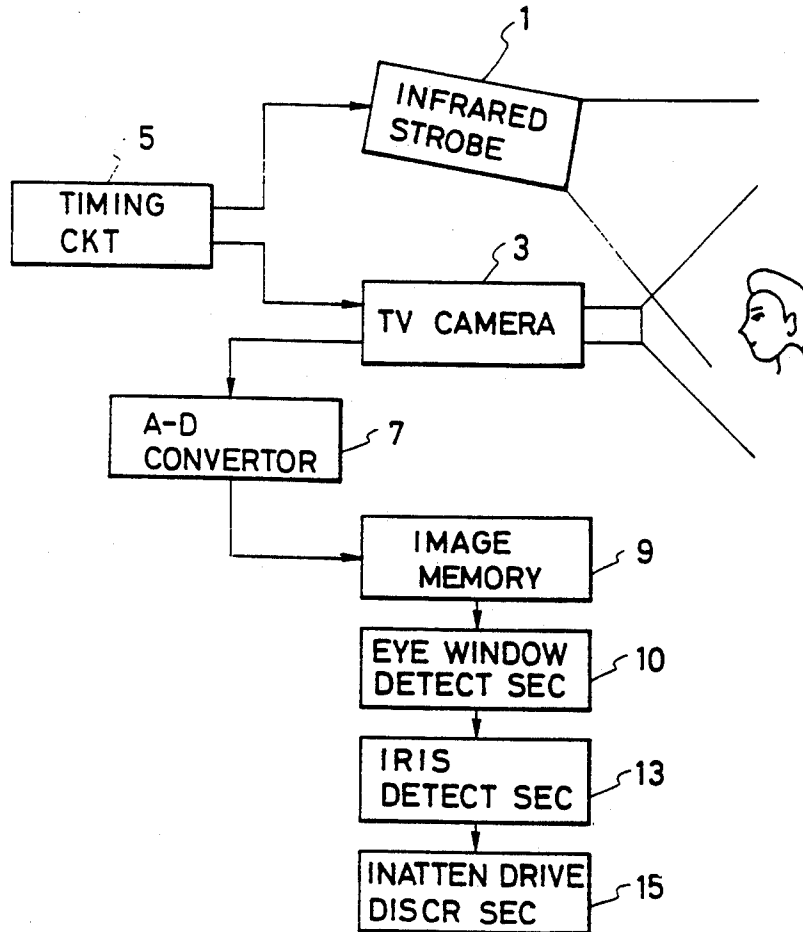


FIG. 1

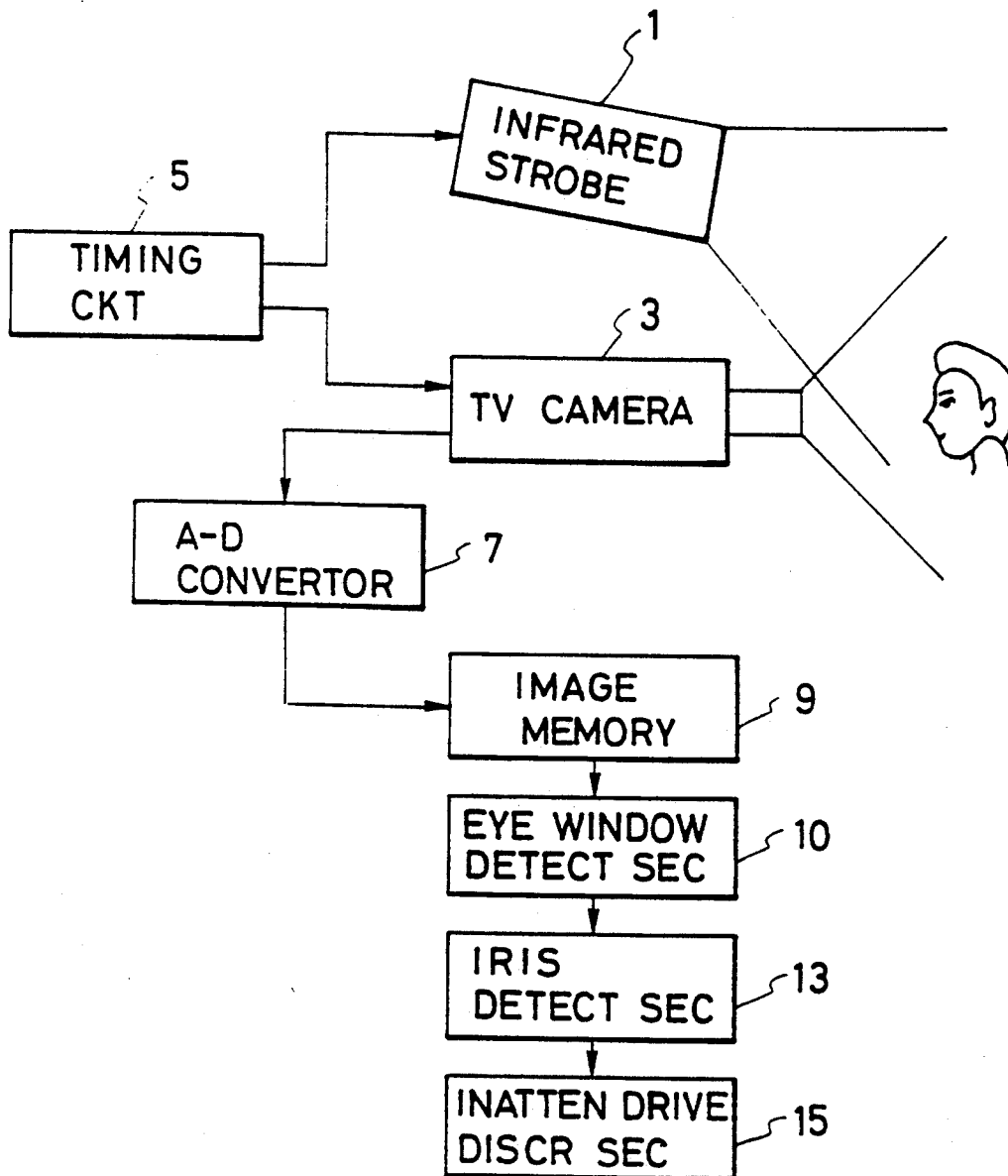


FIG. 2

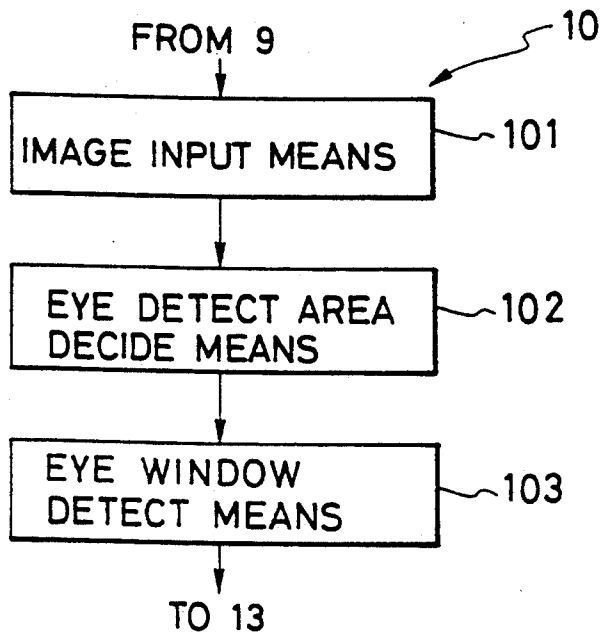


FIG. 2A

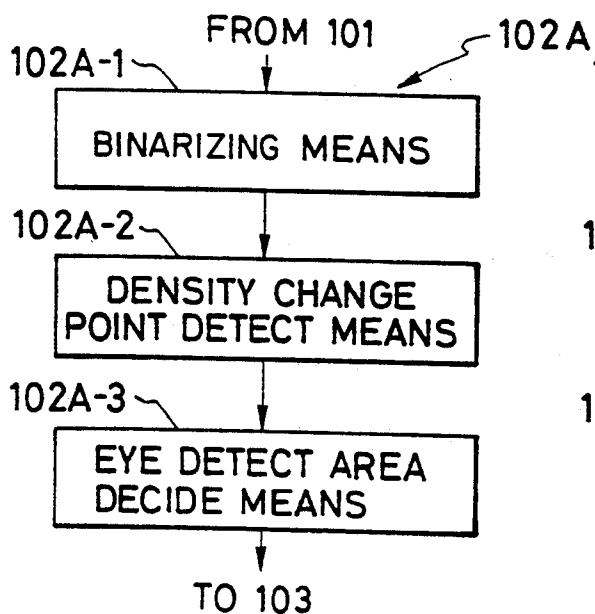


FIG. 2B

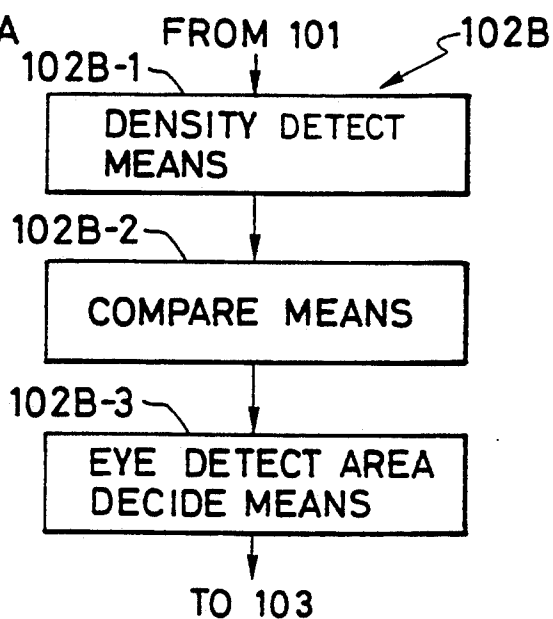


FIG. 3

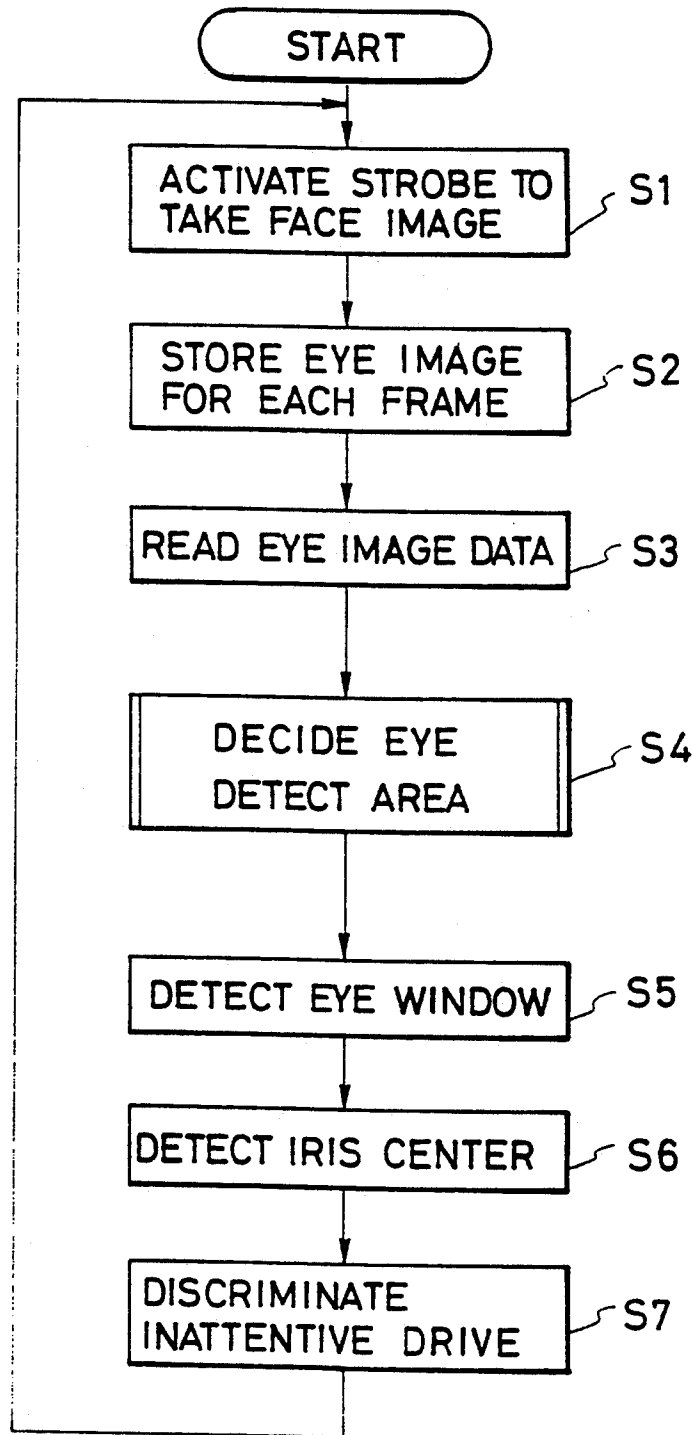


FIG. 3A

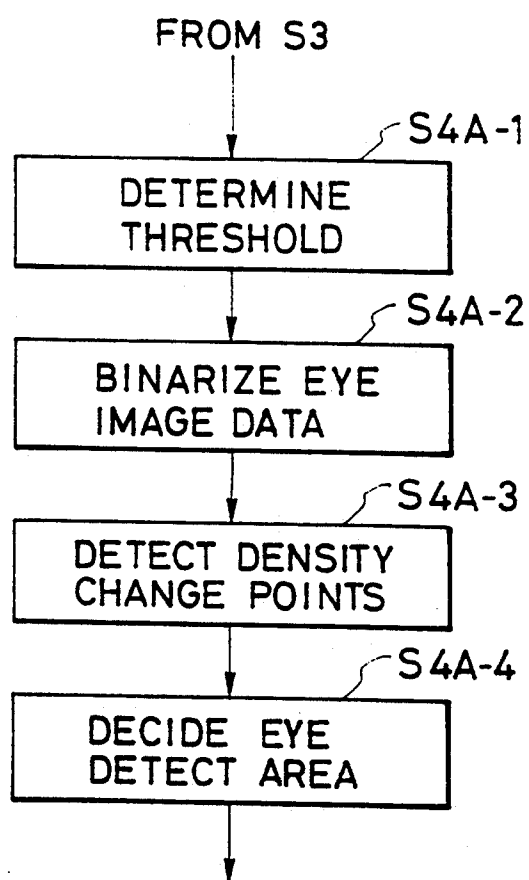
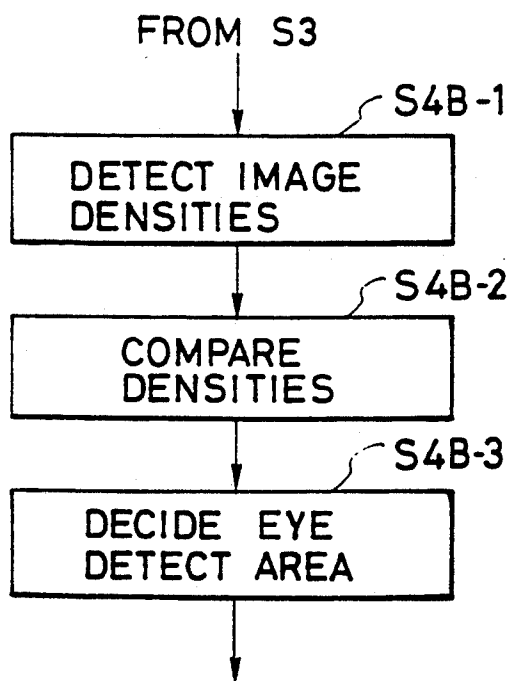


FIG. 3B



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