

EXHIBIT 1305

U.S. PATENT NO. 4,970,653, ISSUED TO KENUE ON NOV. 13, 1990

("KENUE")

TRW Automotive U.S. LLC: EXHIBIT 1305  
PETITION FOR *INTER PARTES* REVIEW  
OF U.S. PATENT NUMBER 8,599,001

- [54] VISION METHOD OF DETECTING LANE BOUNDARIES AND OBSTACLES
- [75] Inventor: Surender K. Kenue, Southfield, Mich.
- [73] Assignee: General Motors Corporation, Detroit, Mich.
- [21] Appl. No.: 334,033
- [22] Filed: Apr. 6, 1989
- [51] Int. Cl.<sup>5</sup> ..... G06F 15/50
- [52] U.S. Cl. .... 364/461; 364/424.02; 358/103
- [58] Field of Search ..... 364/424.02, 461, 424.02; 180/167, 168, 169; 318/587, 103
- [56] **References Cited**

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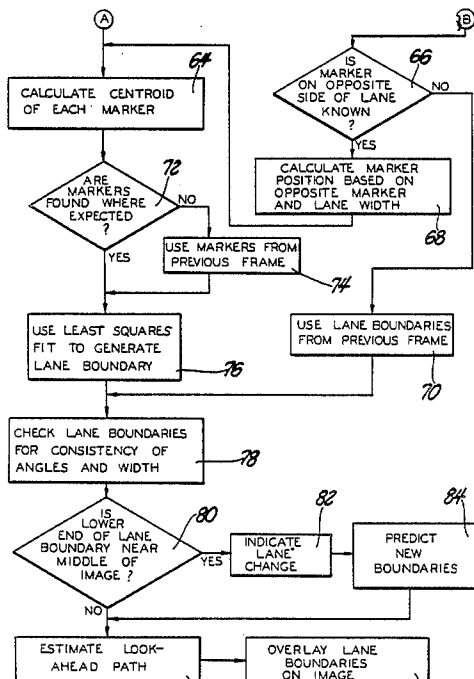
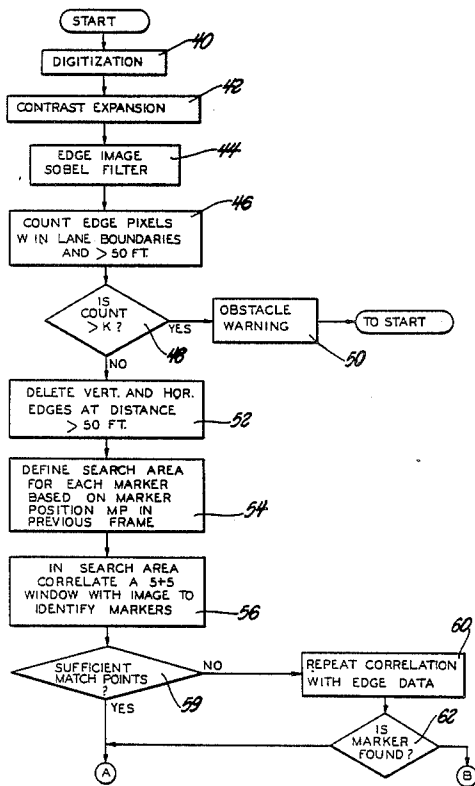
Dickmanns, E. D. and Zapp, A., "A Curvature-Based Scheme for Improving Road Vehicle Guidance by Computer Vision," Proc. SPIE on Mobile Robots, vol. 727, Oct. 1986, pp. 161-168.

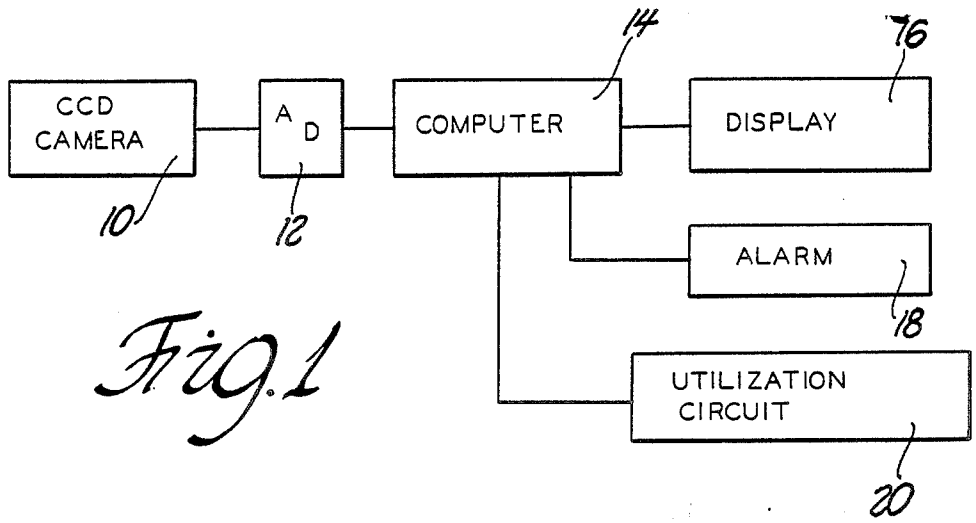
Primary Examiner—Gary Chin  
Attorney, Agent, or Firm—Howard N. Conkey

[57] ABSTRACT

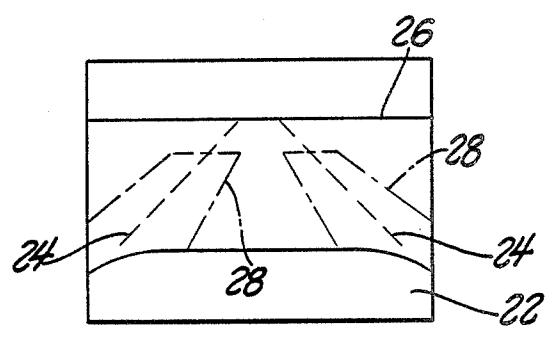
An image processing method operates on an image from a ccd camera viewing a roadway scene in front of a vehicle to detect lane markers and determine the relationship of the vehicle to the lane. Obstacles in the lane near the vehicle are detected and a warning is given to the driver. The method uses template matching techniques or a Hough algorithm to detect the lane markers or road edges.

10 Claims, 7 Drawing Sheets

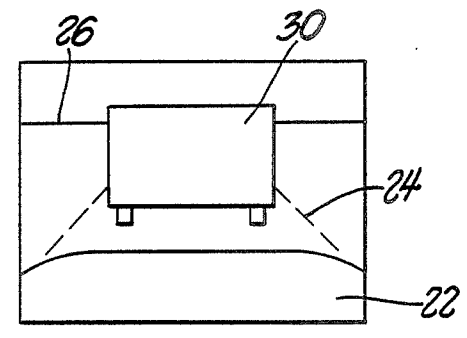




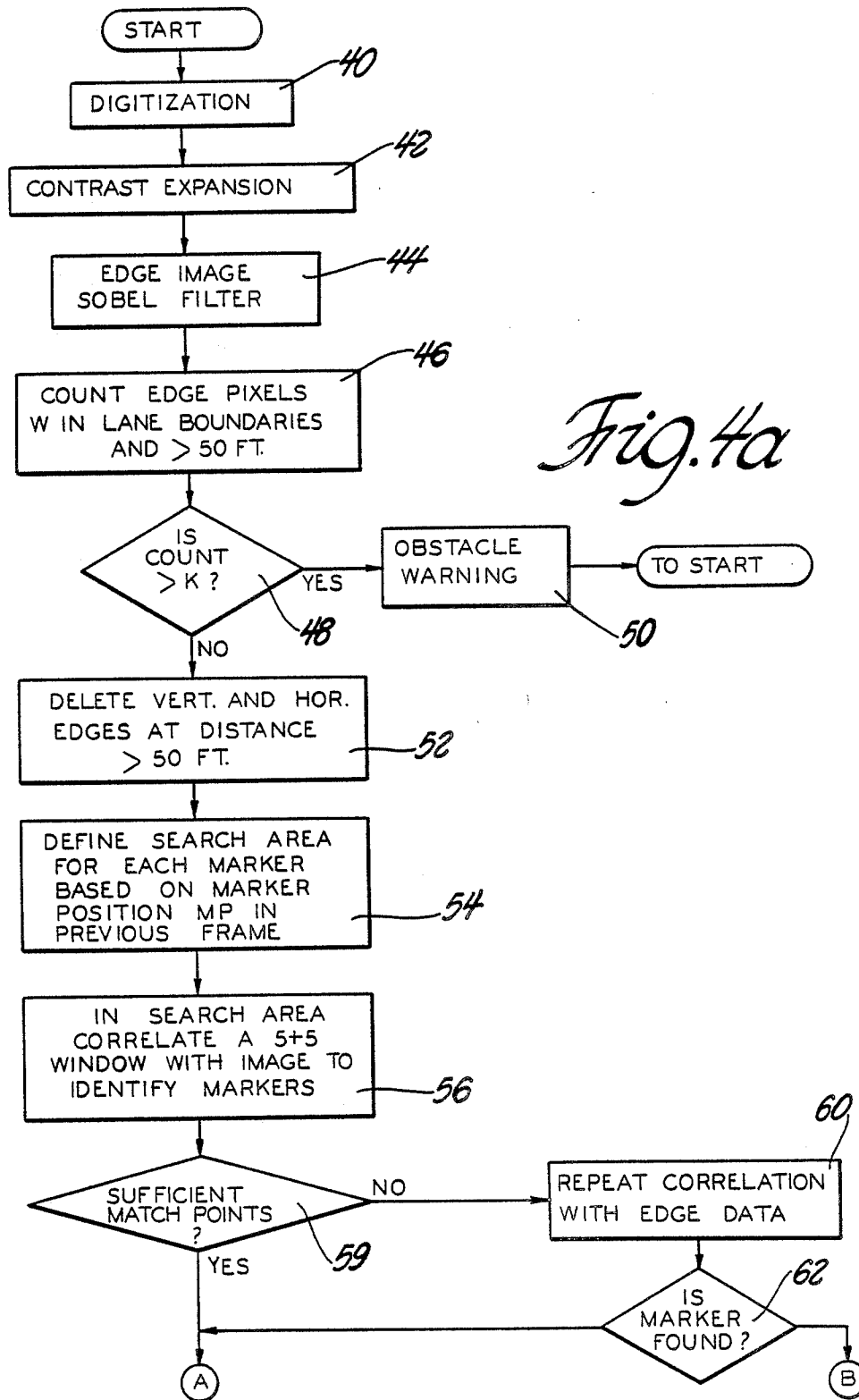
*Fig. 1*



*Fig. 2*



*Fig. 3*



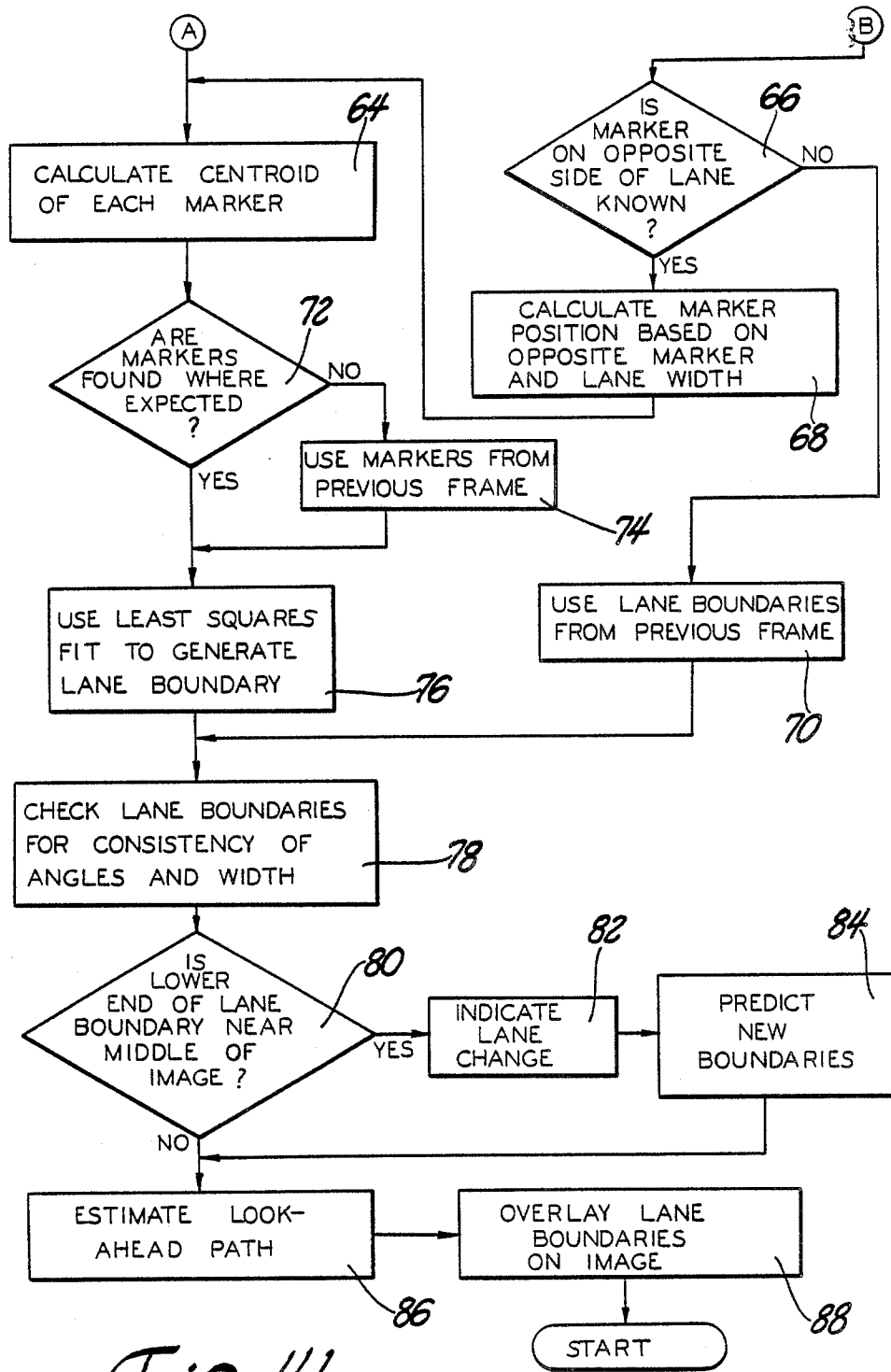


Fig. 4b

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