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Hillesund et al.

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(54) **CONTROL SYSTEM FOR POSITIONING OF MARINE SEISMIC STREAMERS**

4,890,568 A * 1/1990 Dolengowski 114/246

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FOREIGN PATENT DOCUMENTS

EP 613025 A1 * 8/1994 G01V/1/38

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* cited by examiner

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

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(57) **ABSTRACT**

(21) Appl. No.: **09/787,723**

A method of controlling a streamer positioning device (18) configured to be attached to a marine seismic streamer (12) and towed by seismic survey vessel (10) and having a wing and a wing motor for changing the orientation of the wing. The method includes the steps of: obtaining an estimated velocity of the streamer positioning device, calculating a desired change in the orientation of the wing using the estimated velocity of the streamer positioning device, and actuating the wing motor to produce the desired change in the orientation of the wing. The invention also involves an apparatus for controlling a streamer positioning device including means for obtaining an estimated velocity of the streamer positioning device, means for calculating a desired change in the orientation of the wing using the estimated velocity of the streamer positioning device, and means for actuating the wing motor to produce the desired change in the orientation of the wing.

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§ 371 (c)(1),
(2), (4) Date: **Jul. 2, 2001**

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PCT Pub. Date: **Apr. 13, 2000**

(30) **Foreign Application Priority Data**

Oct. 1, 1998 (GB) 9821277

(51) **Int. Cl.**⁷ **B63B 21/66**

(52) **U.S. Cl.** **114/244; 114/253**

(58) **Field of Search** 114/242, 244–246,
114/253, 162, 163

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,676,183 A * 6/1987 Conboy 114/245

26 Claims, 3 Drawing Sheets

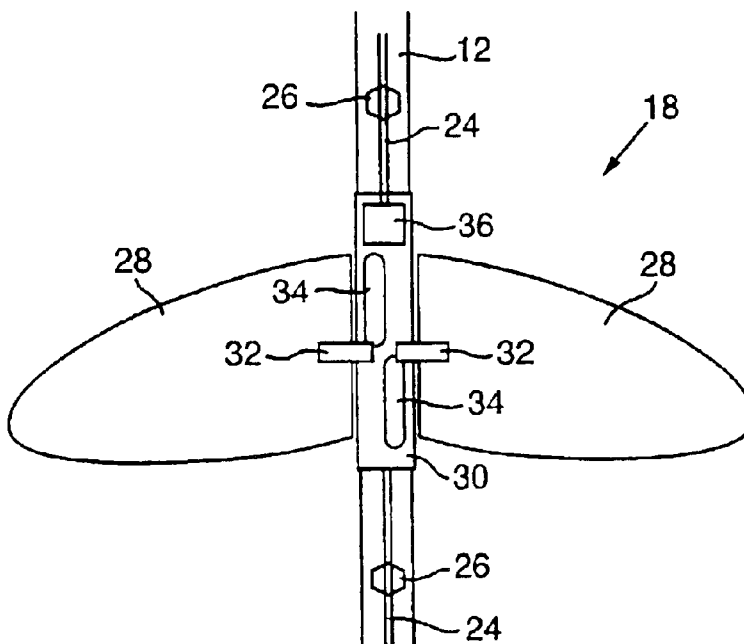


Fig. 1.

Prior Art

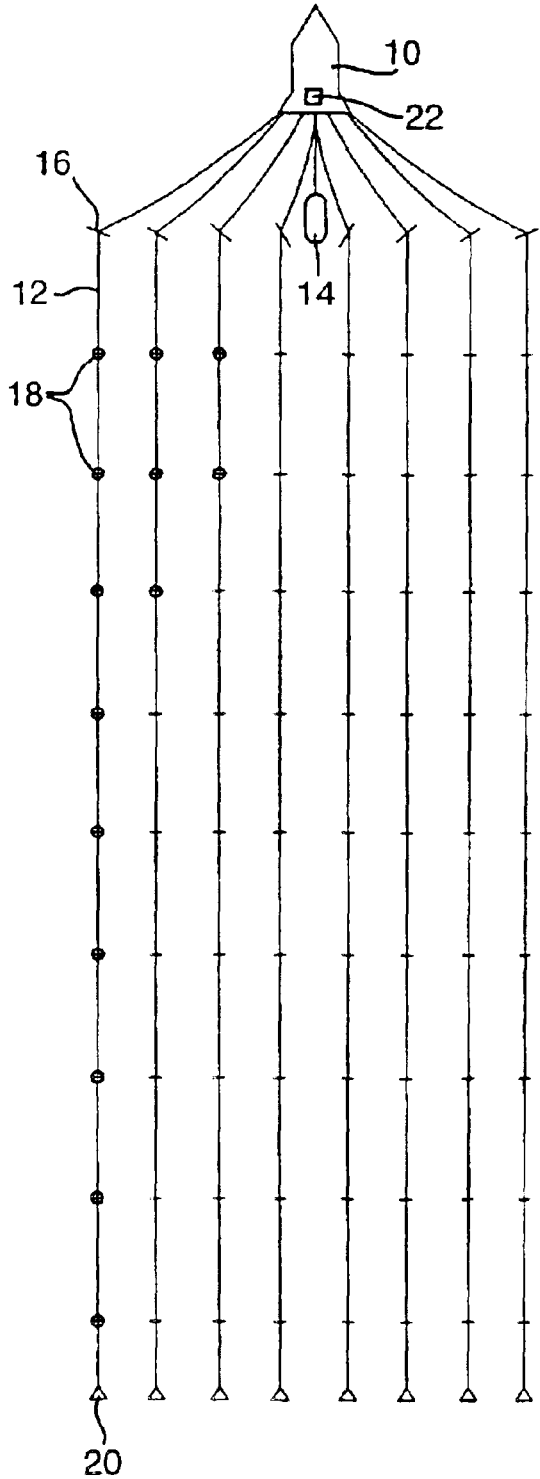


Fig.2.

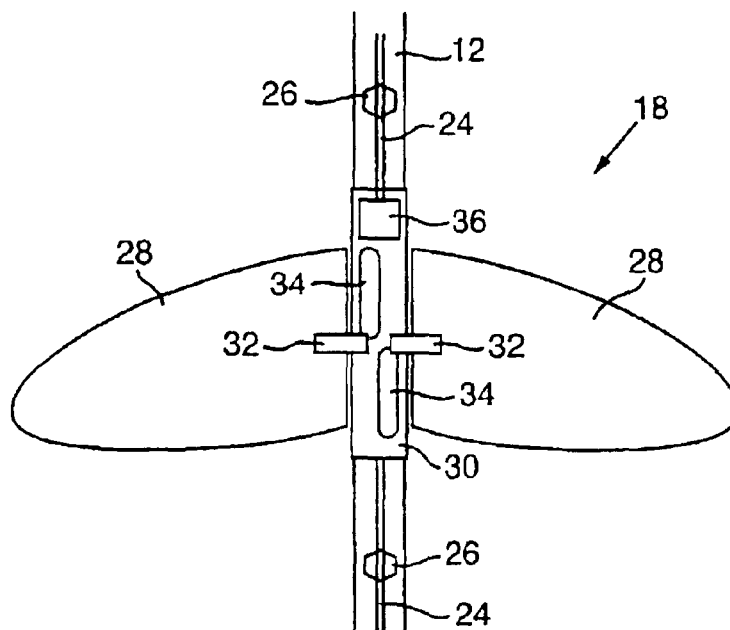


Fig.3.

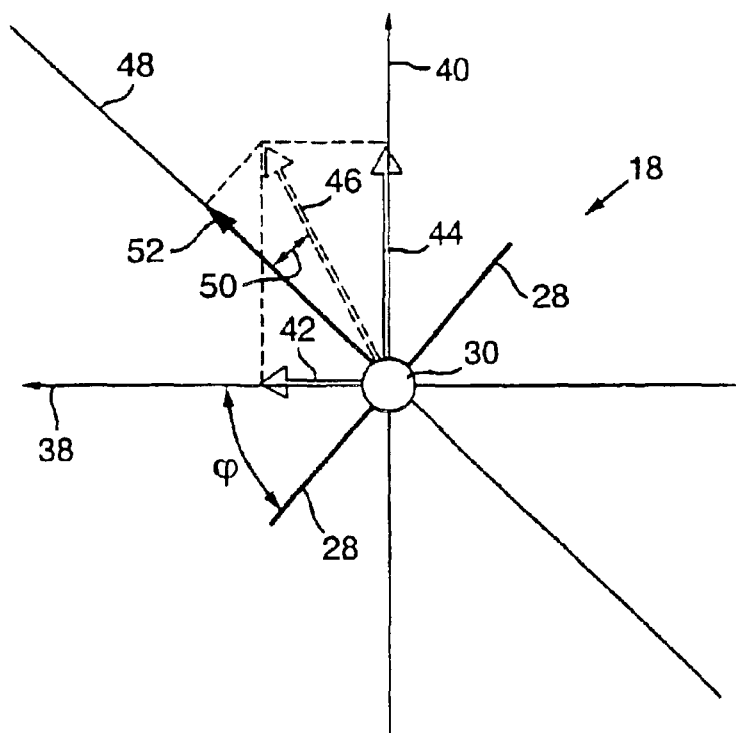
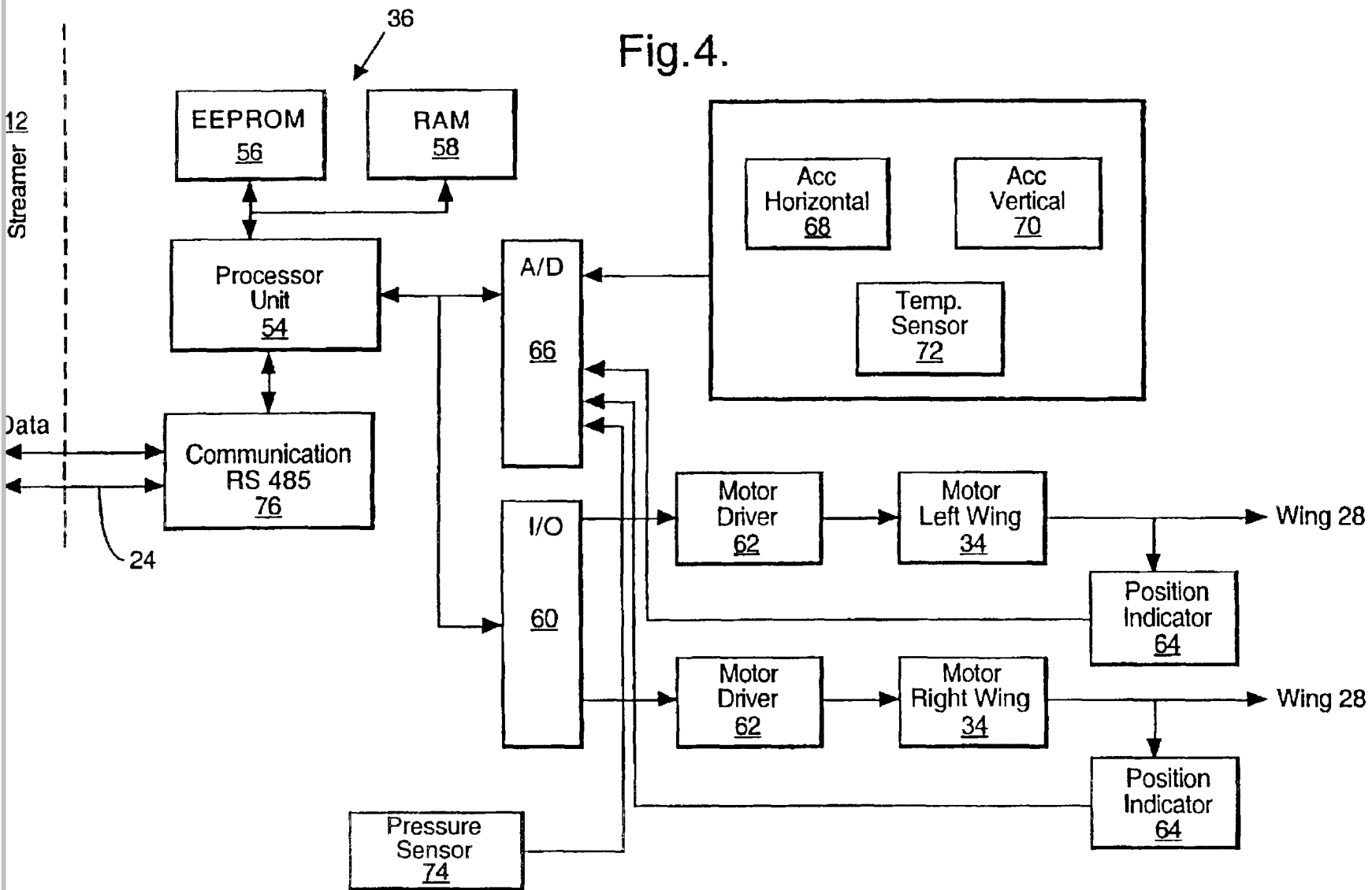


Fig. 4.



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