

- [54] CORIOLIS-TYPE MASS FLOWMETER CIRCUITRY
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- [73] Assignee: The Foxboro Company, Foxboro, Mass.
- [21] Appl. No.: 420,569
- [22] Filed: Oct. 12, 1989

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Primary Examiner—Herbert Goldstein
Attorney, Agent, or Firm—Fish & Richardson

Related U.S. Application Data

- [60] Division of Ser. No. 116,257, Oct. 29, 1987, Pat. No. 4,911,020, which is a continuation-in-part of Ser. No. 923,847, Oct. 28, 1986, Pat. No. 4,891,991.
- [51] Int. Cl.⁵ G01F 1/84
- [52] U.S. Cl. 73/861.38
- [58] Field of Search 73/861.38, 861.37

[57] ABSTRACT

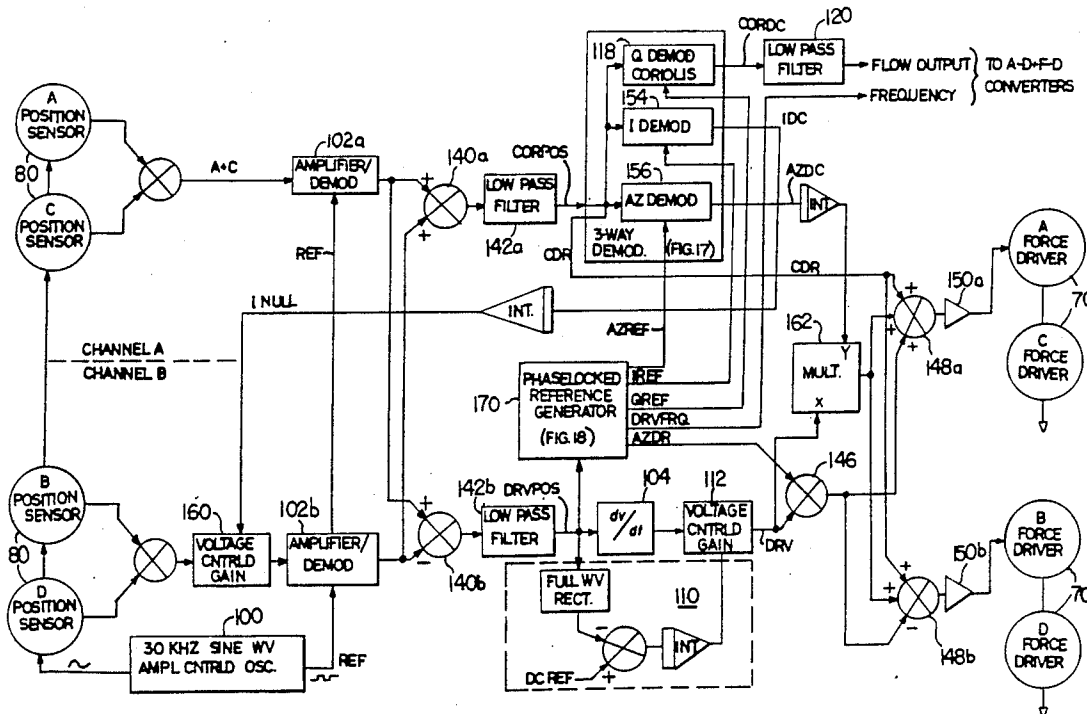
Displacement sensors at opposite ends of at least one oscillating conduit produce output signals from which the drive component or the Coriolis component, or preferably both, are recovered. An oscillatory drive signal is derived from the drive component, and a mass flow signal is derived from the Coriolis component. The remaining drive component in a combination of the two sensor outputs is nulled by amplitude control of one sensor output. Two force drivers at opposite ends of the conduit are driven by complementary drive signals to which a perturbation signal is added. The remaining perturbation signal in a combination of the two sensor outputs is nulled by adding compensation to both drive signals to eliminate drive force imbalance. Synchronous demodulation is used in the preferred embodiment to detect several parameters in a combination of the sensor outputs. In a dual loop configuration, pairs of sensors and/or force drivers are located at opposite ends of each conduit section.

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21 Claims, 12 Drawing Sheets



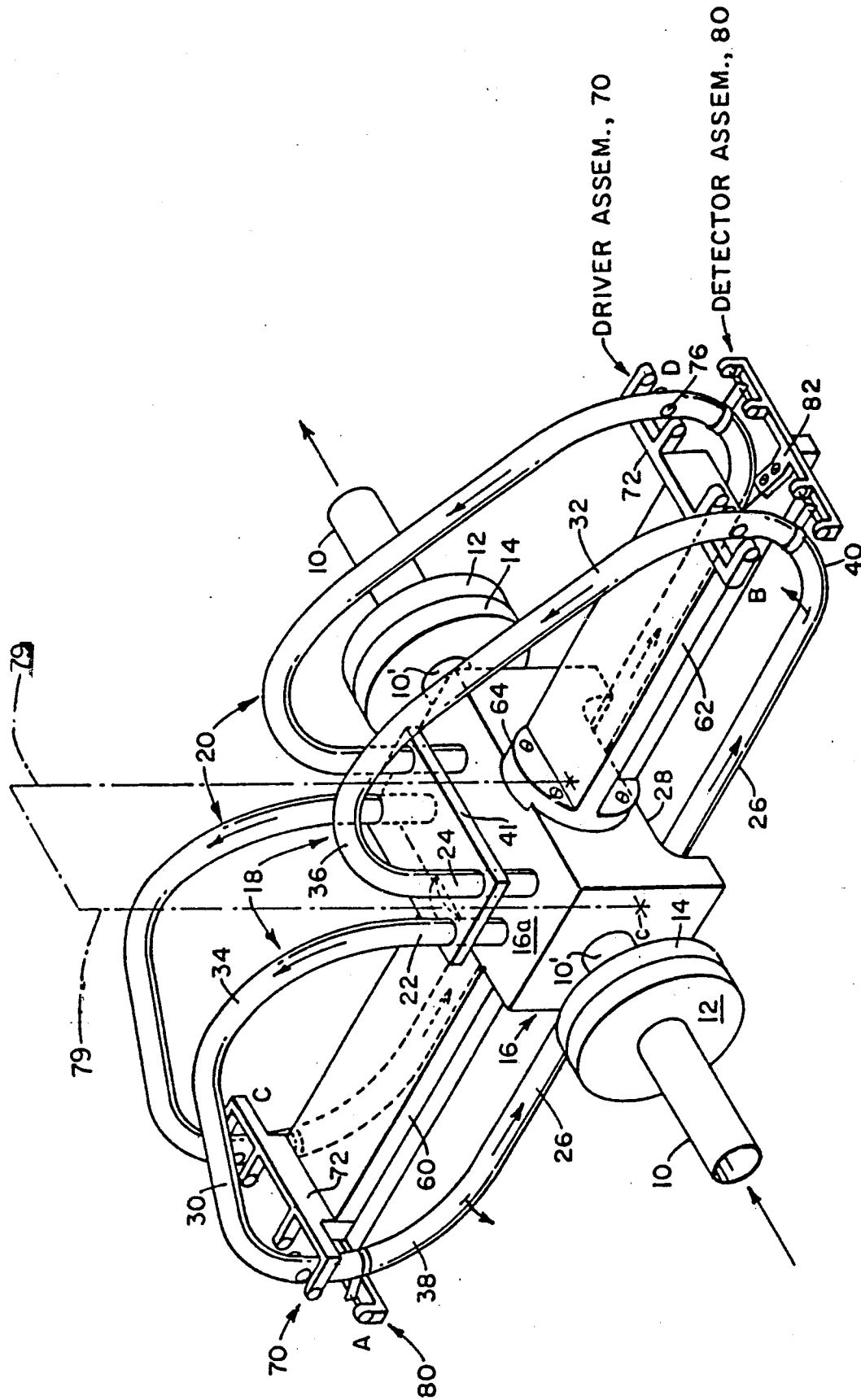


FIG. 1

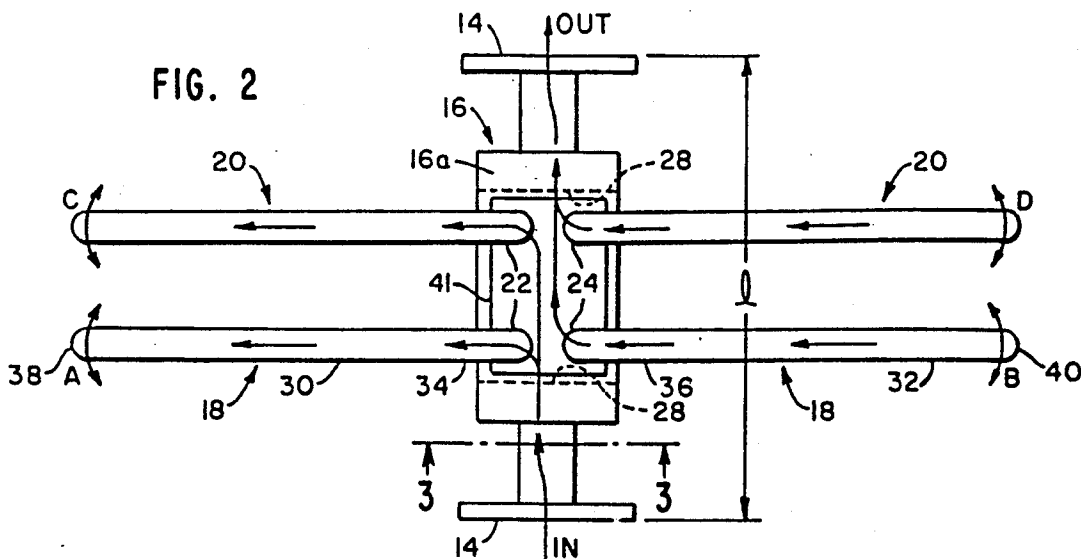


FIG. 2A
(SERIES FLOW)

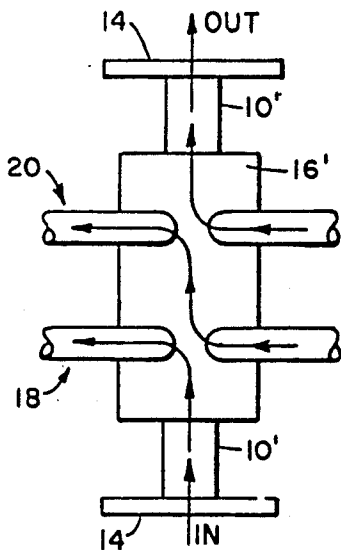
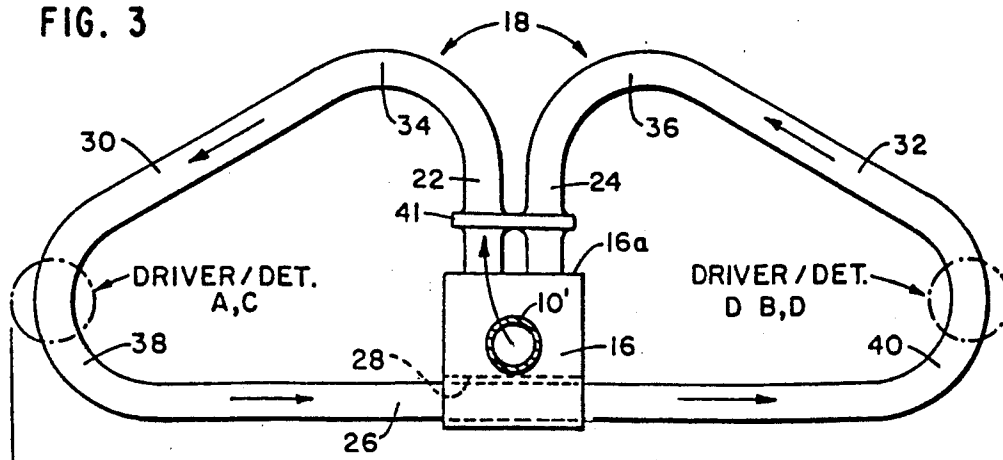


FIG. 3



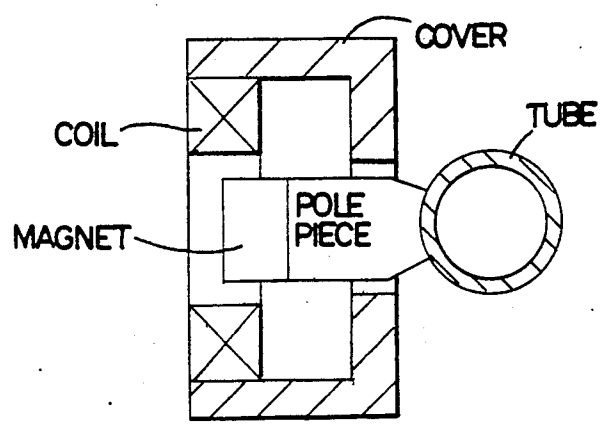
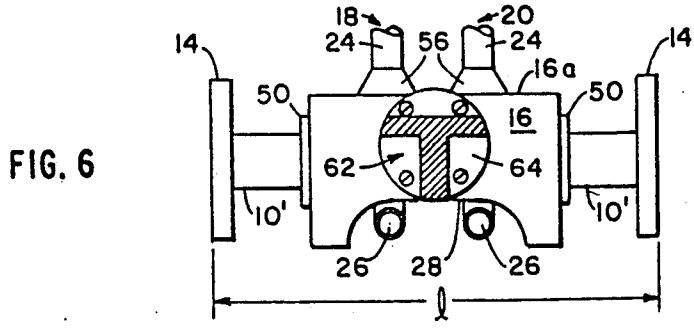
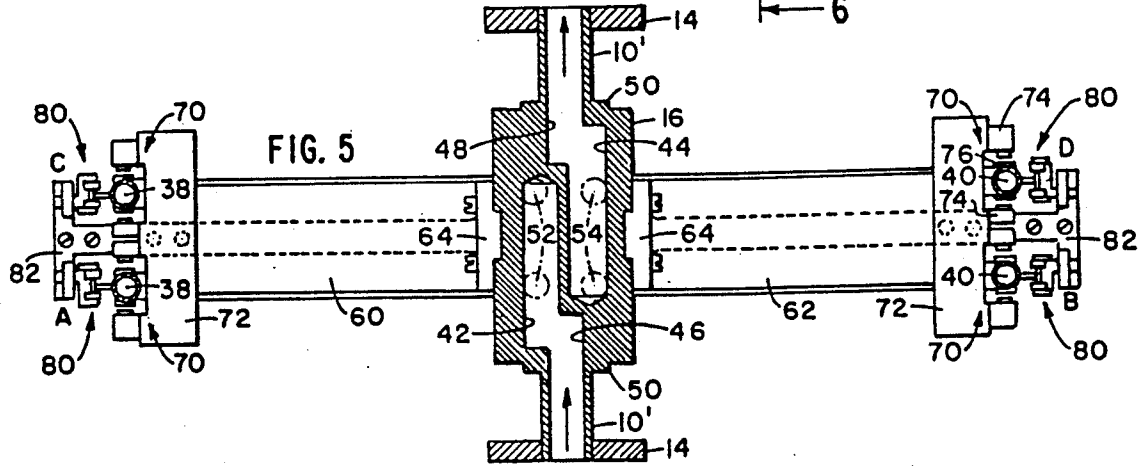
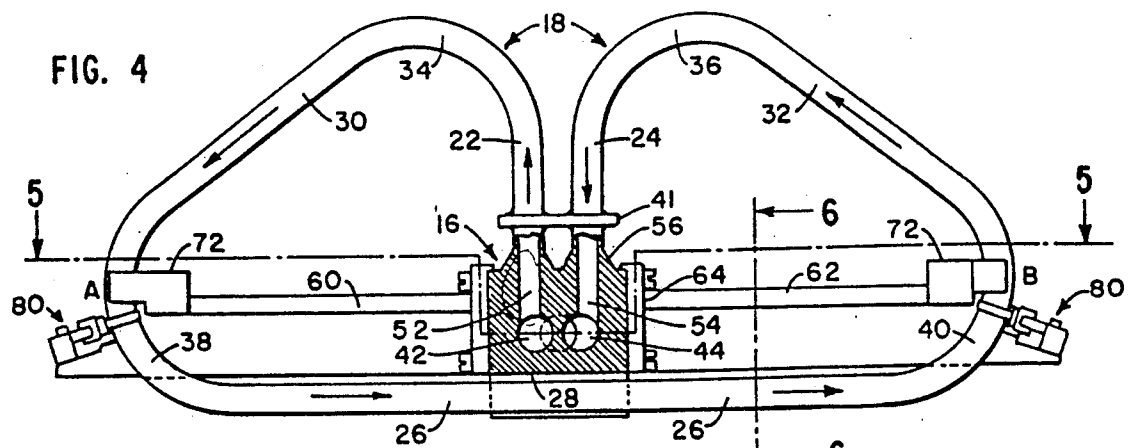


FIG. 6A

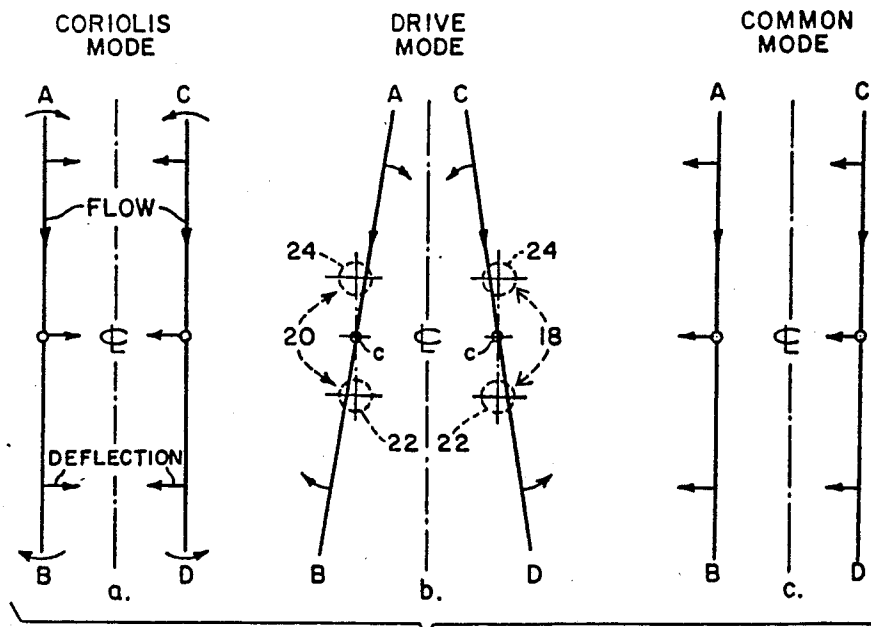
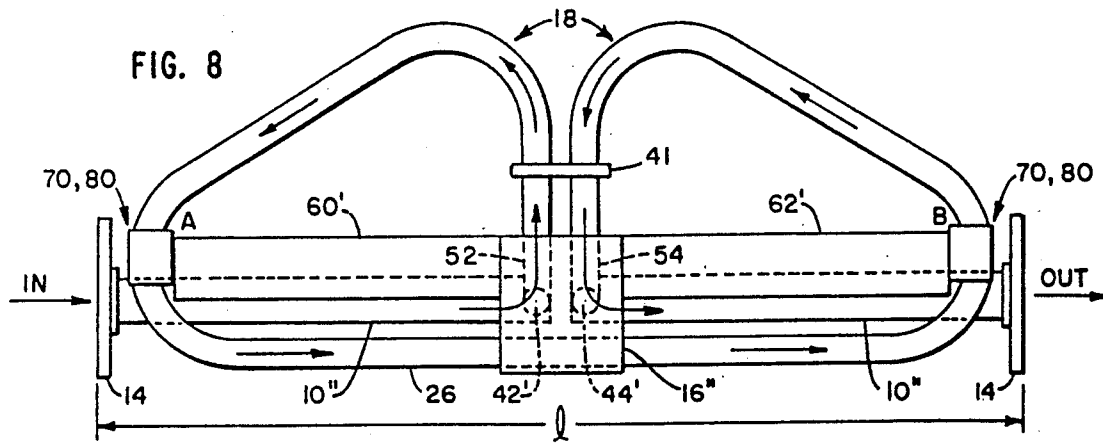
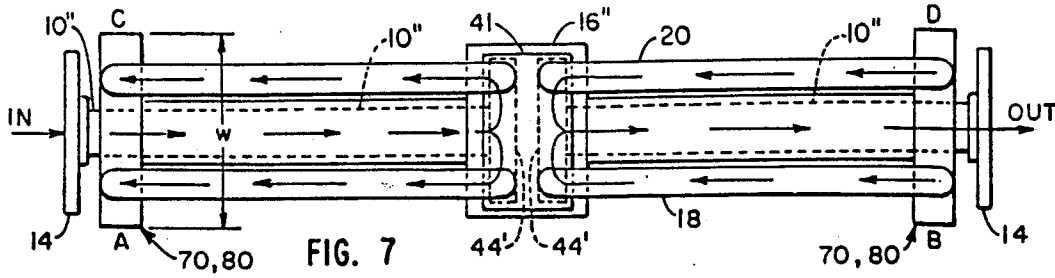


FIG. 9

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