

- [54] **METHOD AND STRUCTURE FOR FLOW MEASUREMENT**
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- [73] Assignee: **Micro Motion, Inc., Boulder, Colo.**
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- [22] Filed: **Feb. 11, 1982**

**Related U.S. Patent Documents**

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- [63] Continuation-in-part of Ser. No. 818,475, Jul. 25, 1977, abandoned.
- [51] Int. Cl.<sup>3</sup> ..... **G01F 1/86**
- [52] U.S. Cl. .... **73/861.38; 73/434**
- [58] Field of Search ..... **73/32 A, 434, 505, 861.18, 73/861.35, 861.37, 861.38**

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[57]

## ABSTRACT

Apparatus and method for mass flow measurement utilizing a substantially "U" shaped conduit mounted in a cantilever manner at the legs thereof, [means for oscillating the conduit, and means for measuring] so that, when the conduit is oscillated, sensors mounted on the conduit can measure the Coriolis force by measurement of the force moment or the angular motion of the conduit around an axis substantially symmetrical to the legs of the conduit. The force moment is measured by sensing incipient movement around the axis, and generating and measuring a nulling force. In preferred embodiments, the oscillating means are mounted on a spring arm having a natural frequency substantially equal to that of the "U" shaped conduit, and in a particularly preferred [displacement] embodiment the measuring [means are sensors] sensors are mounted on the "U" shaped conduit and adapted to measure, with proper direction sense, the time differential between the leading and trailing portions of the "U" shaped conduit passing through the plane of the "U" shaped conduit at substantially midpoint of the oscillation thereof.

55 Claims, 14 Drawing Figures

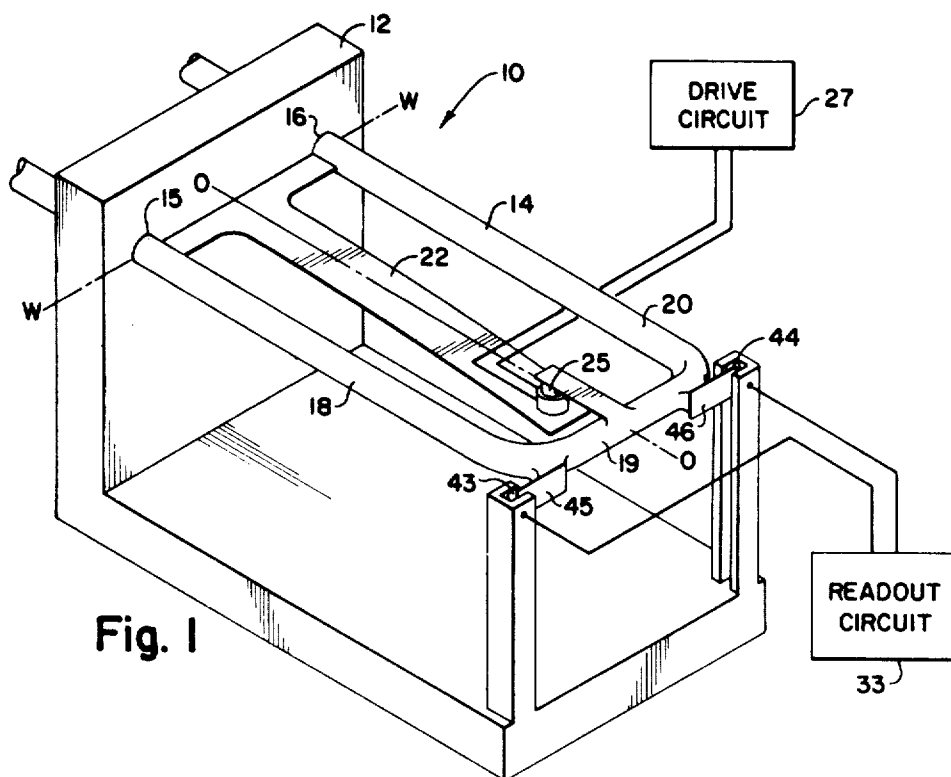


Fig. 1

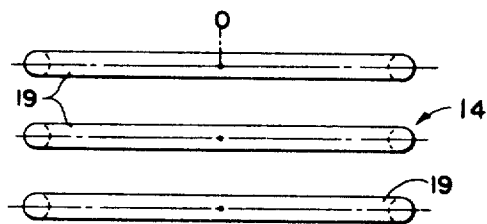


Fig. 2

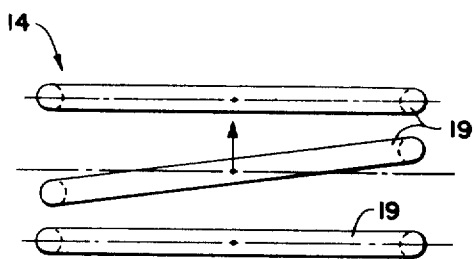


Fig. 3

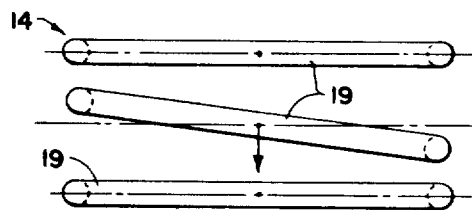
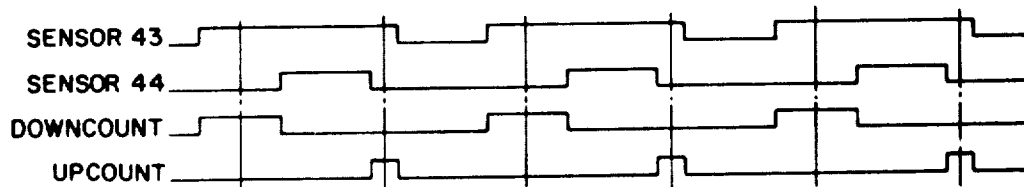
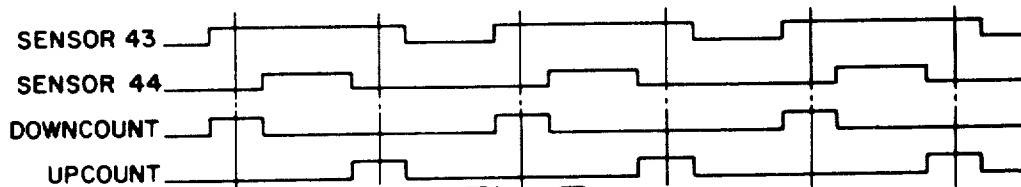
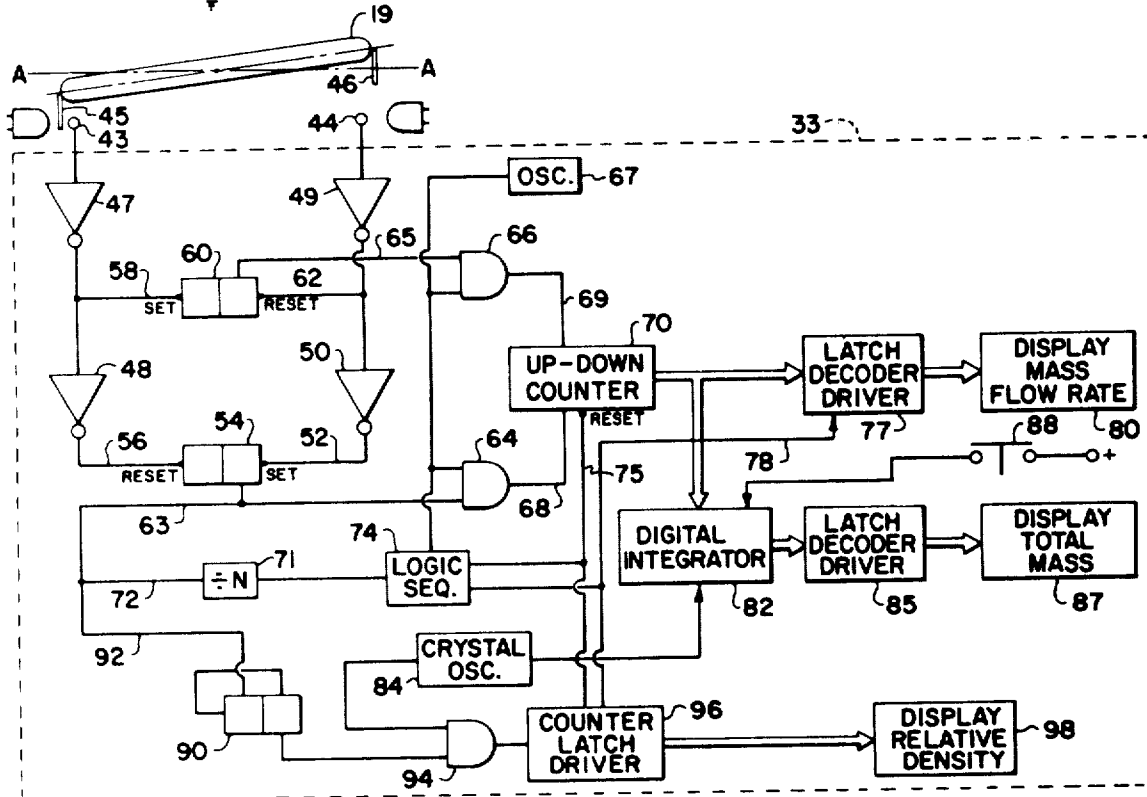
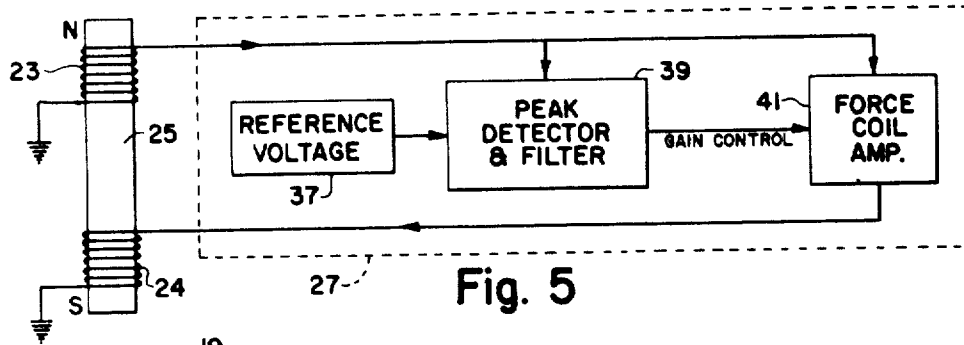


Fig. 4



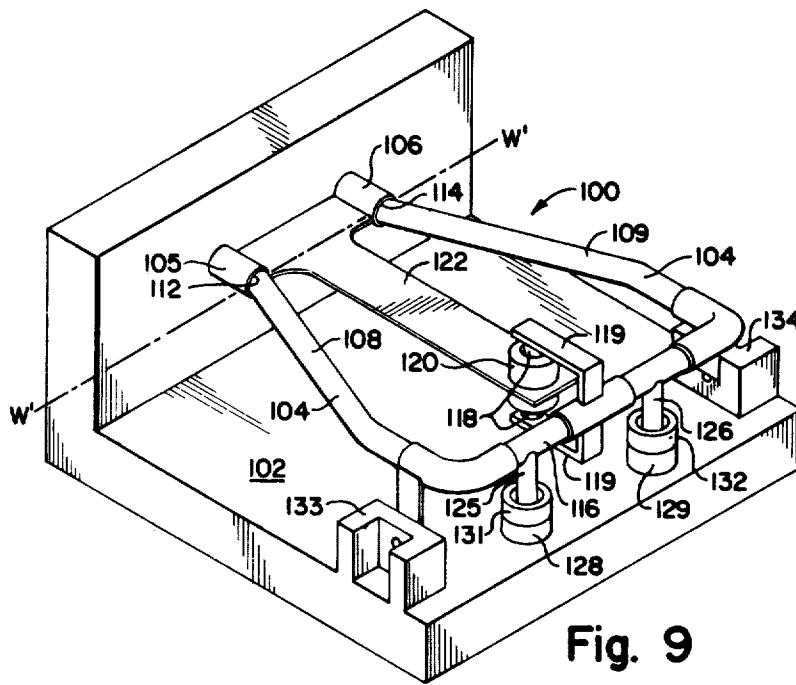


Fig. 9

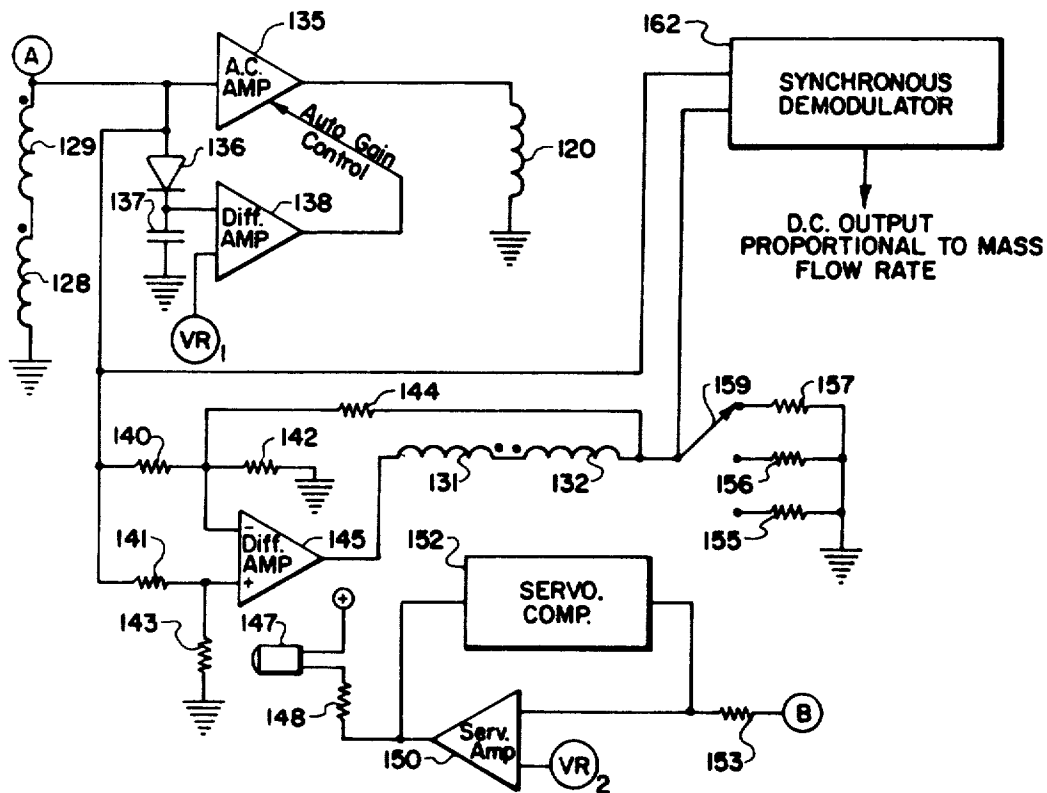


Fig. 10

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