

- [54] IN-LINE VIBRATORY
 VISCOMETER-DENSITOMETER
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 Company, Ltd., Edison, N.J.
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- [52] U.S. Cl. 73/54; 73/32 A;
 73/59
- [58] Field of Search 73/59, 54, 32 A, 179,
 73/60, 702

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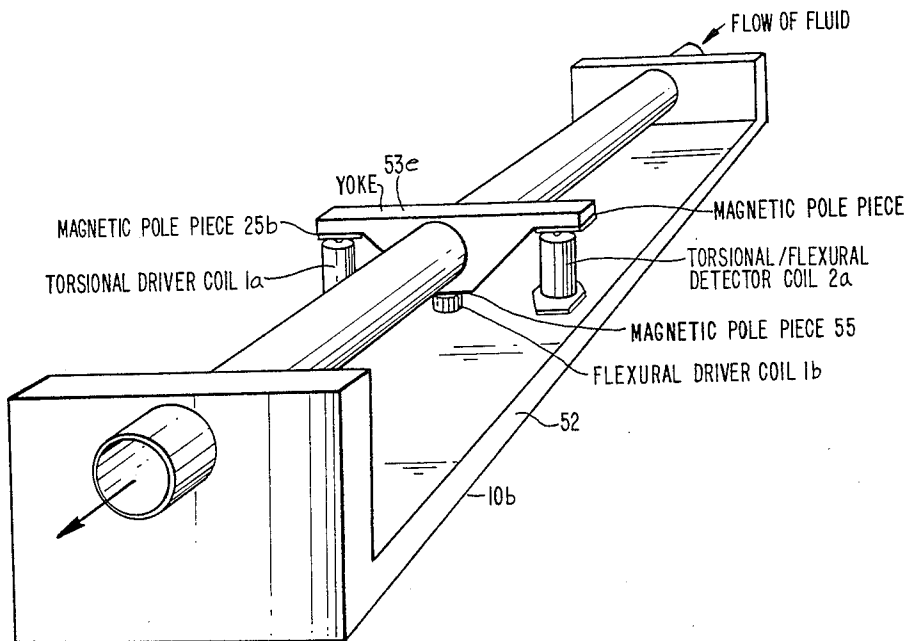
401908 2/1984 U.S.S.R. 73/32 A

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 Assistant Examiner—Hezron E. Williams
 Attorney, Agent, or Firm—Arthur L. Lessler

[57] ABSTRACT

A rotational vibratory viscometer-densitometer for in-line process control and similar applications, having an elastic hollow metal tube extending between two clamps, and a relatively rigid transverse yoke secured to the tube at a point midway between the clamps. The yoke has magnetically permeable ends and a magnetically permeable center portion. Electromagnets adjacent one end of the yoke and the center portion thereof interact with the yoke to cause the tube to oscillate simultaneously in torsion and in flexure at the natural frequency of the tube in combination with the fluid within it. The amplitude of torsional oscillation is maintained constant by a torsional detector and control circuit, and the power required to maintain said amplitude is determined, said power being a measure of the viscosity of the fluid flowing through the tube. The frequency of flexural oscillation of the tube is determined by a flexural detector and associated circuit, said frequency being a measure of the density of the fluid flowing through the tube.

24 Claims, 11 Drawing Figures



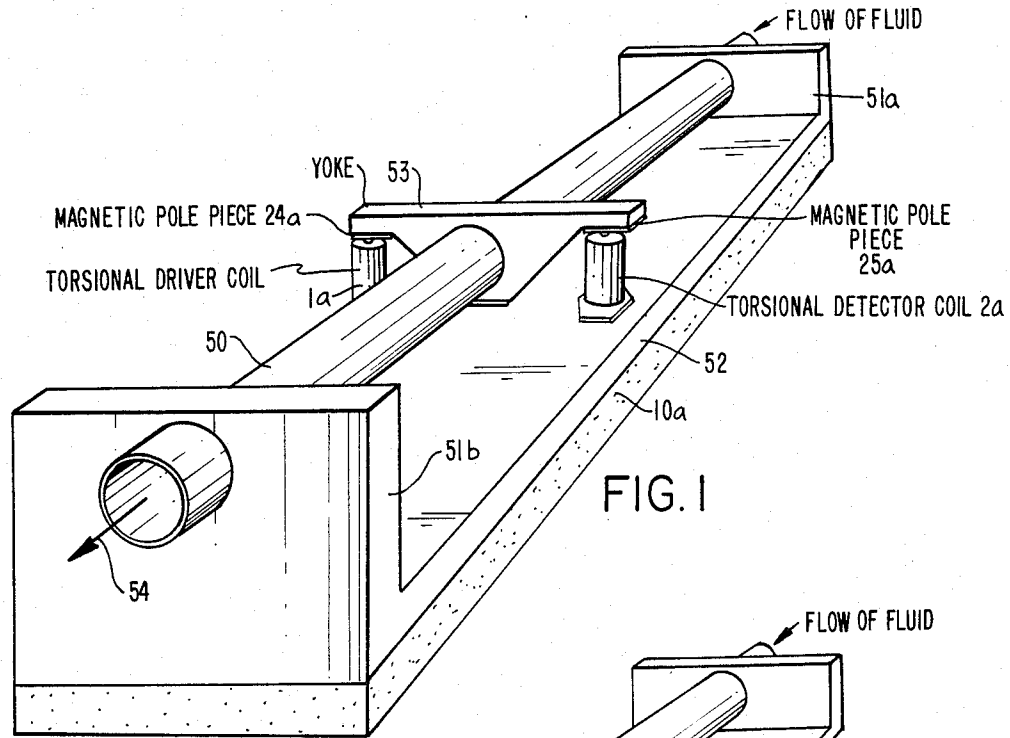


FIG. 1

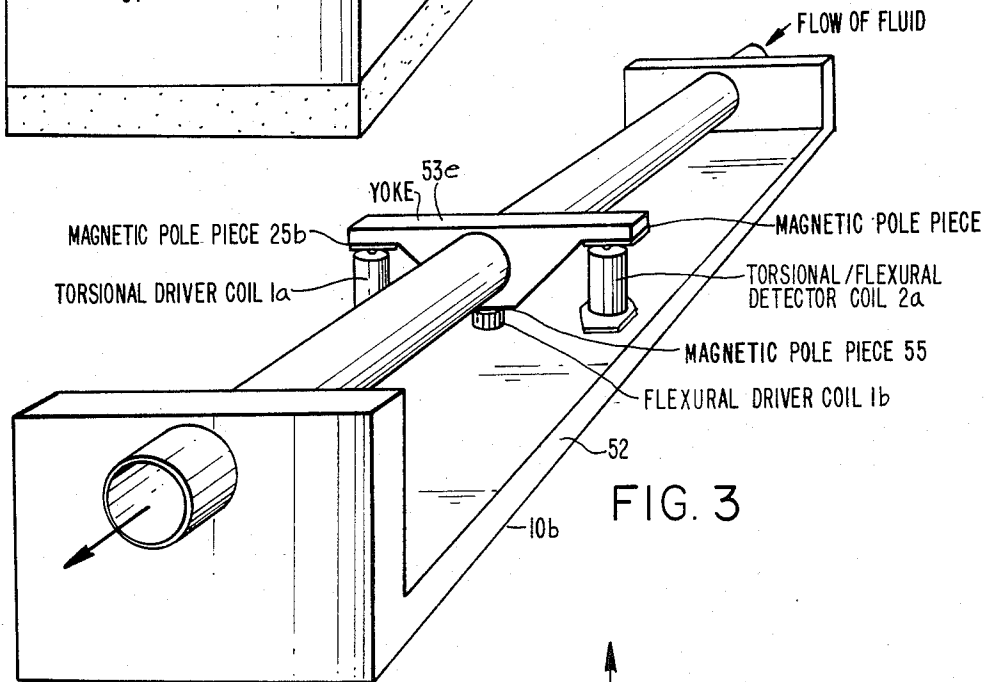


FIG. 3

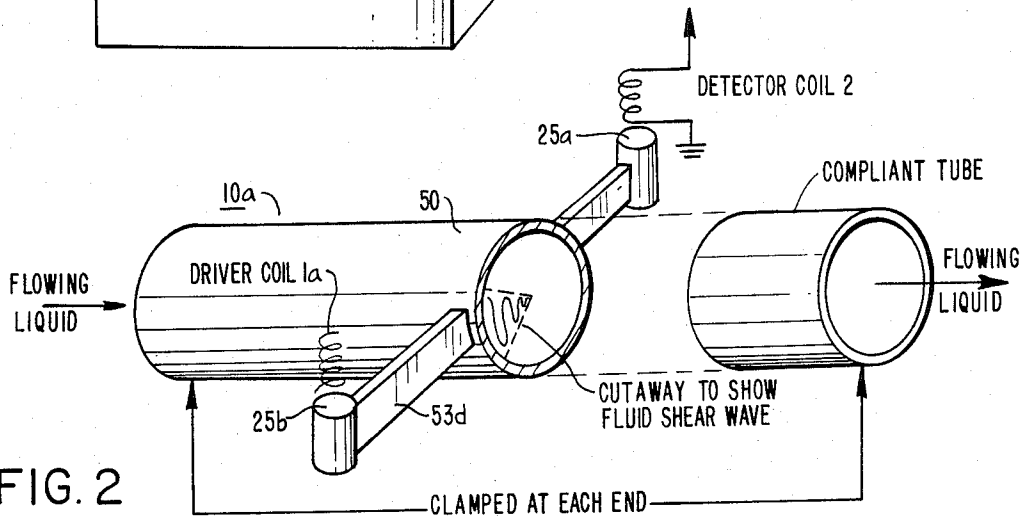


FIG. 2

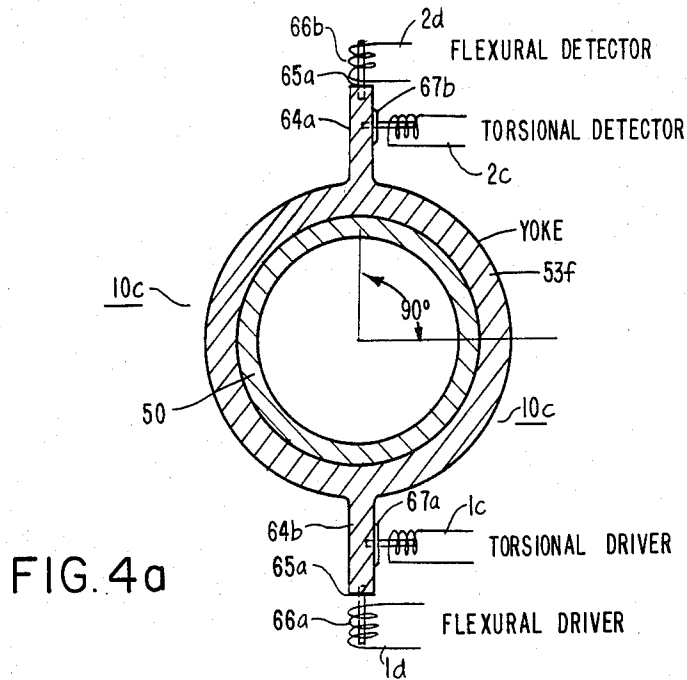


FIG. 4a

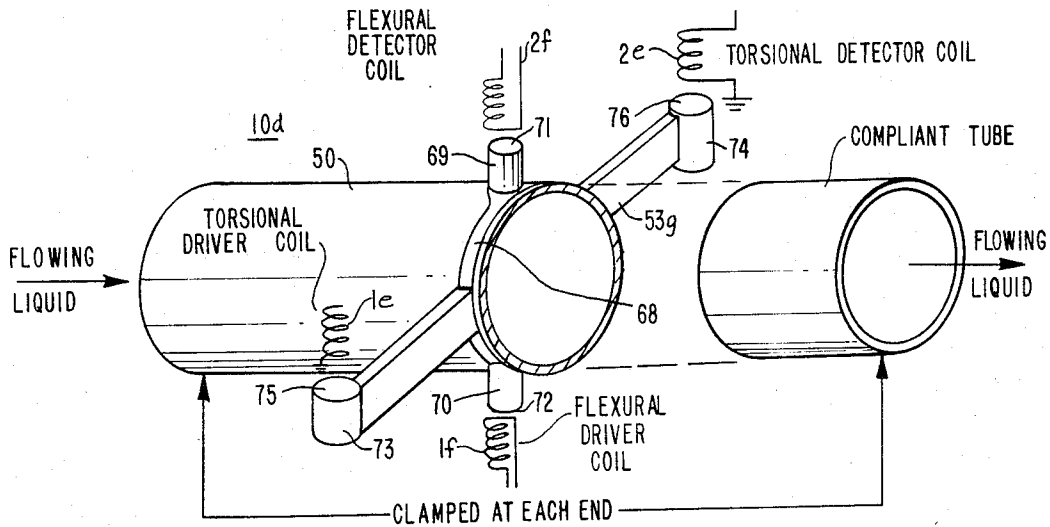


FIG. 4b

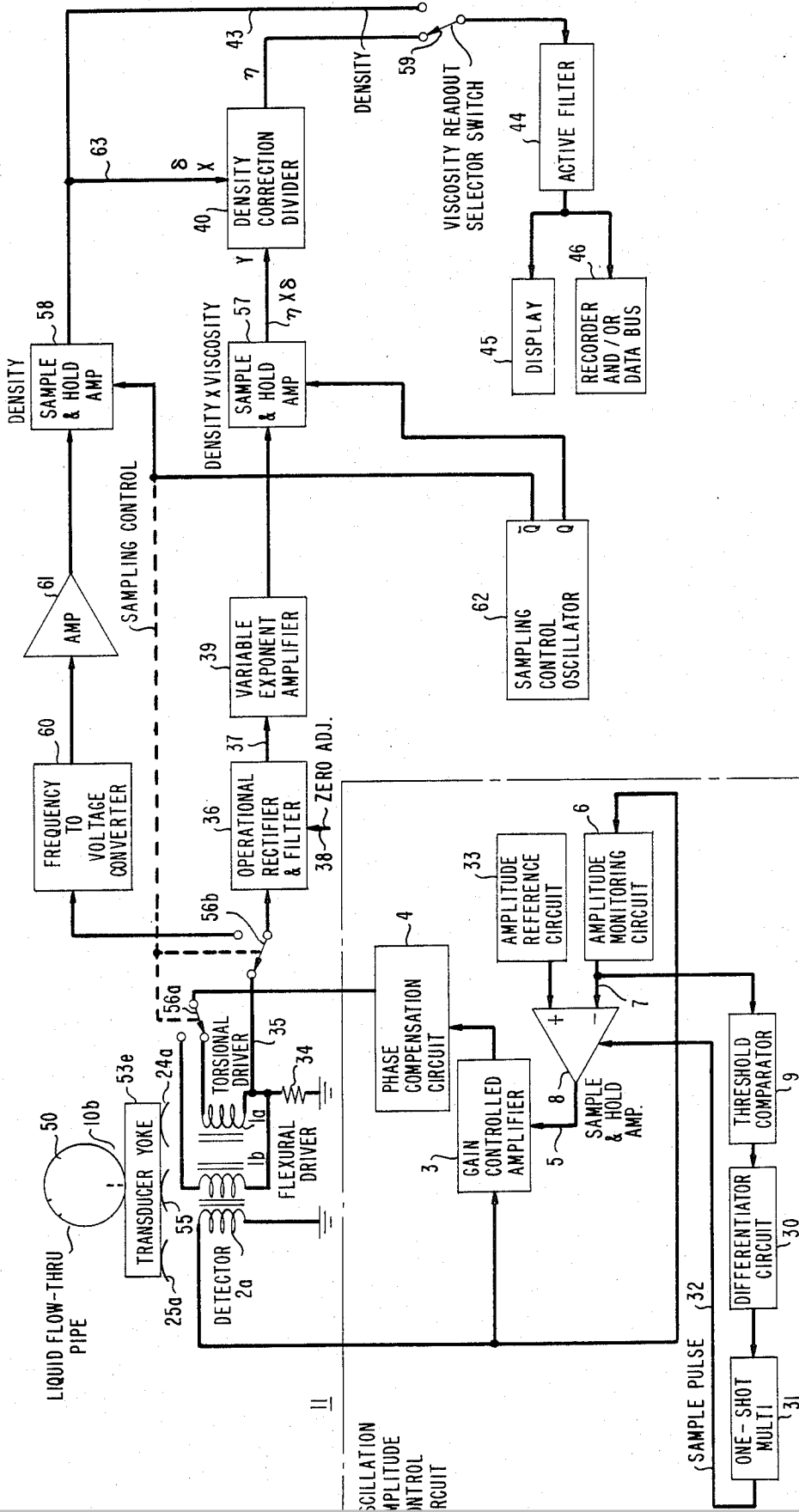
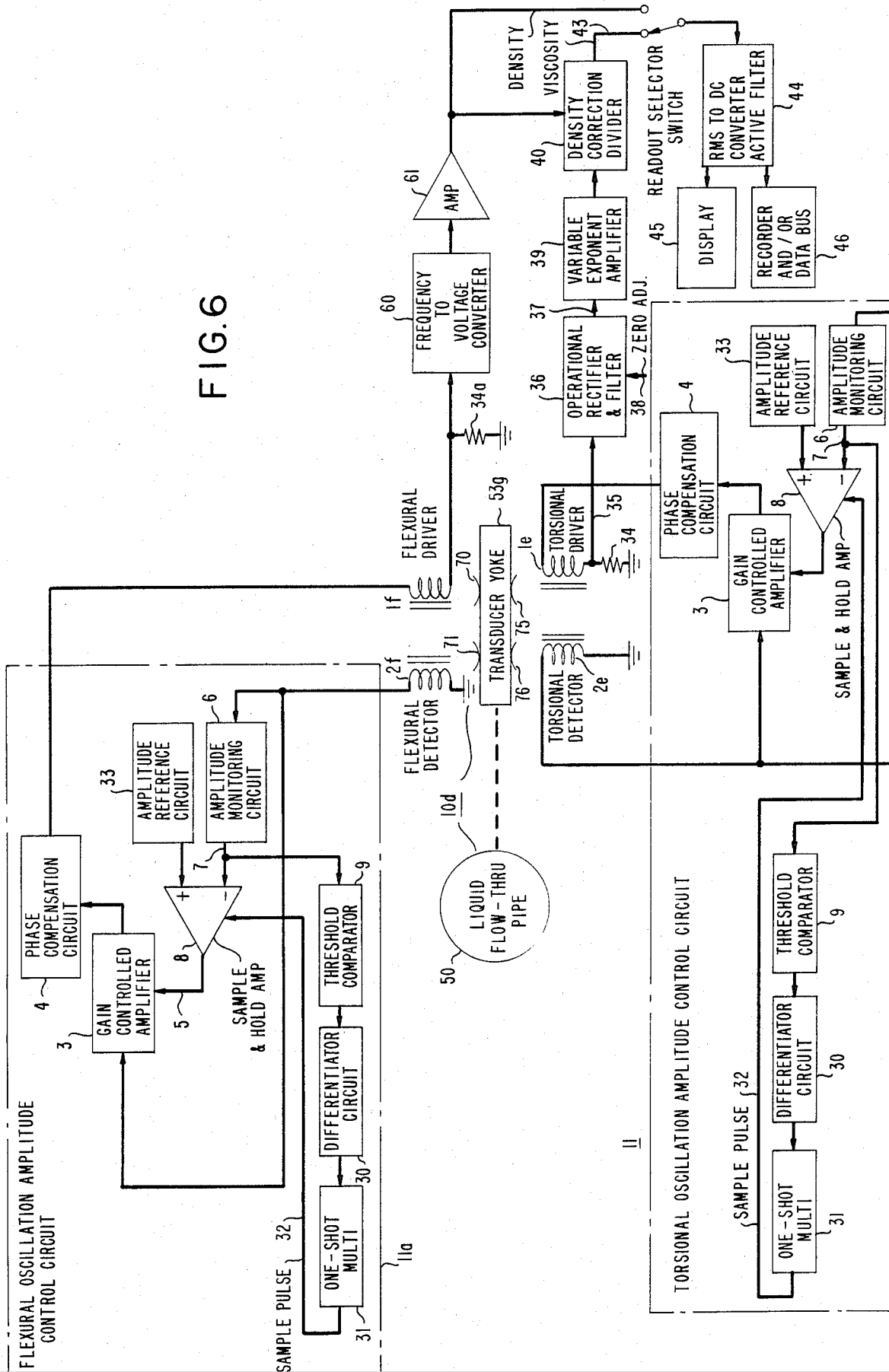


FIG. 5

FIG. 6



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