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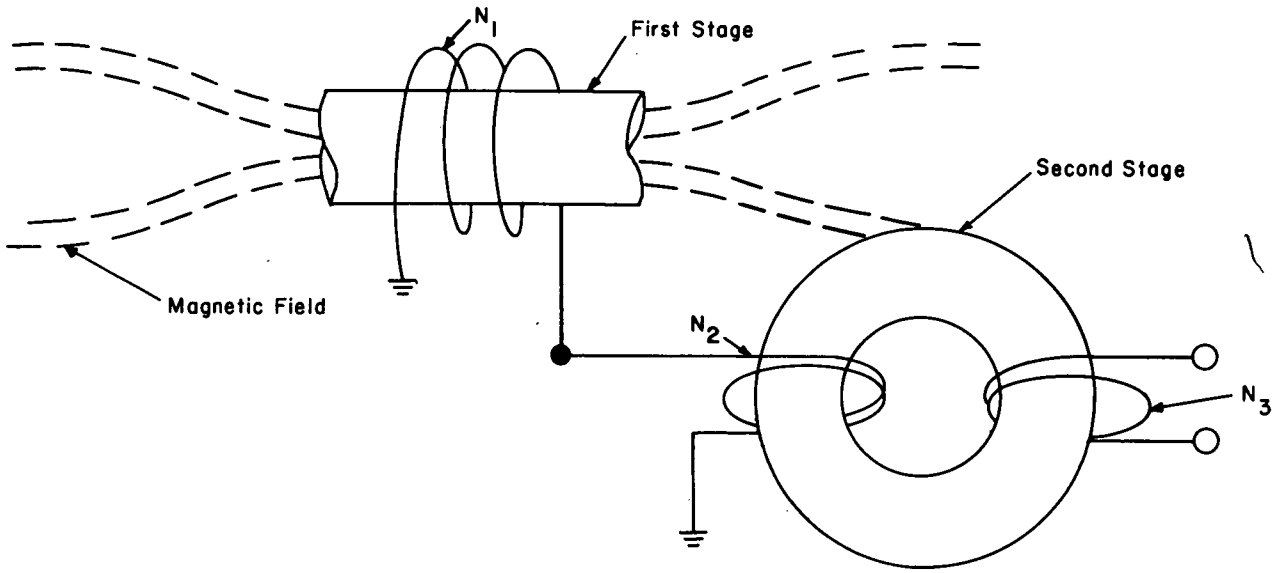
AEC-NASA TECH BRIEF

Two-Stage Magnetometer Measures Weak Magnetic Fields



A sensitive two-stage magnetometer is capable of measuring field strengths of 10^{-8} gauss. In the first stage, a high permeability core is aligned parallel to the magnetic field. The second stage is a ferromagnetic toroid which saturates rapidly (optimum non-linear characterisctics.)

The rate of change of flux in the first stage establishes a voltage between the ground points and the common terminal (see figure). This voltage generates magnetic flux lines in the second stage which are proportional to the flux lines existing in the first stage. The cross sectional areas, permeabilities of the two materials, and windings N1 and N2 control this ratio.

The permeability of the first stage is known. Since the magnetic induction is equal to the permeability times the field strength, the field strength may be determined by measuring the output voltage at N3 and, thus, the magnetic induction in the second stage. Adjustment of the turns ratio and area ratio of the first and second stages provides a wide range of sensitivities.

Note:

Requests for further information may be directed to:

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(continued overleaf)

Patent status:

Inquiries about obtaining rights for commerical use of this invention may be made to:

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