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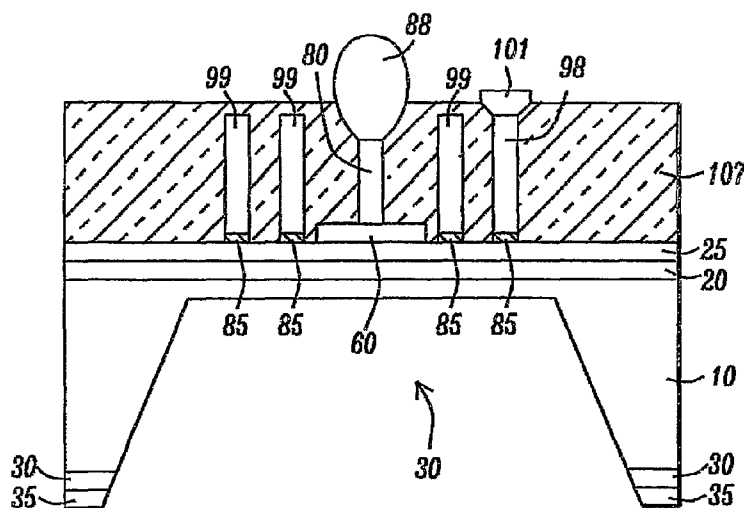
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(54) Title: MICROFABRICATED SYSTEM FOR MAGNETIC FIELD GENERATION AND FOCUSING



(57) Abstract: A method of forming, in or on a Si substrate, planar micro-coils with coil windings of high aspect ration (>3) and a wide variety of geometric shapes. The micro-coils may be formed on a Si substrate and be embedded in a dielectric, or they may be formed in trenches within a Si substrate. The micro-coils may have field enhancing ferromagnetic pillars rising above the micro-coil plane, formed at positions of maximum magnetic field strength and the micro-coils may also include magnetic layers formed beneath the substrate and contacting the pillars to form a substantially closed pathway for the magnetic flux. The substrate may be thinned to membrane proportions. These micro-coils produce strong magnetic fields with strong field gradients and can be used in a wide variety of processes that involve the exertion of strong magnetic forces at small distances or the creation of magnetic wells for trapping and manipulating small particles.

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