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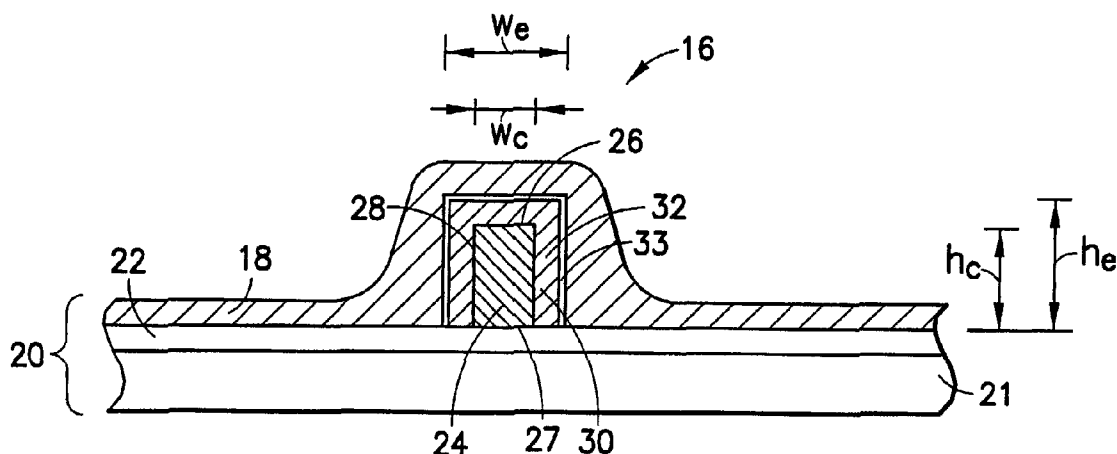
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(54) Title: FET CHANNEL HAVING A STRAINED LATTICE STRUCTURE ALONG MULTIPLE SURFACES



(57) Abstract: A channel (16) of a FinFET (10) has a channel core (24) and a channel envelope (32), each made from a semiconductor material defining a different lattice structure to exploit strained silicon properties. A gate is coupled to the channel envelope through a gate dielectric. Exemplary materials are Si and $\text{Si}_x\text{Ge}_{1-x}$, wherein $78 < x < 92$. The channel core (24) has a top surface (26) of width w_c and an upstanding surface (28, 30) of height h_c , preferably oriented 90° to one another. The channel envelope (32) is in contact with the top (26) and upstanding surfaces (28, 30), so that the area of interface is increased as compared to contact only along the top surface (26), improving electrical conductivity and gate (18) control over the channel (16). The height h_c can be tailored to enable a smaller scale FET (10) within a stabilized SRAM. Various methods of making the channel (16) are disclosed, including a mask and etch method, a handle wafer/carrier wafer method, and a shallow trench method. Embodiments and methods for FinFETs with one to four gates are disclosed.



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