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(54) Title: ATOMIC SCALE FABRICATION OF DIAMOND QUANTUM COMPUTERS

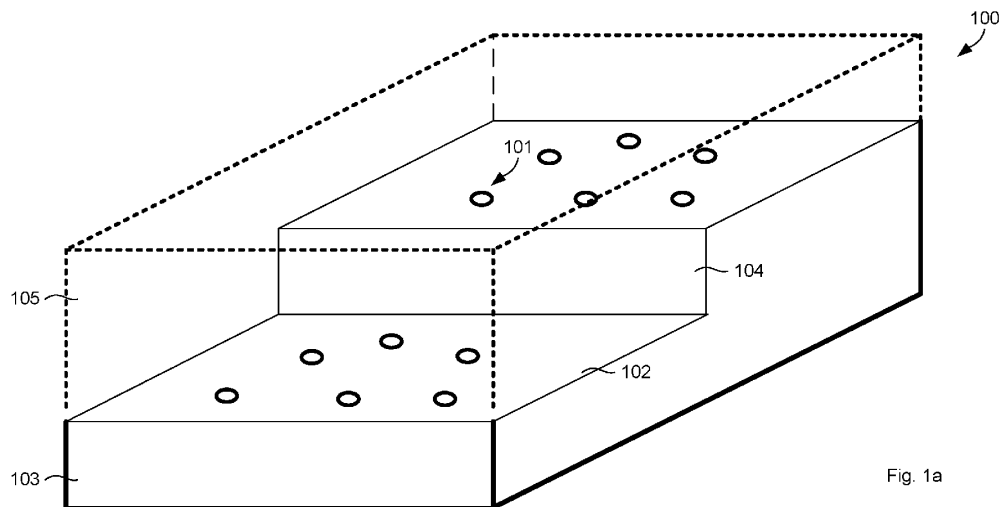


Fig. 1a

(57) **Abstract:** This disclosure relates to a method for manufacturing multiple optically addressable qubits in diamond. The method comprises providing a diamond substrate with a passivated surface; removing passivation atoms from the passivated surface to create multiple de-passivated sites where the passivation atoms have been removed; exposing the multiple de-passivated sites to a nitrogen-containing compound to adsorb nitrogen at the multiple de-passivated sites of the diamond substrate; overgrowing the multiple de-passivated sites with diamond by chemical vapour deposition (CVD) at a diamond growth rate related to a temperature and a pressure, wherein diffusion or desorption of the nitrogen at the multiple de-passivated sites is avoided to incorporate the nitrogen into the diamond; converting the incorporated nitrogen into multiple nitrogen vacancies; and charging the multiple nitrogen vacancies with a negative charge.

[Continued on next page]

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