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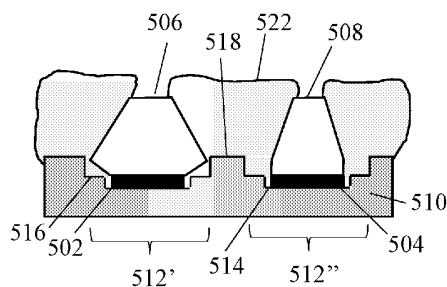


Fig. 5

(57) Abstract: A method is disclosed for manufacturing lab grown diamond material by plasma enhanced chemical vapour deposition (PECVD). A substrate is exposed to a plasma containing carbon species while supported within a recess in a holder, resulting in a single crystal diamond (SCO) growing on the substrate while polycrystalline diamond (PCD) is deposited on the substrate holder. In the invention, the relative rate of growth of the single crystal diamond on the substrate and the polycrystalline diamond on the surface of the holder is set, by control of at least one of the applied energy, cooling of the substrate holder and the chemical composition of the process gases, such that the single crystal diamond grown on the substrate protrudes above the surface of the holder and is constrained not to increase or to reduce in cross sectional area with increased distance from the surface of the holder by simultaneous growth of a polycrystalline diamond layer on the surface of the holder.