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(54) Title: LIPSEAL EDGE EXCLUSION ENGINEERING TO MAINTAIN MATERIAL INTEGRITY AT WAFER EDGE

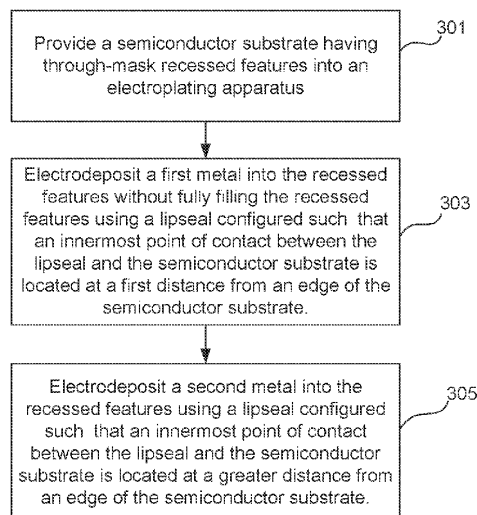


FIGURE 3

(57) Abstract: Sequential electrodeposition of metals into through-mask features on a semiconductor substrate is conducted such as to reduce the deleterious consequences of lipseal's pressure onto the mask material. In a first electroplating step, a first metal (e.g., nickel) is electrodeposited using a lipseal that has an innermost point of contact with the semiconductor substrate at a first distance from the edge of the substrate. In a second electroplating step, a second metal (e.g., tin) is electrodeposited using a lipseal that has an innermost point of contact with the semiconductor substrate at a greater distance from the edge of the substrate than the first distance. This allows to at least partially shift the lipseal pressure from a point that could have been damaged during the first electrodeposition step and to shield from electrolyte any cracks that might have formed in the mask material during the first electroplating step.

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