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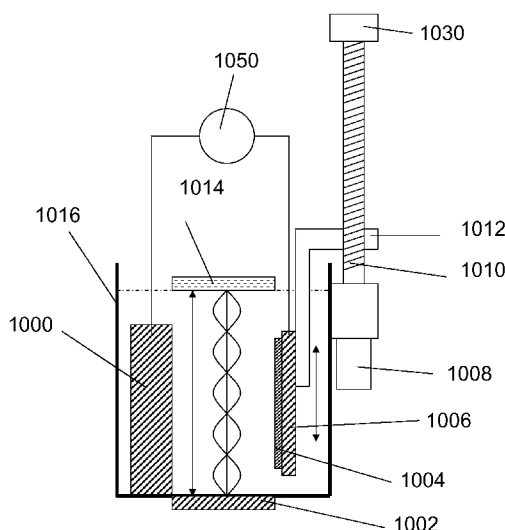


FIG 1A

(57) Abstract: An apparatus for substrate metallization from electrolyte is provided. The apparatus comprises: an immersion cell containing metal salt electrolyte; at least one electrode connecting to at least one power supply; an electrically conductive substrate holder holding at least one substrate to expose a conductive side of the substrate to face the at least one electrode; an oscillating actuator for oscillating the substrate holder with an amplitude and a frequency; at least one ultrasonic device with an operating frequency and an intensity, disposed in the metallization apparatus; at least one ultrasonic power generator connecting to the ultrasonic device; at least one inlet for metal salt electrolyte feeding; and at least one outlet for metal salt electrolyte draining.