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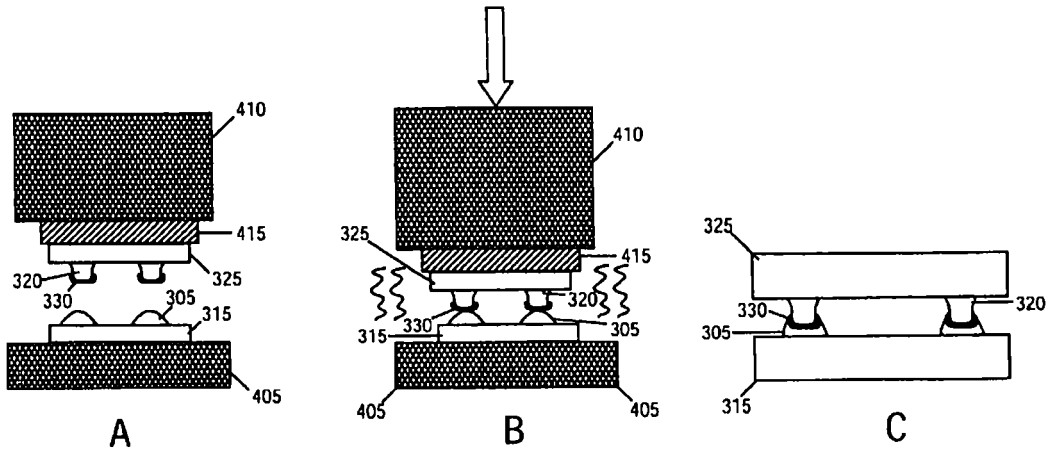
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(54) Title: FLUXLESS FLIP CHIP INTERCONNECTION




(57) Abstract: A flip chip method of joining a chip and a substrate is described. A thermocompression bonder is utilized to align the chip and substrate and apply a contact force to hold solder bumps (305) on the substrate against metal bumps (320) on the chip. The chip is rapidly heated from its non-native side by a pulse heater (415) in the head (410) of the bonder until the re-flow temperature of the solder bumps (305) is reached. Proximate with reaching the re-flow temperature at the solder bumps (305), the contact force is released. The solder is held above its re-flow temperature for several seconds to facilitate wetting of the substrate's metal protrusions (320) and joining. Metal caps (330) comprised of a noble metal such as palladium is applied to the surface of the metal bumps (320) to prevent the metal bumps (320) (which generally comprise a highly-conductive and highly-reactive metal such as copper) from oxidizing in the elevated temperatures just prior to and during the re-flow operation.

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