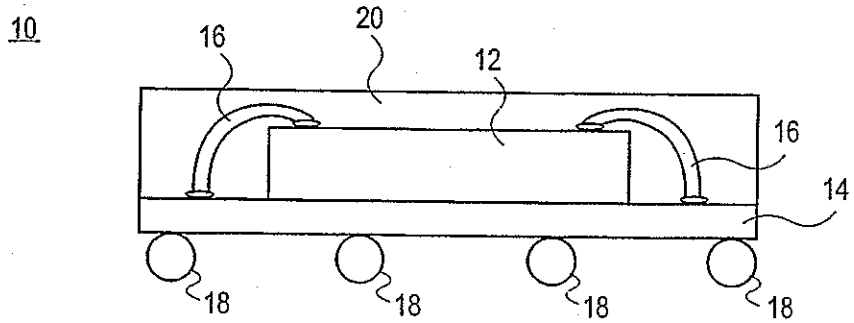


FIG. 1A
(PRIOR ART)

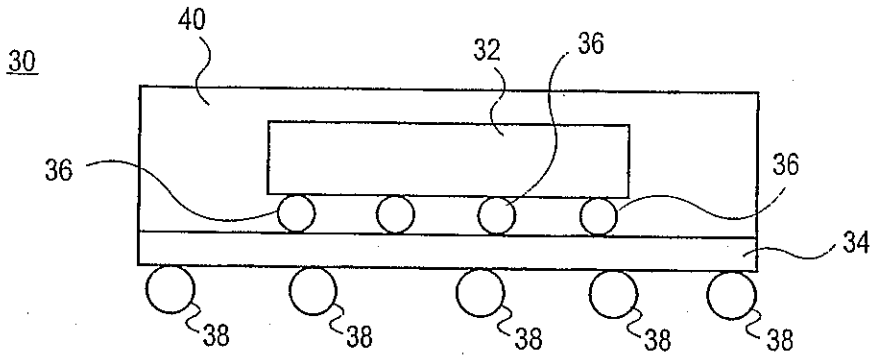


FIG. 1B
(PRIOR ART)

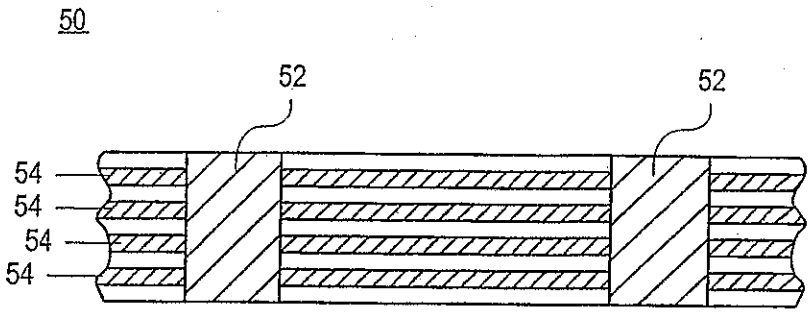


FIG. 1C

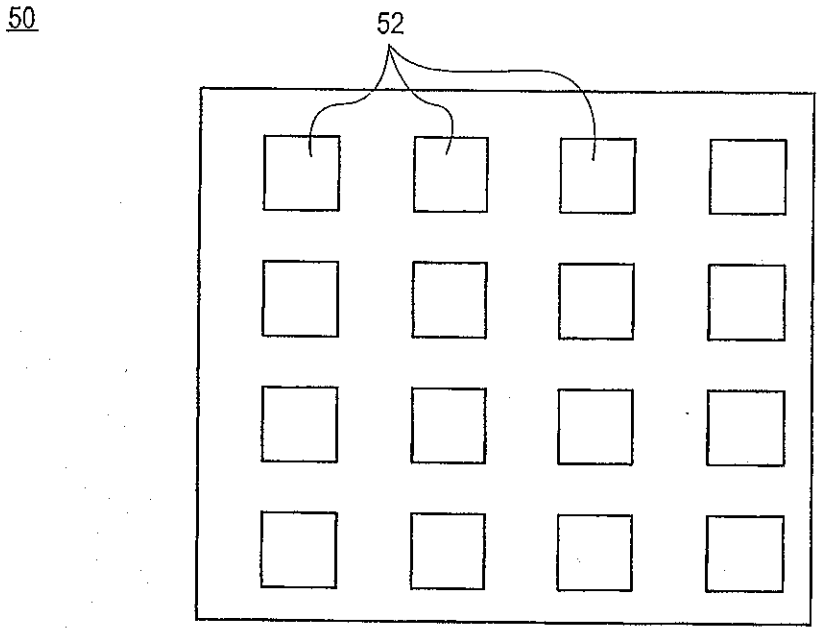


FIG. 1D

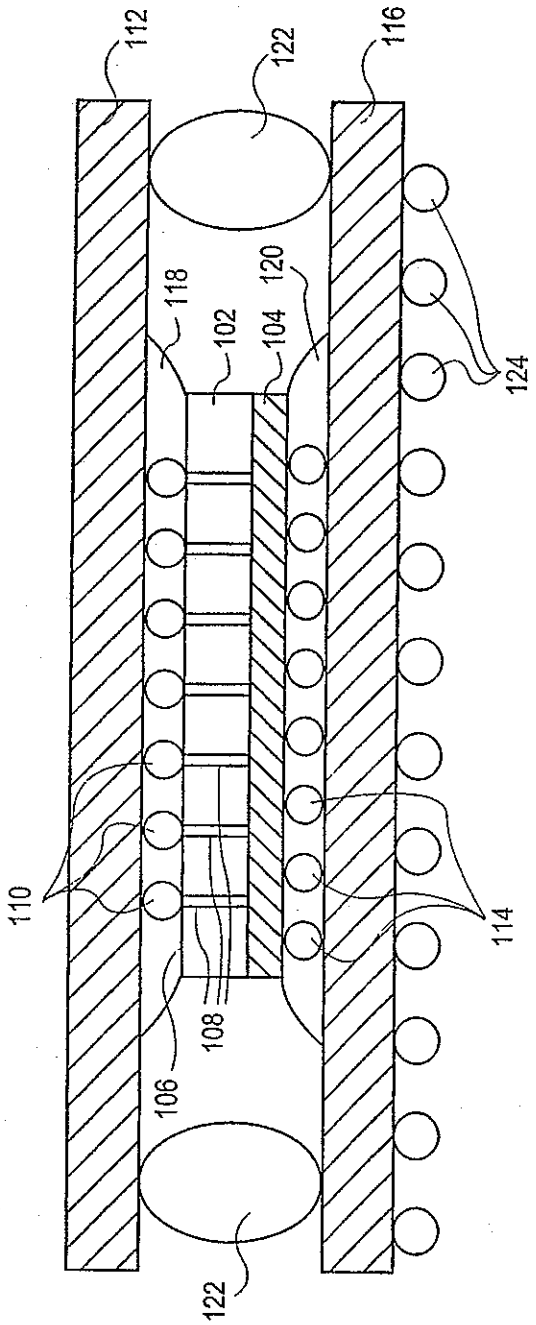


FIG. 2A

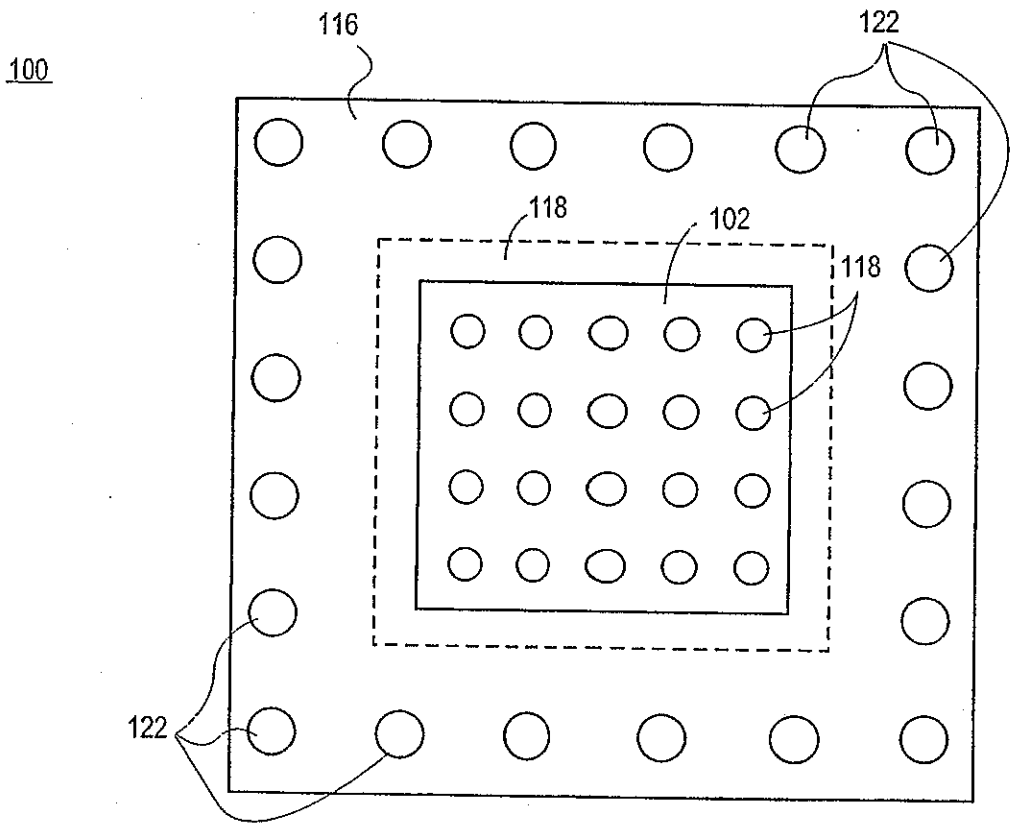


FIG. 2B

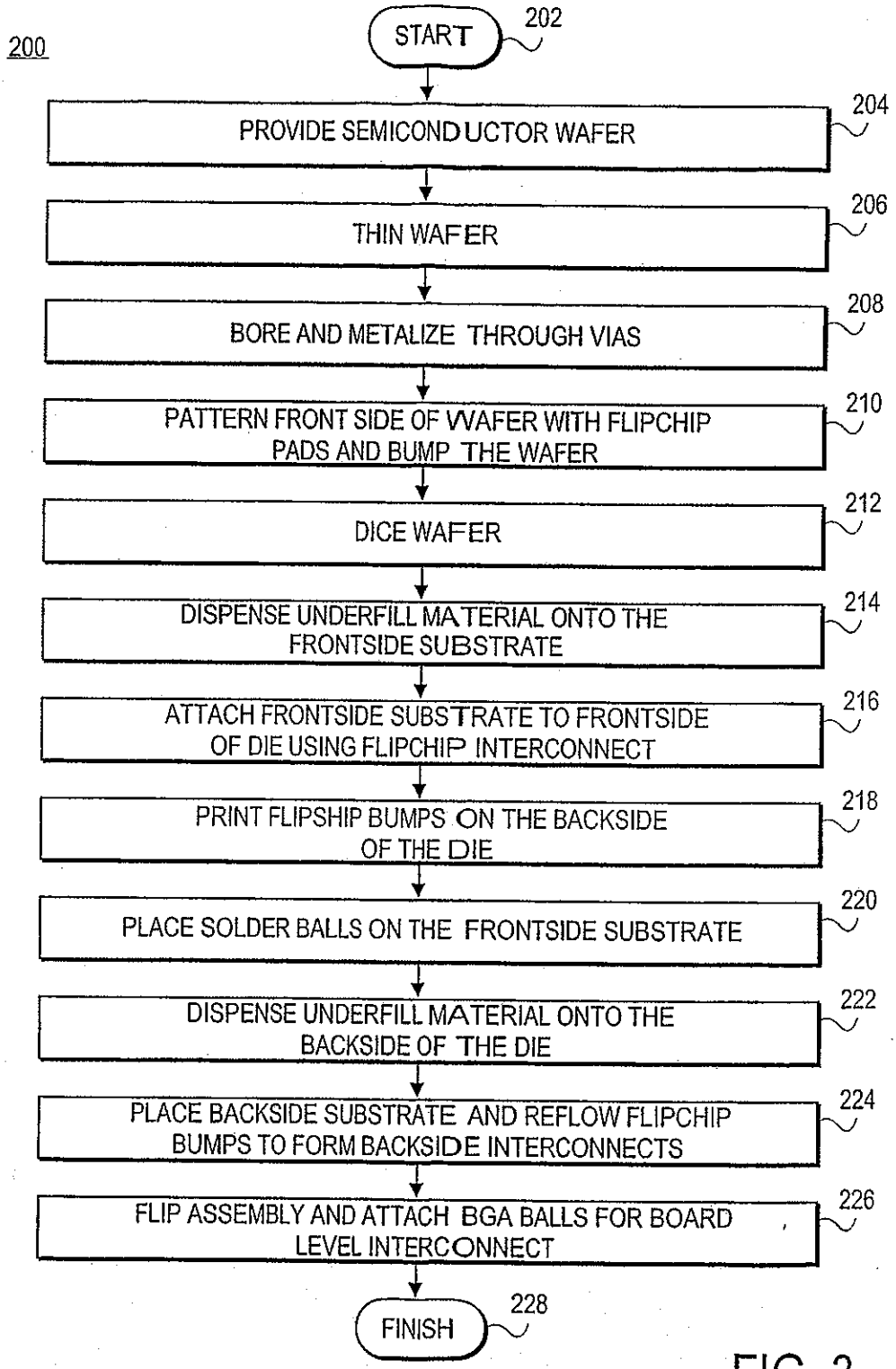

200
START
202
PROVIDE SEMICONDUCTOR WAFER
204
THIN WAFER
206
BORE AND METALIZE THROUGH VIAS
208
PATTERN FRONT SIDE OF WAFER WITH FLIPCHIP PADS AND BUMP THE WAFER
210
DICE WAFER
212
DISPENSE UNDERFILL MATERIAL ONTO THE FRONTSIDE SUBSTRATE
214
ATTACH FRONTSIDE SUBSTRATE TO FRONTSIDE OF DIE USING FLIPCHIP INTERCONNECT
216
PRINT FLIPSHIP BUMPS ON THE BACKSIDE OF THE DIE
218
PLACE SOLDER BALLS ON THE FRONTSIDE SUBSTRATE
220
DISPENSE UNDERFILL MATERIAL ONTO THE BACKSIDE OF THE DIE
222
PLACE BACKSIDE SUBSTRATE AND REFLOW FLIPCHIP BUMPS TO FORM BACKSIDE INTERCONNECTS
224
FLIP ASSEMBLY AND ATTACH BGA BALLS FOR BOARD LEVEL INTERCONNECT
226
FINISH
228

FIG. 3

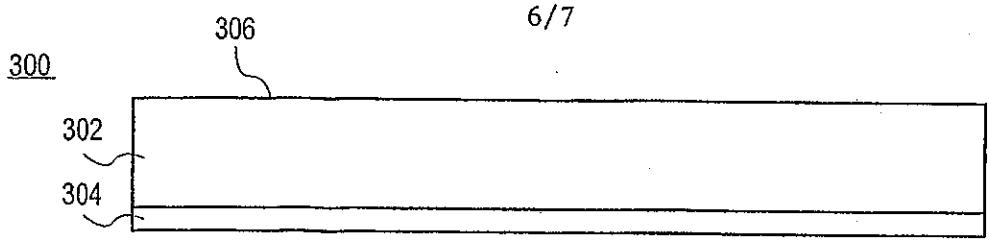


FIG. 4A

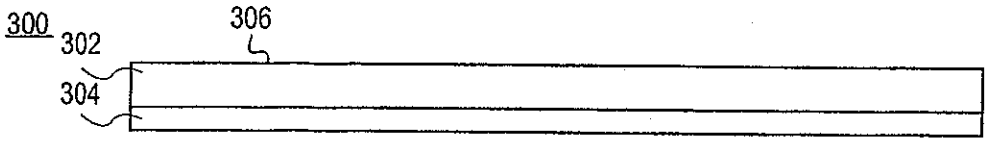


FIG. 4B

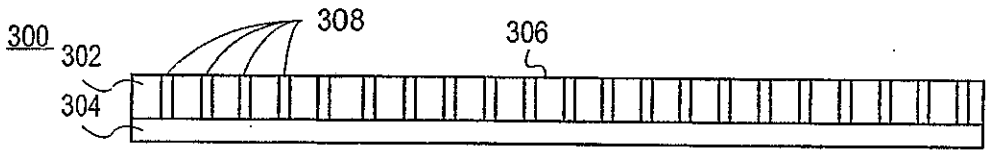


FIG. 4C

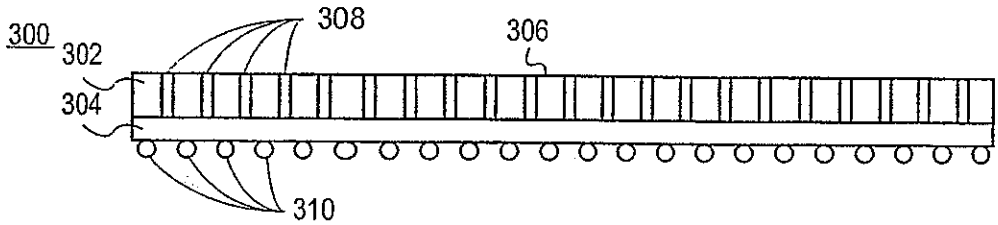


FIG. 4C

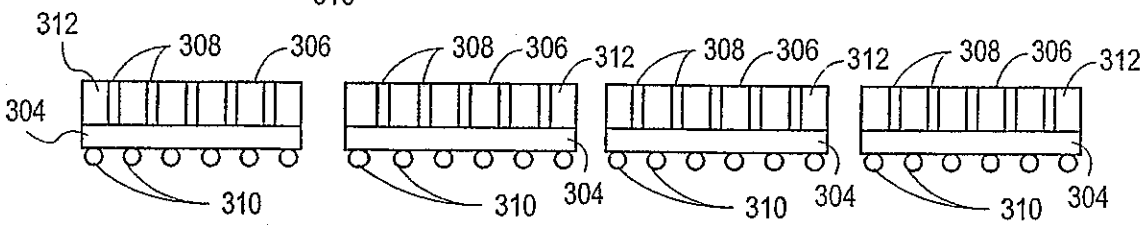


FIG. 4E

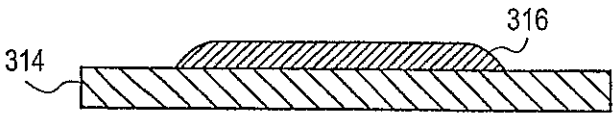


FIG. 4F

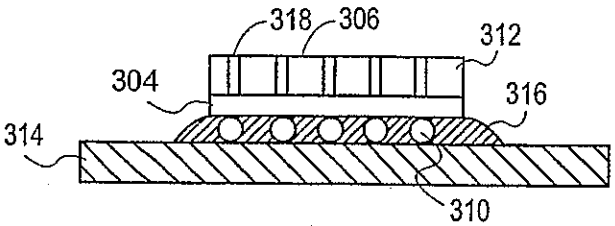


FIG. 4G

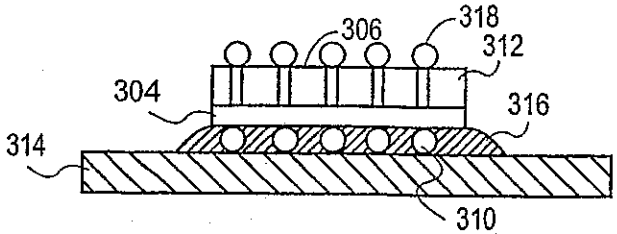


FIG. 4H

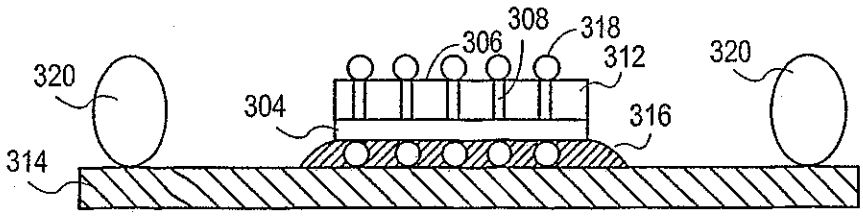


FIG. 4I

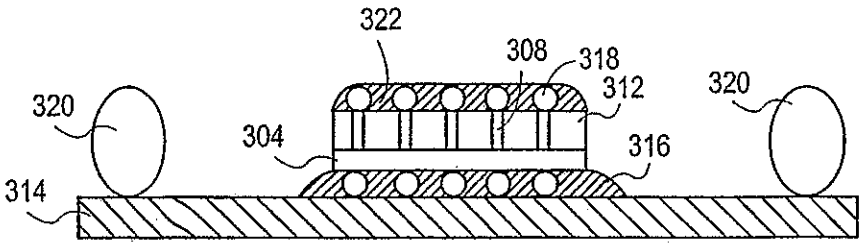


FIG. 4J

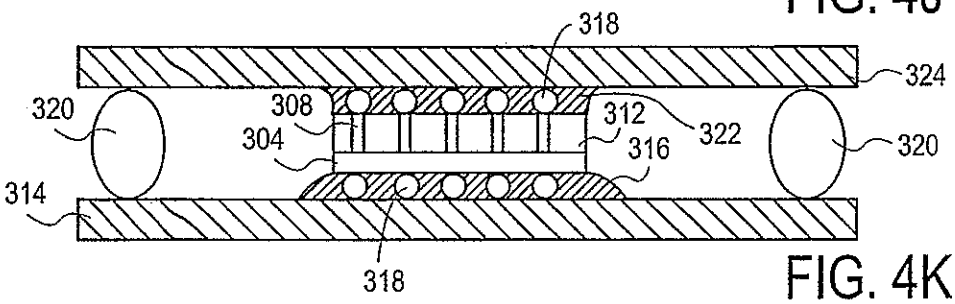


FIG. 4K

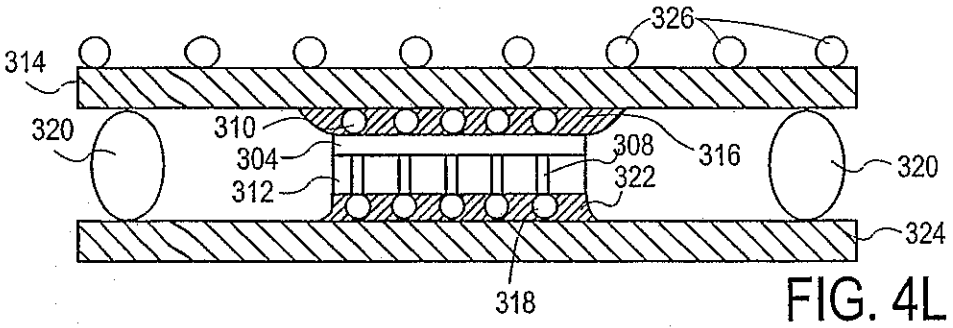


FIG. 4L

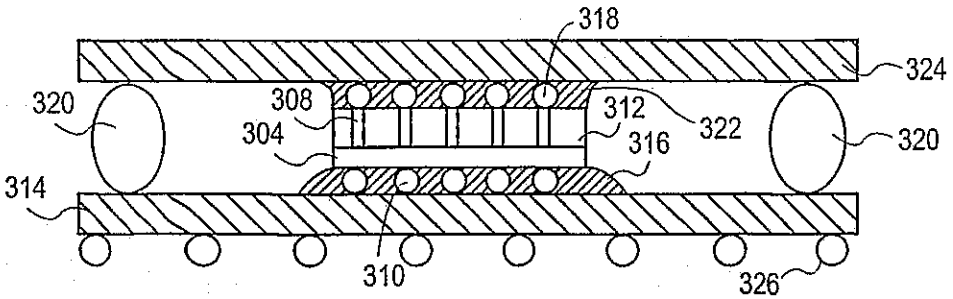


FIG. 4M