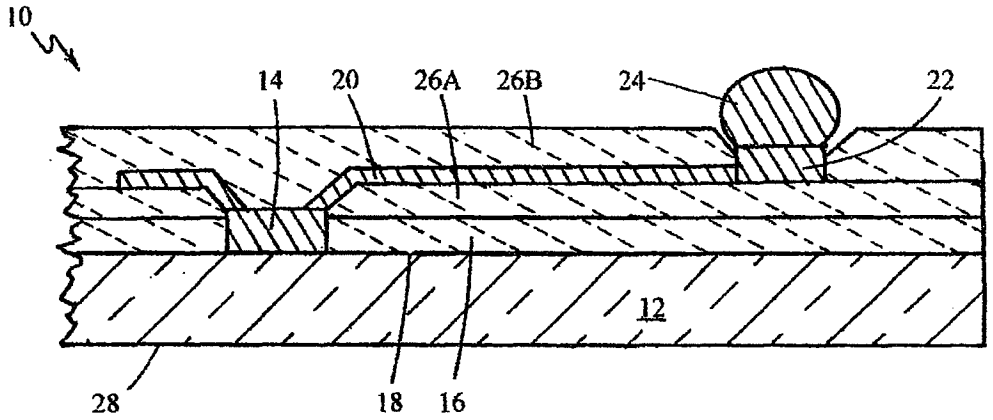



**FIG. 1**
PRIOR ART

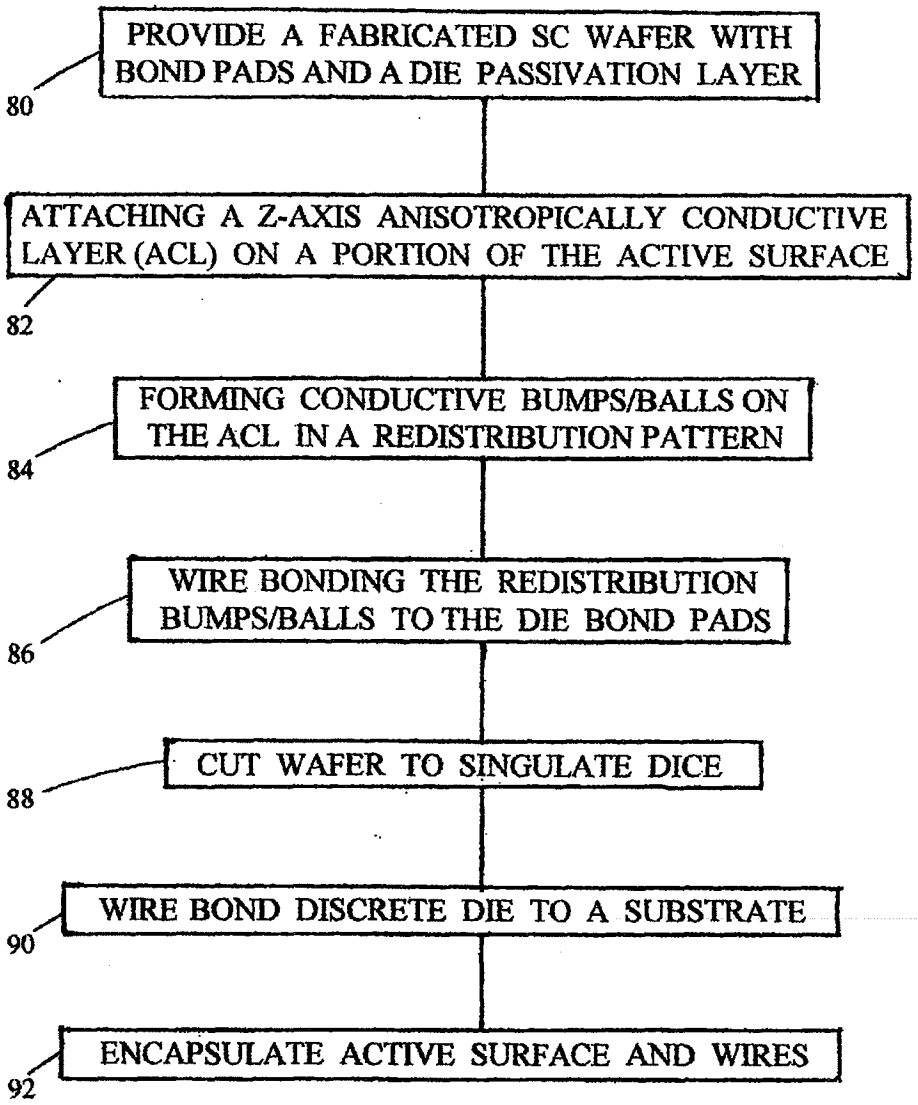

PROVIDE A FABRICATED SC WAFER WITH BOND PADS AND A DIE PASSIVATION LAYER
80
ATTACHING A Z-AXIS ANISOTROPICALLY CONDUCTIVE LAYER (ACL) ON A PORTION OF THE ACTIVE SURFACE
82
FORMING CONDUCTIVE BUMPS/BALLS ON THE ACL IN A REDISTRIBUTION PATTERN
84
WIRE BONDING THE REDISTRIBUTION BUMPS/BALLS TO THE DIE BOND PADS
86
CUT WAFER TO SINGULATE DICE
88
WIRE BOND DISCRETE DIE TO A SUBSTRATE
90
ENCAPSULATE ACTIVE SURFACE AND WIRES
92

**FIG. 2**

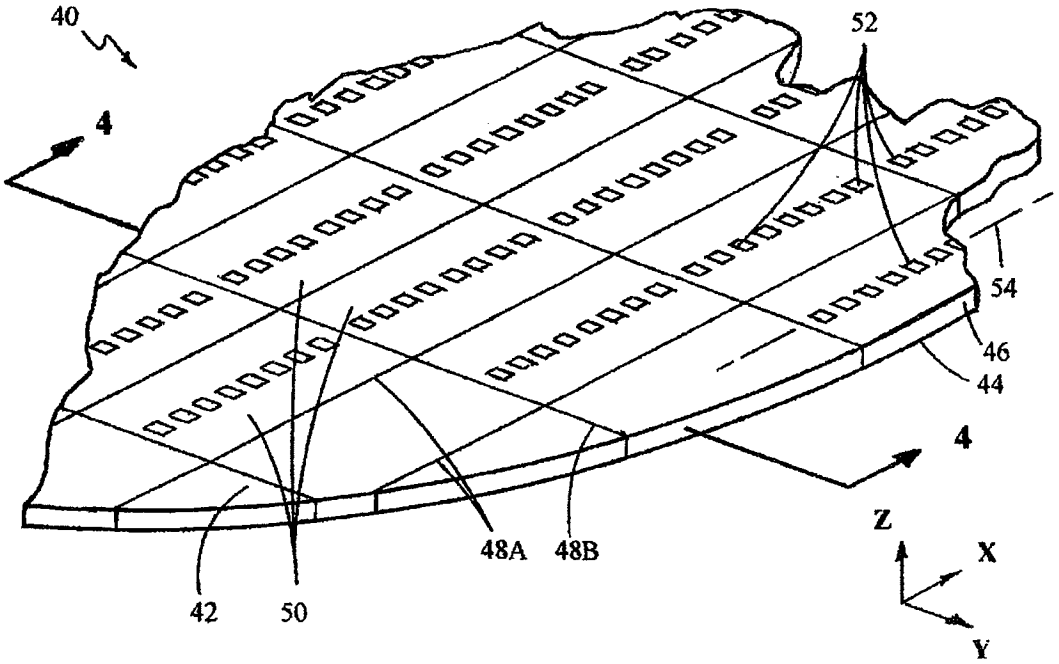



FIG. 3

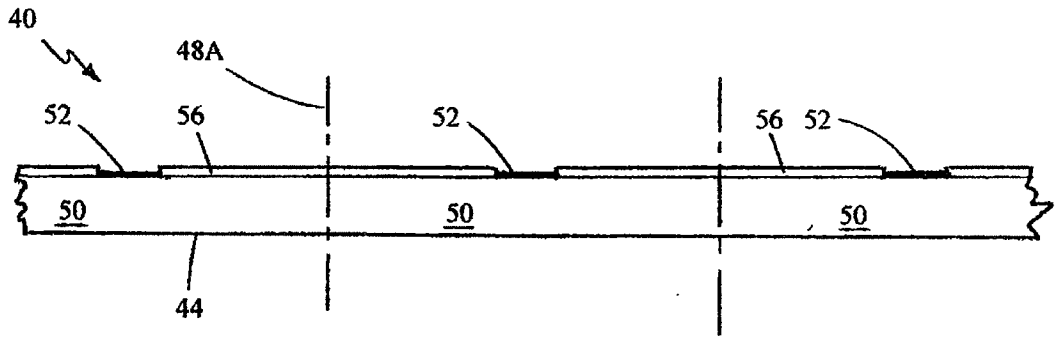



FIG. 4

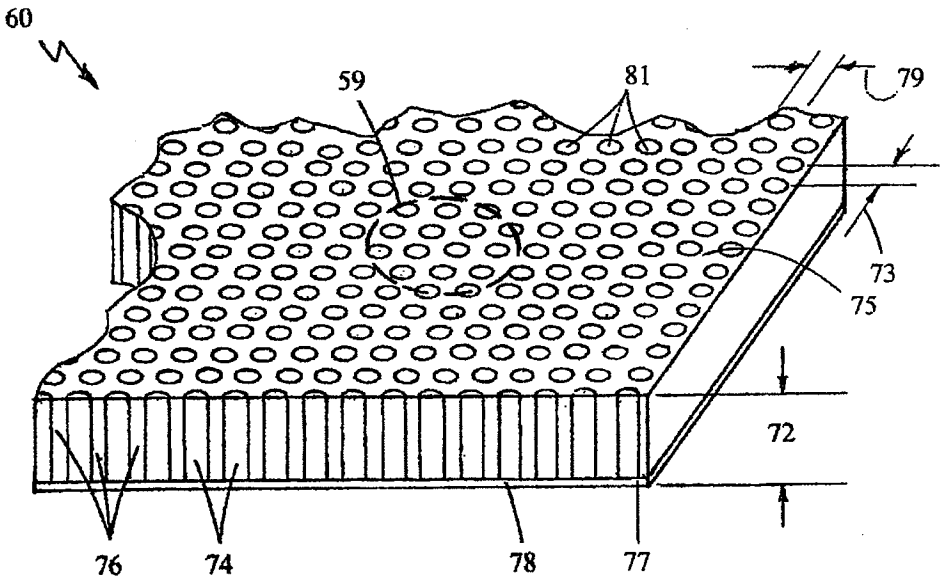



**FIG. 5**

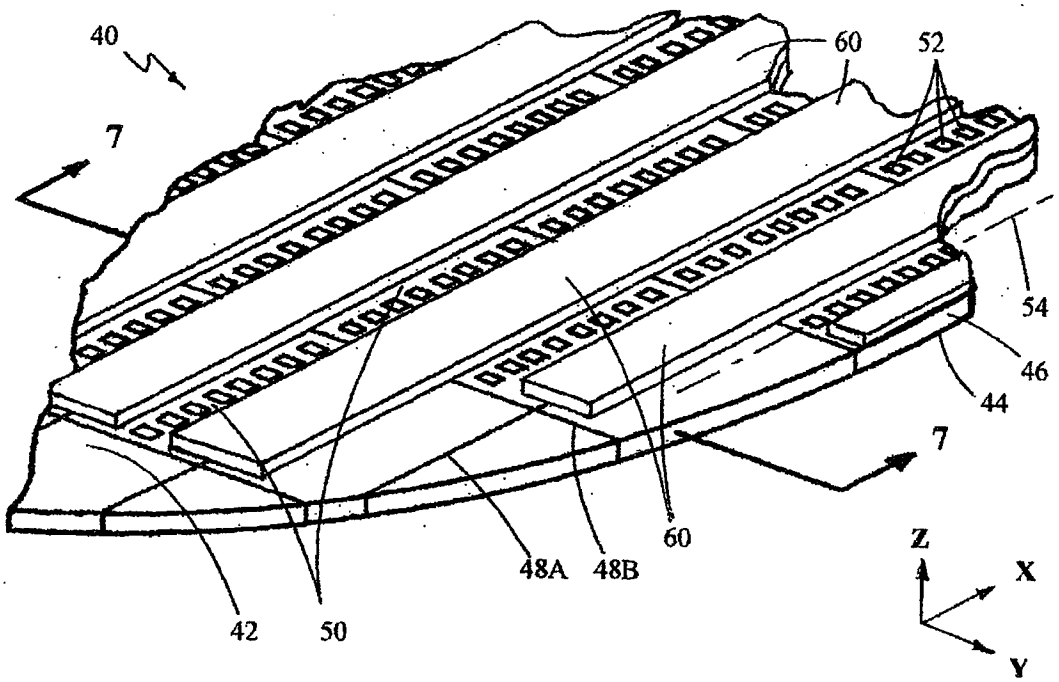

40
7
60
52
54
46
44
7
60
48A
48B
42
50
Z
X
Y

FIG. 6

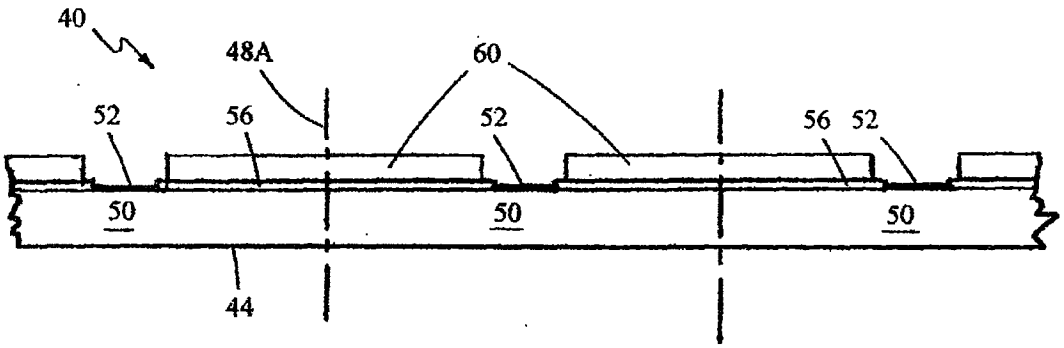

40
48A
60
52
56
52
56
52
50
50
50
44

FIG. 7

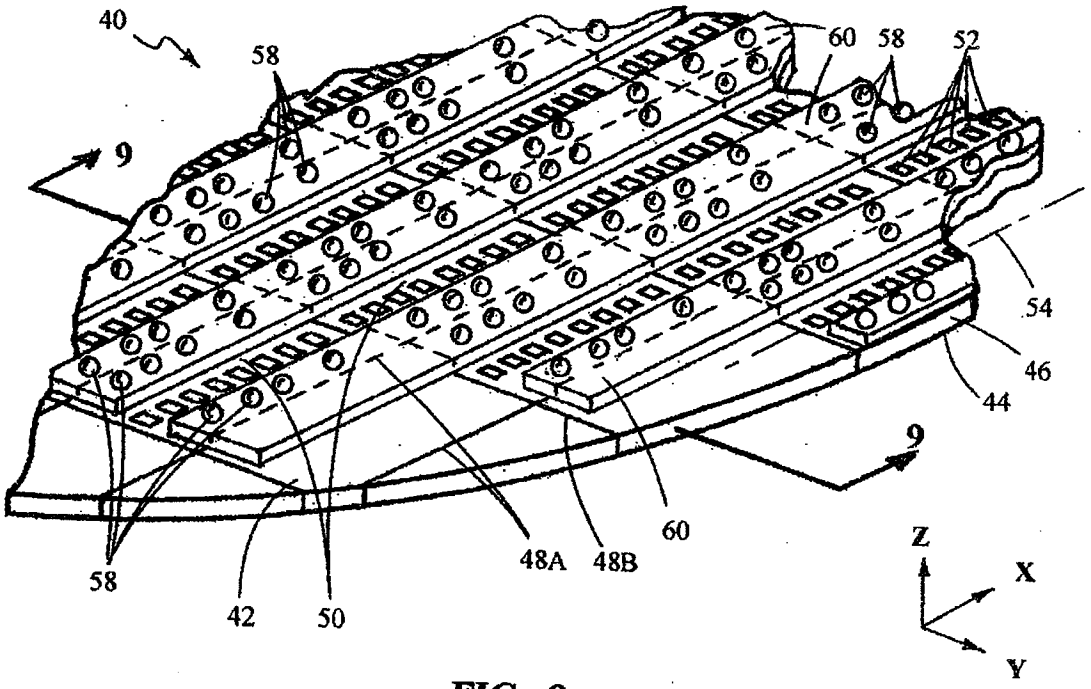

40
58
9
60
58
52
54
46
44
9
60
48A
48B
58
42
50
Z
X
Y

FIG. 8

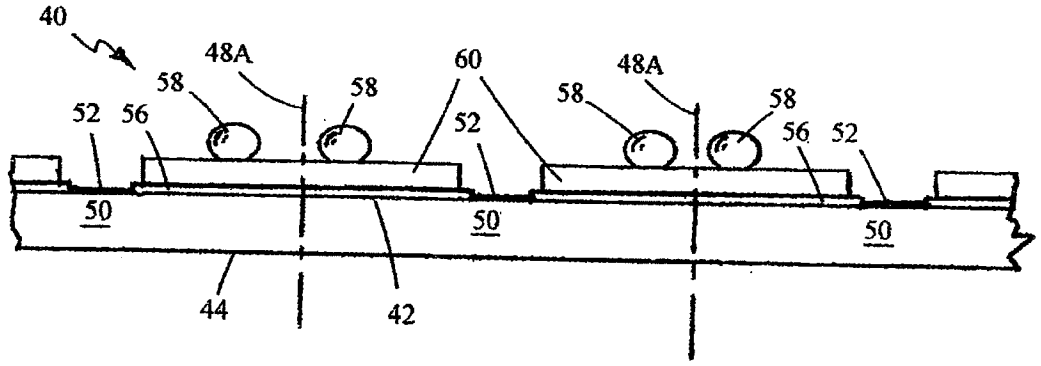

40
48A
58
58
60
48A
58
58
52
56
52
56
52
50
50
50
44
42

FIG. 9

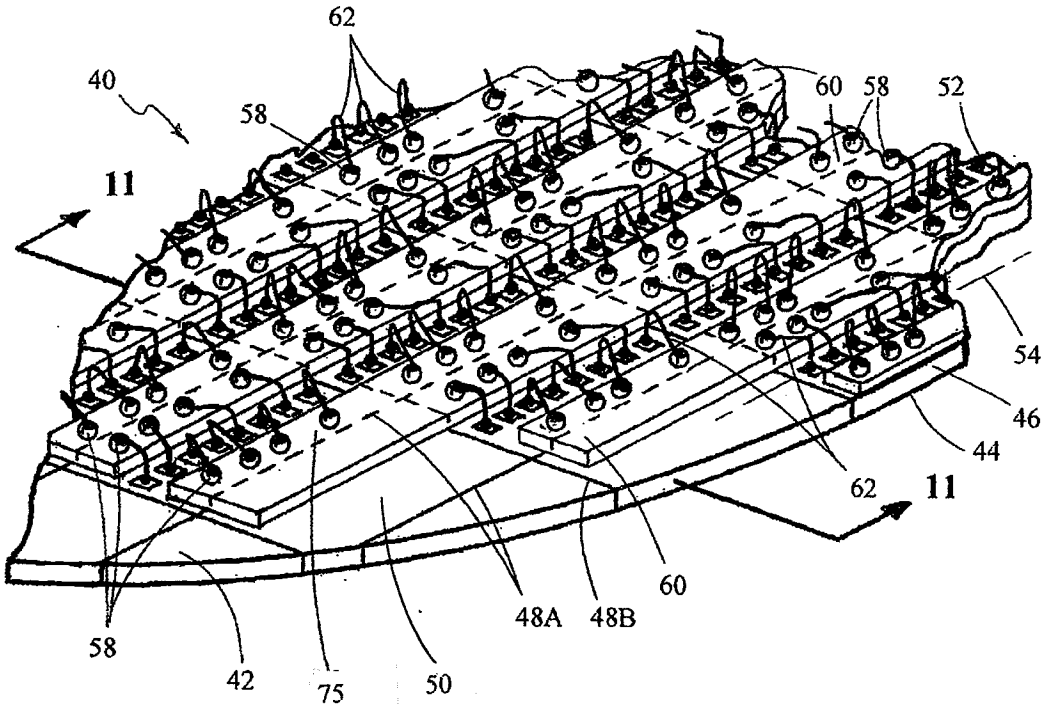

62
40
58
60
58
52
11
54
46
44
62
11
60
48A
48B
58
42
75
50

FIG. 10

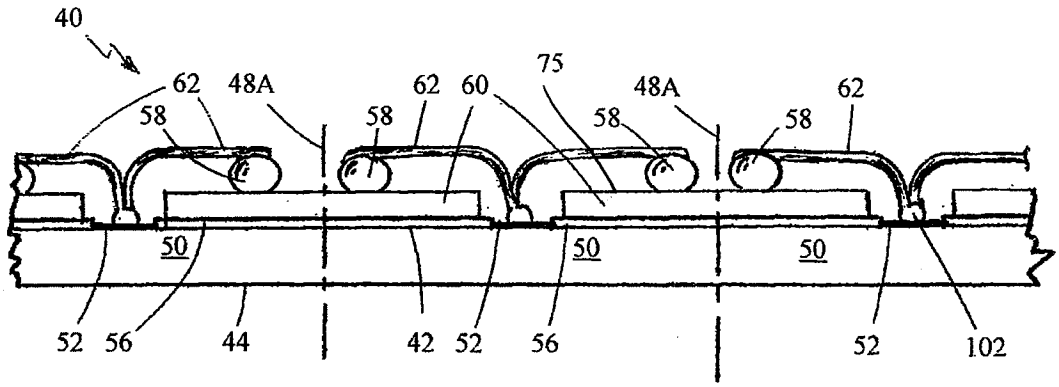

40
62
48A
58
62
60
75
48A
62
58
58
58
58
50
50
50
52
56
44
42
52
56
52
102

FIG. 11

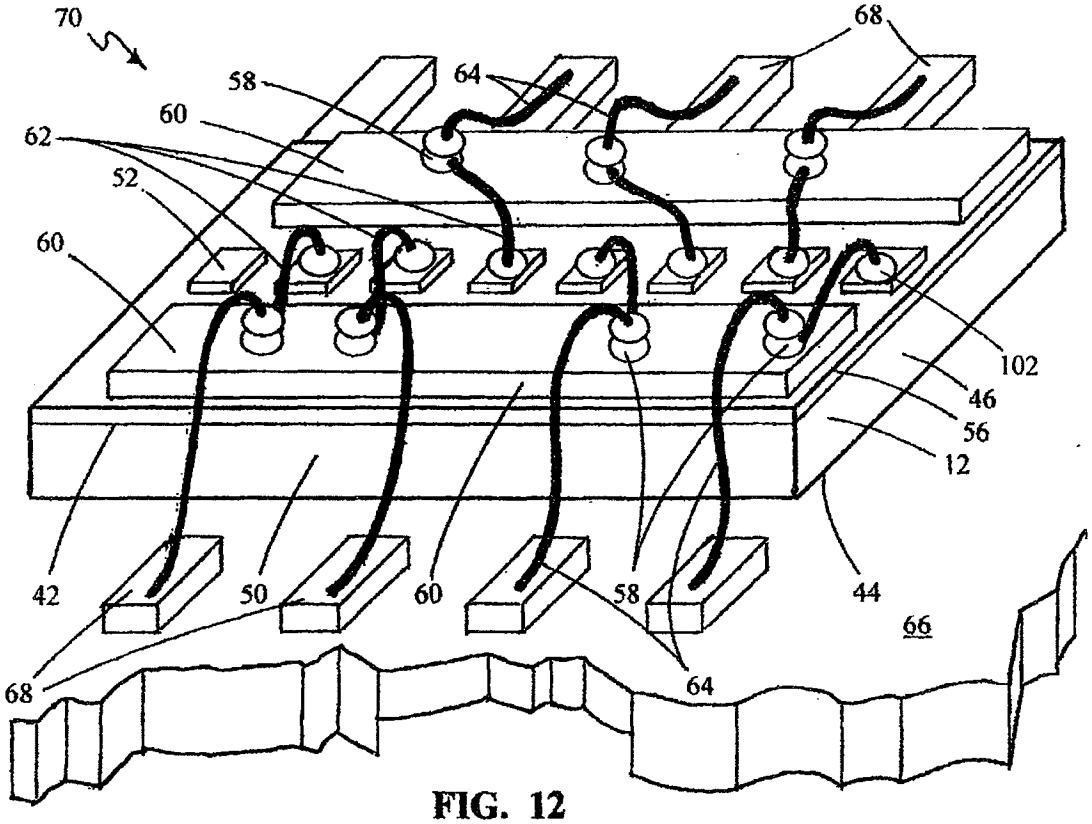



FIG. 12

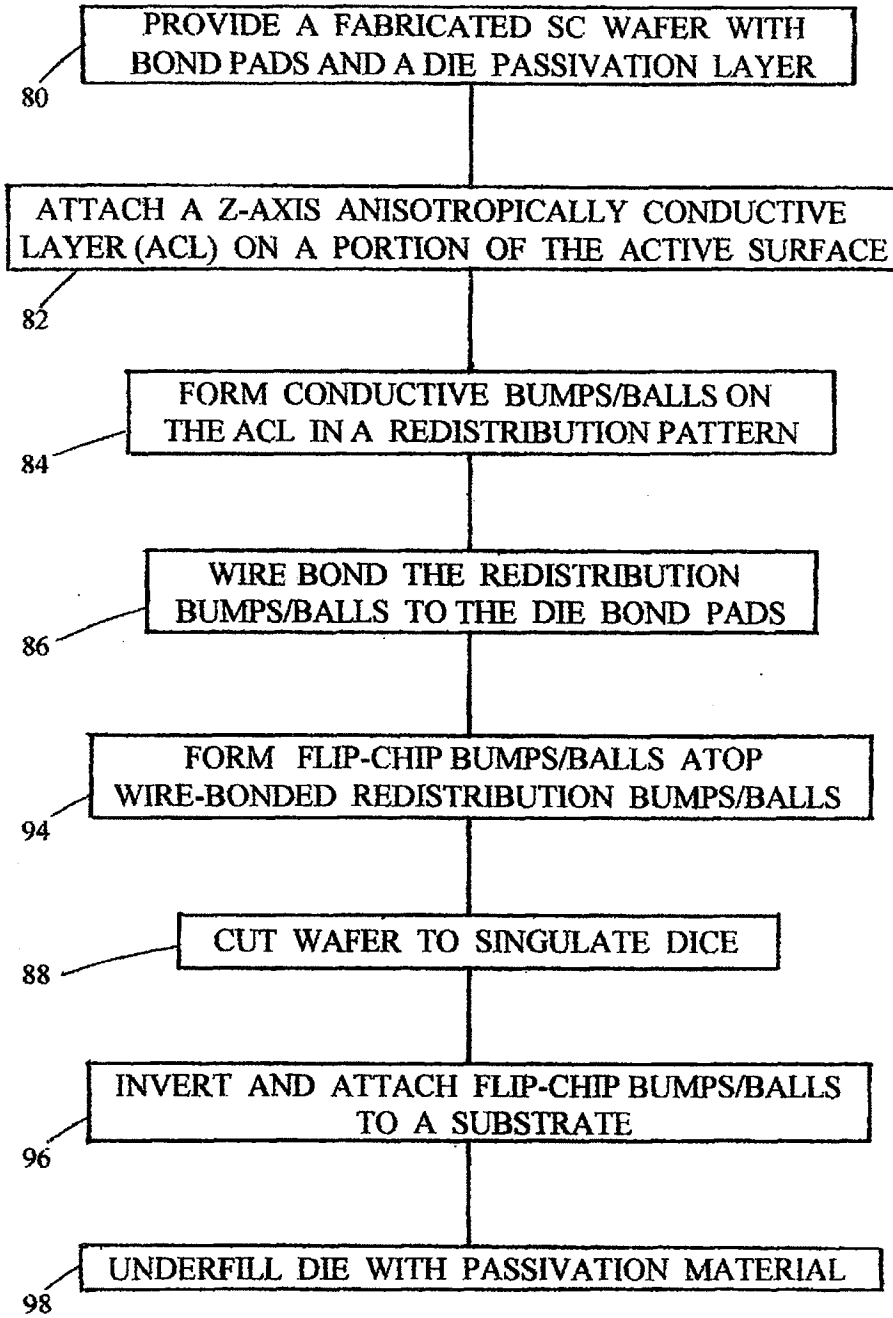

PROVIDE A FABRICATED SC WAFER WITH BOND PADS AND A DIE PASSIVATION LAYER
80
ATTACH A Z-AXIS ANISOTROPICALLY CONDUCTIVE LAYER (ACL) ON A PORTION OF THE ACTIVE SURFACE
82
FORM CONDUCTIVE BUMPS/BALLS ON THE ACL IN A REDISTRIBUTION PATTERN
84
WIRE BOND THE REDISTRIBUTION BUMPS/BALLS TO THE DIE BOND PADS
86
FORM FLIP-CHIP BUMPS/BALLS ATOP WIRE-BONDED REDISTRIBUTION BUMPS/BALLS
94
CUT WAFER TO SINGULATE DICE
88
INVERT AND ATTACH FLIP-CHIP BUMPS/BALLS TO A SUBSTRATE
96
UNDERFILL DIE WITH PASSIVATION MATERIAL
98

**FIG. 13**

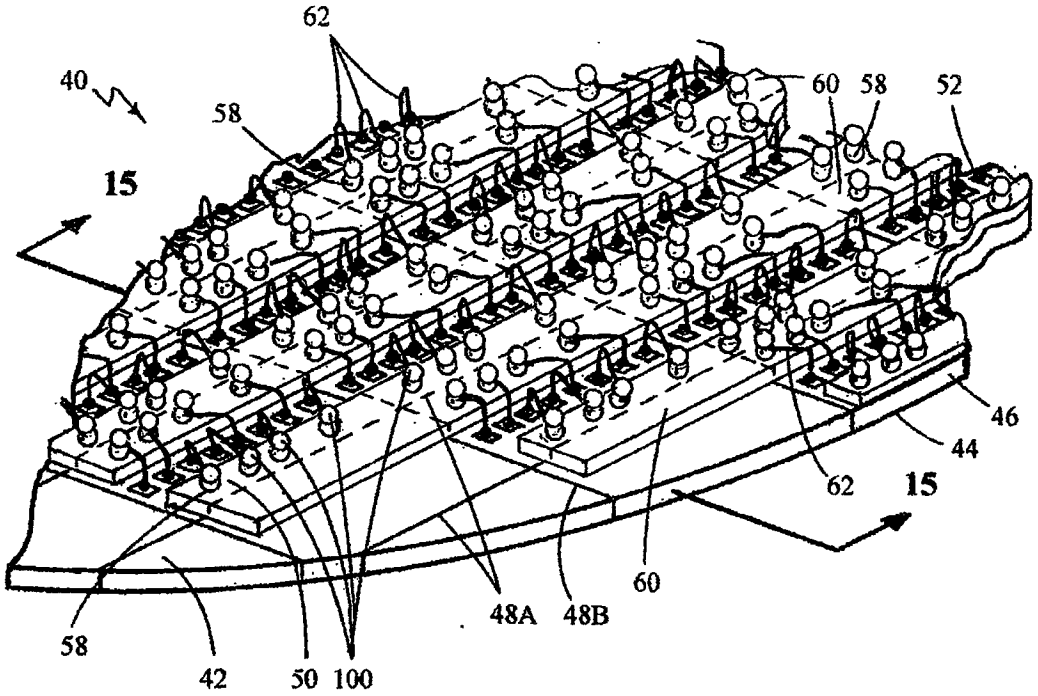

62
40
58
60
58
52
15
46
44
62
15
60
48A
48B
58
42
50
100

FIG. 14

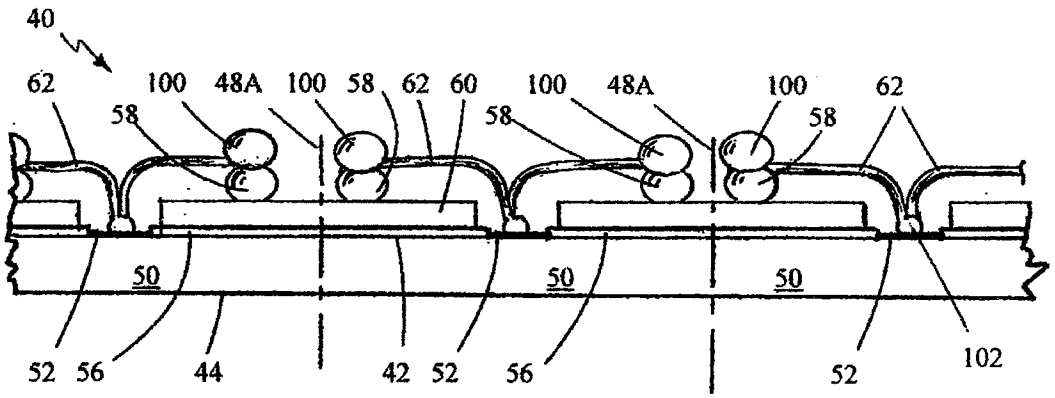

40
62
100
48A
100
58
62
60
100
48A
100
62
58
58
58
50
50
50
52
56
44
42
52
56
52
102

FIG. 15

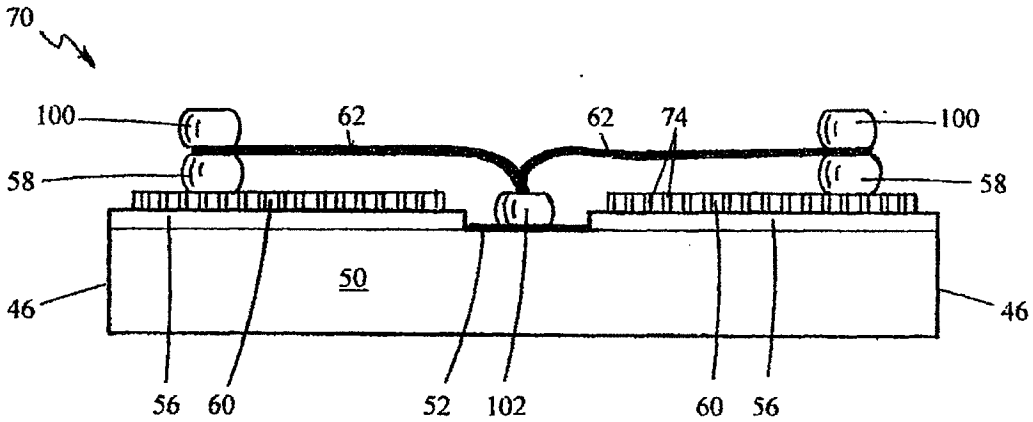

70
100
62
62
74
100
58
58
50
46
46
56
60
52
102
60
56

**FIG. 16**

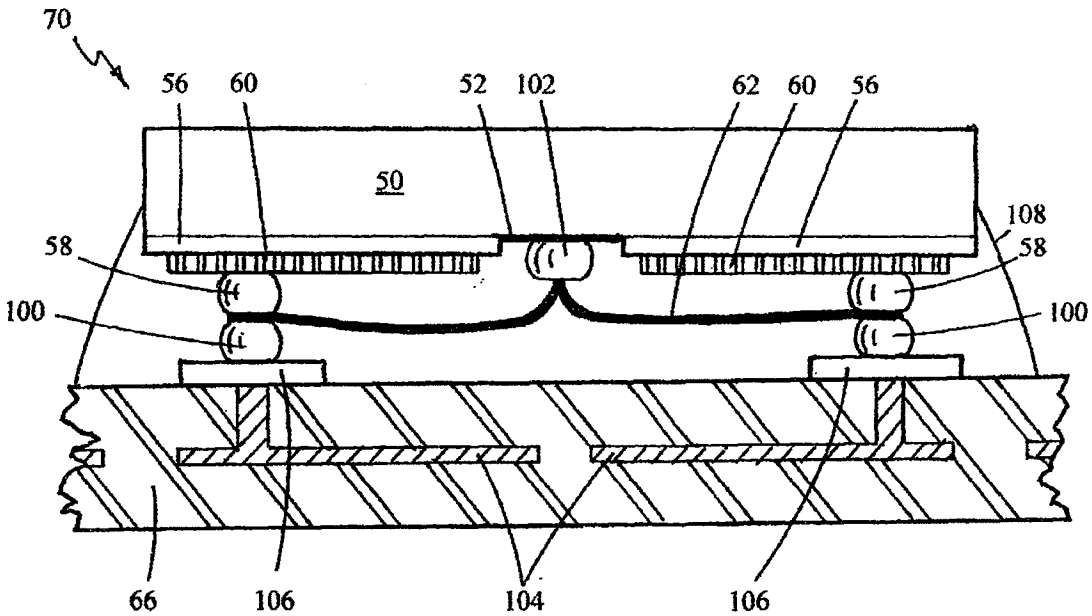

70
56
60
52
102
62
60
56
50
108
58
58
100
100
66
106
104
106

**FIG. 17**