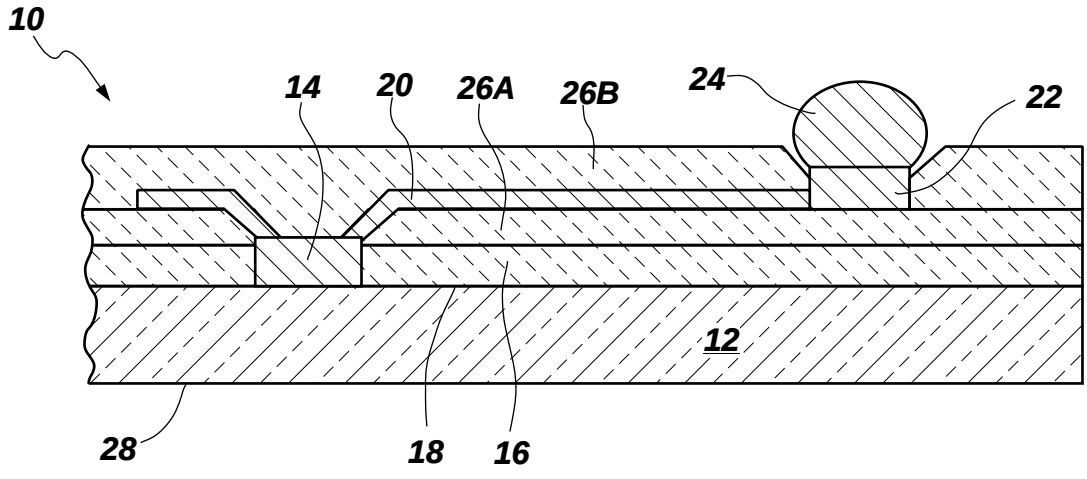


FIG. 1
(PRIOR ART)

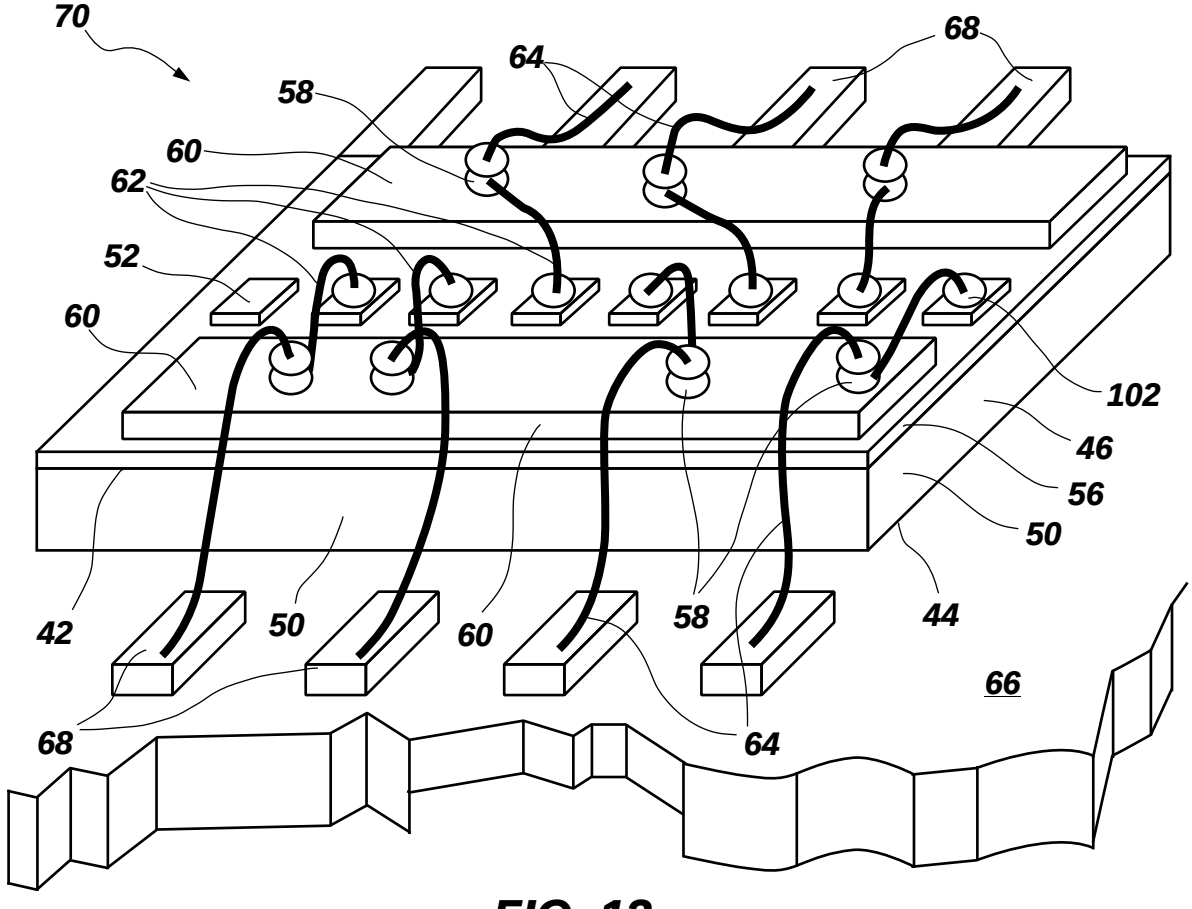


FIG. 12

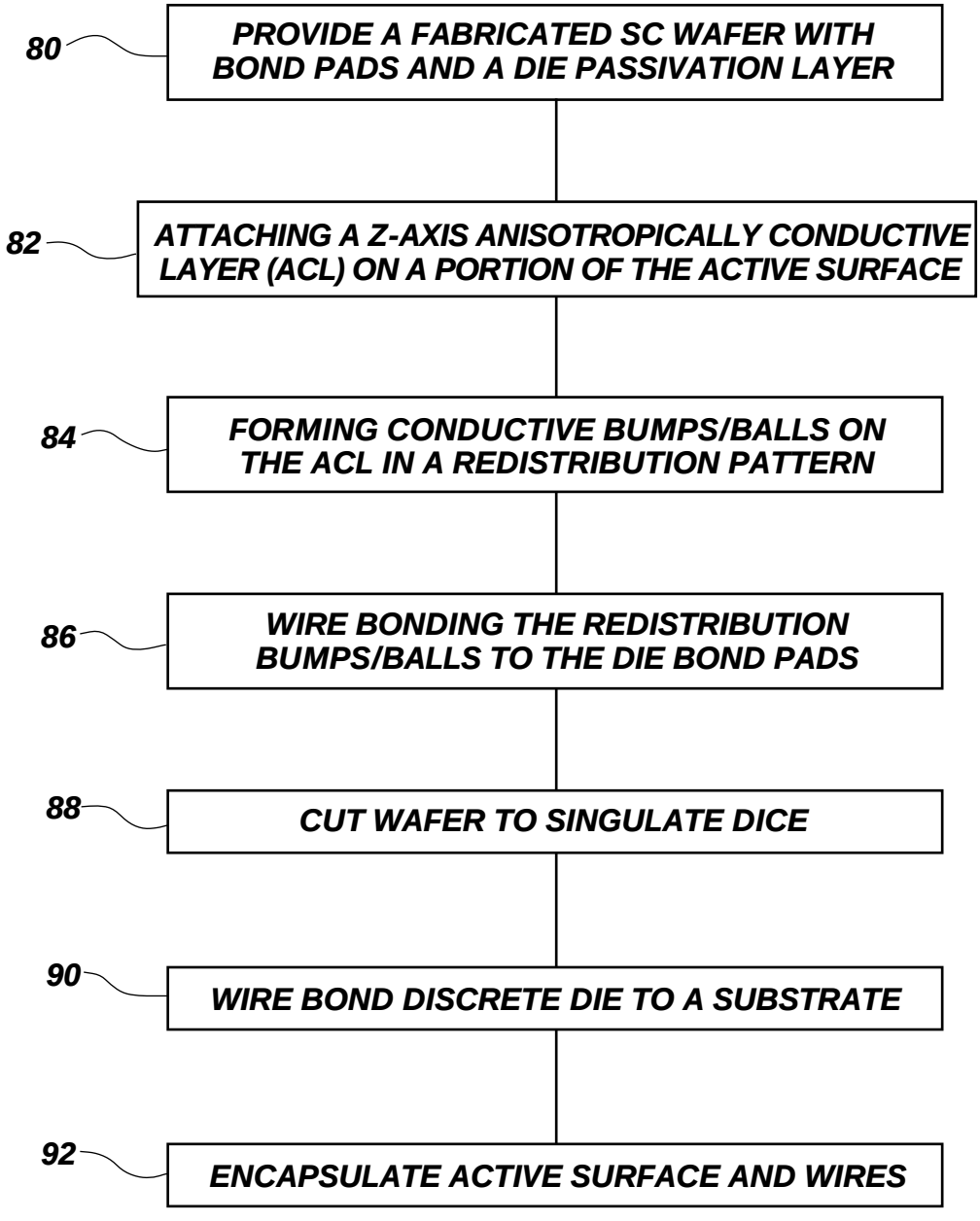

80
PROVIDE A FABRICATED SC WAFER WITH BOND PADS AND A DIE PASSIVATION LAYER
82
ATTACHING A Z-AXIS ANISOTROPICALLY CONDUCTIVE LAYER (ACL) ON A PORTION OF THE ACTIVE SURFACE
84
FORMING CONDUCTIVE BUMPS/BALLS ON THE ACL IN A REDISTRIBUTION PATTERN
86
WIRE BONDING THE REDISTRIBUTION BUMPS/BALLS TO THE DIE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

FIG. 2

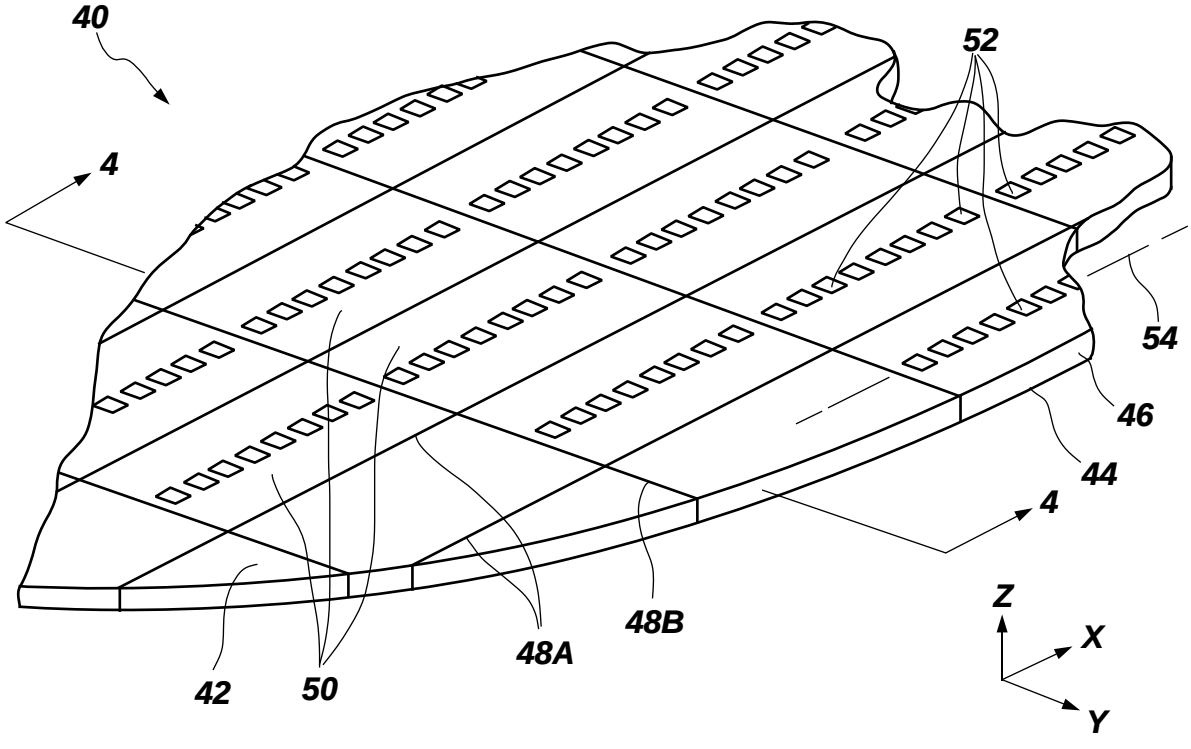


FIG. 3

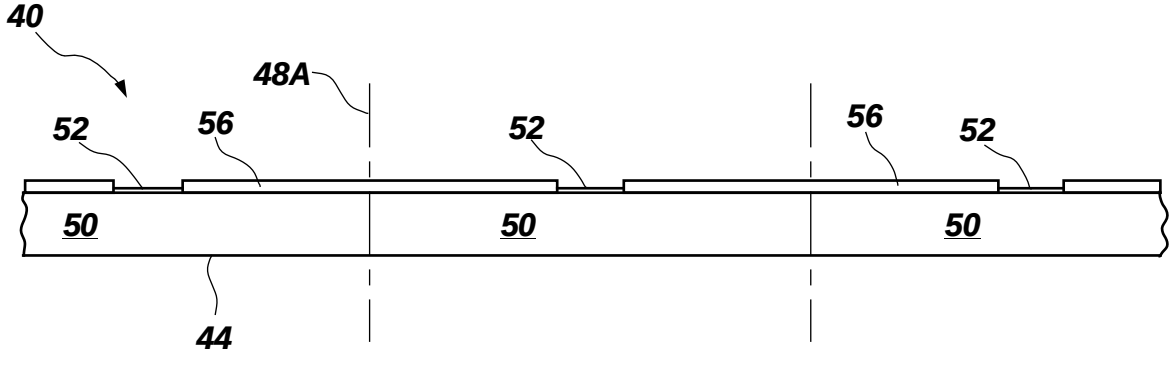


FIG. 4

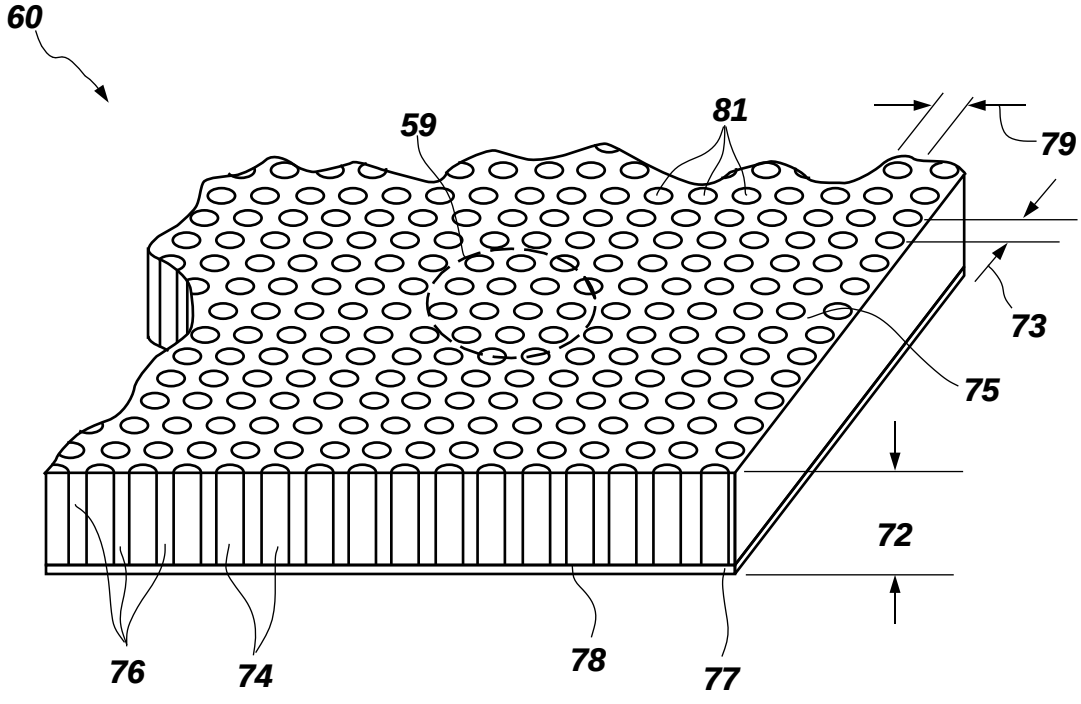


FIG. 5

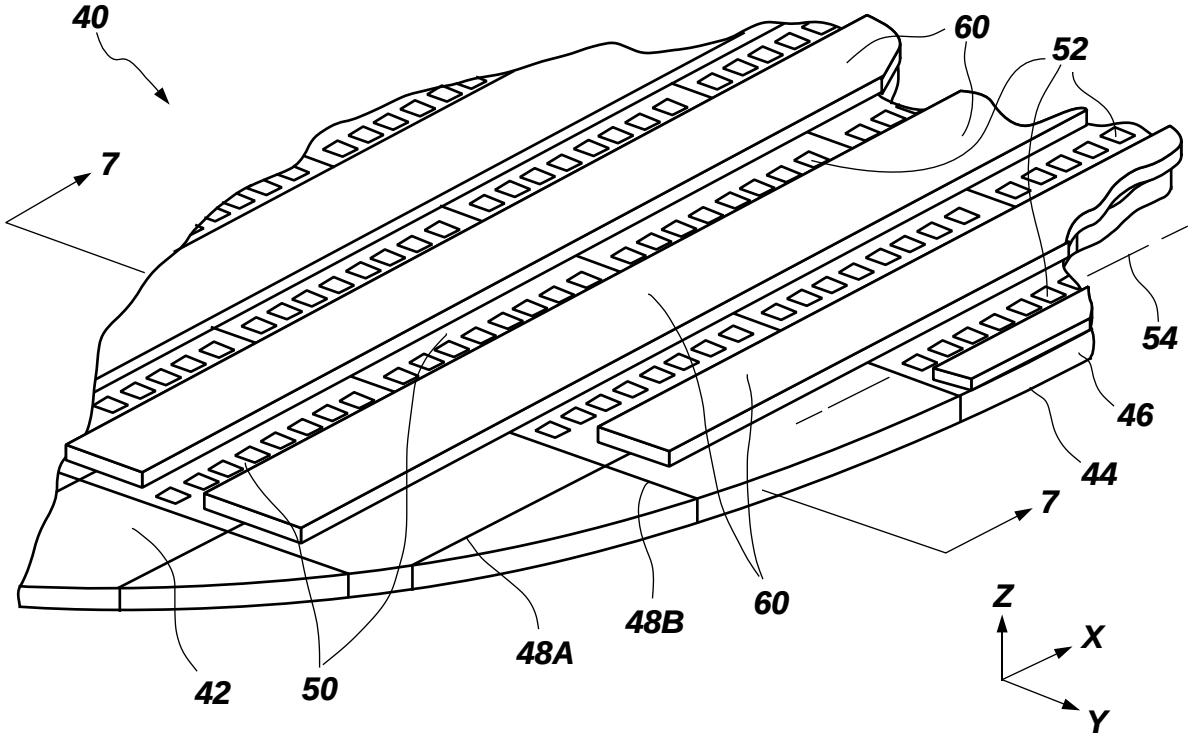

40
7
60
52
54
46
44
7
48B
60
48A
42
50
Z
X
Y

FIG. 6

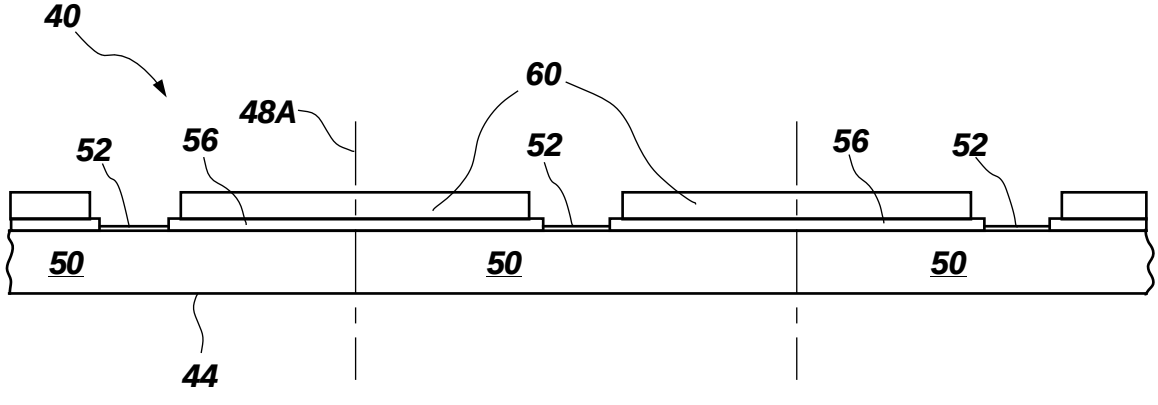

40
48A
60
52
56
52
56
52
50
50
50
44

FIG. 7

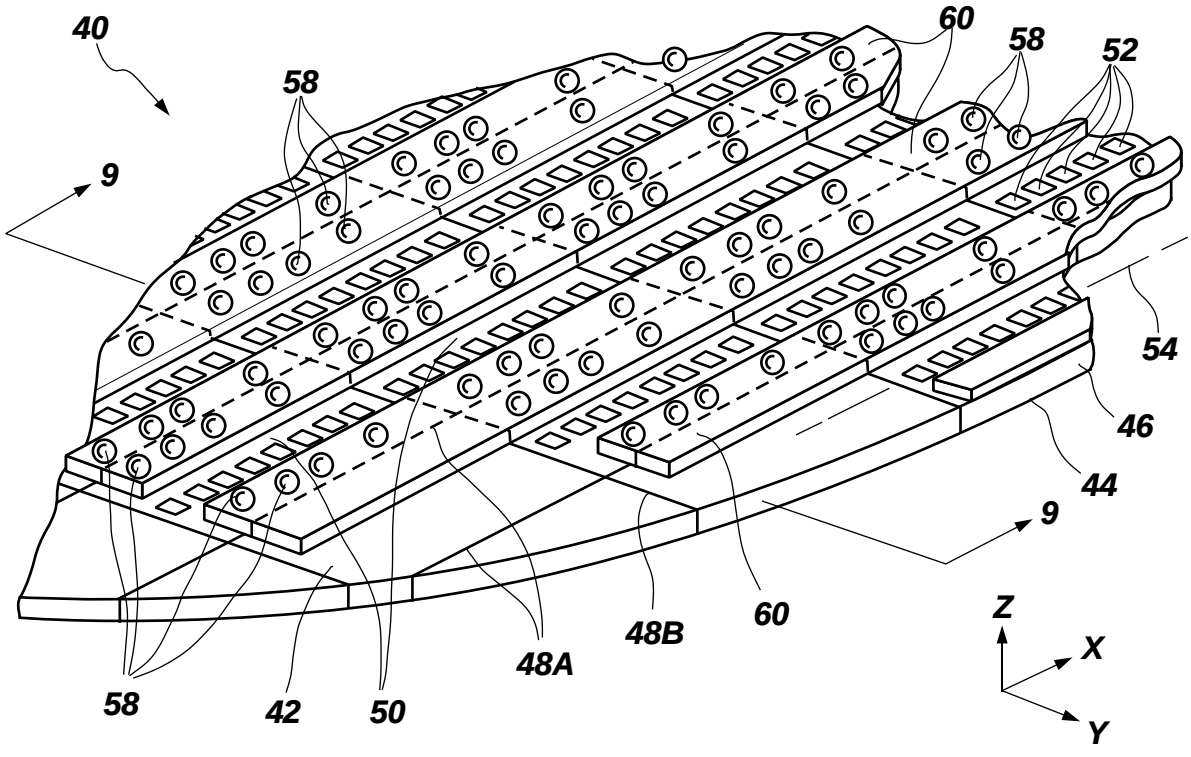

40
58
9
60
58
52
54
46
44
9
48B
60
48A
58
42
50
Z
X
Y

FIG. 8

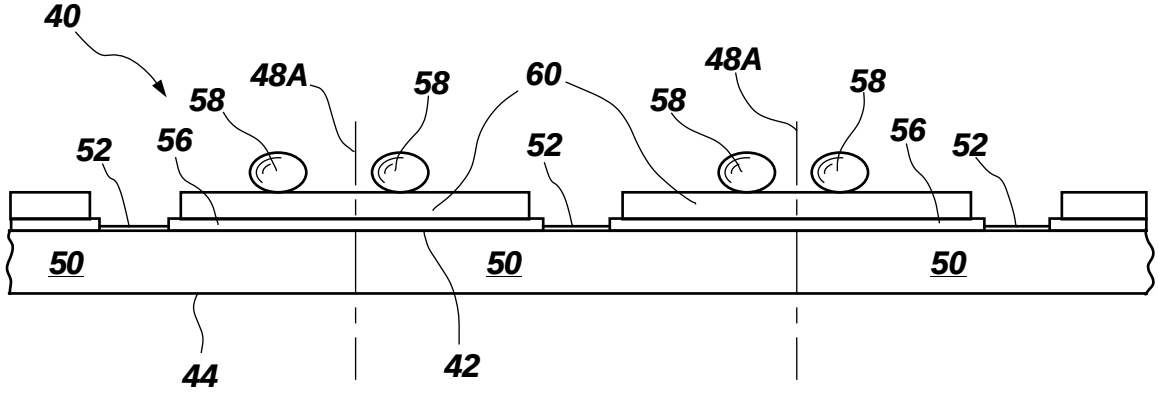

40
48A
58
58
60
58
48A
58
52
56
52
52
56
52
50
50
50
44
42

FIG. 9

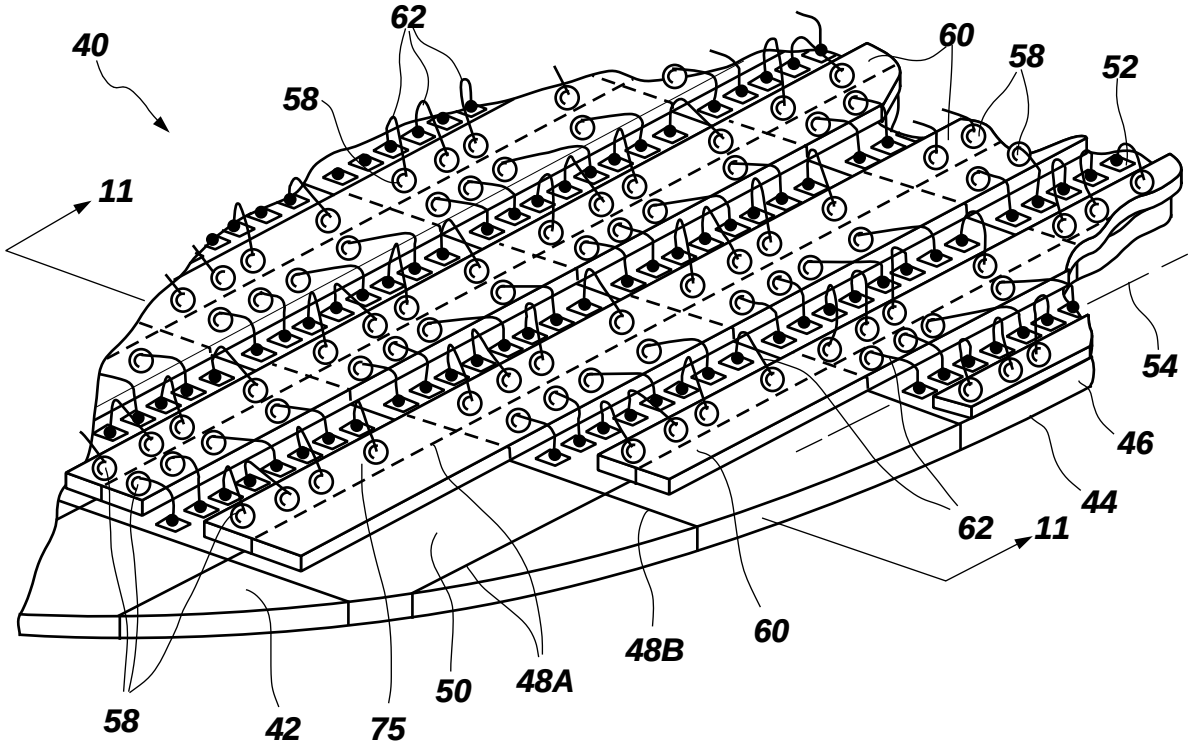

40
62
58
60
58
52
11
54
46
44
62
11
60
48B
48A
50
58
42
75

FIG. 10

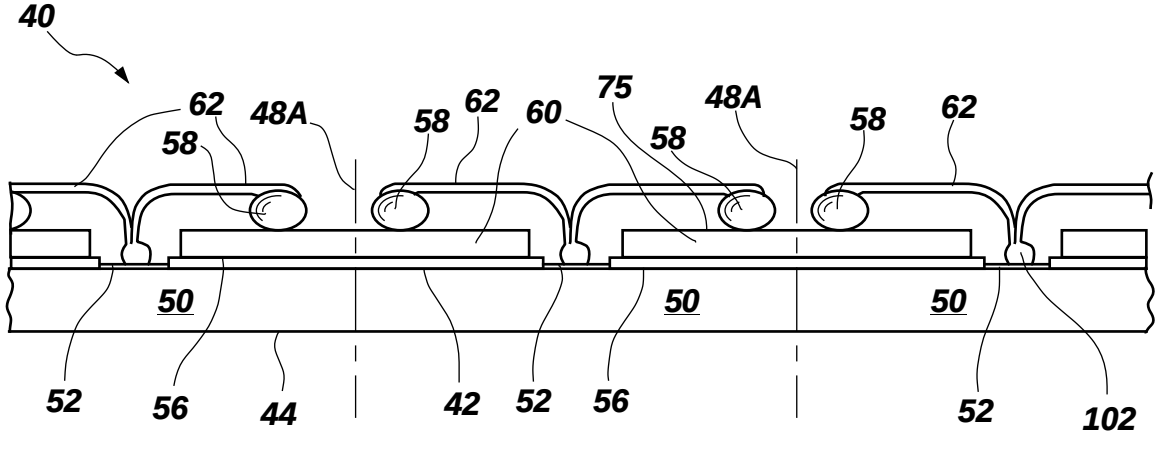

40
62
48A
58
58
62
60
75
58
48A
58
62
50
50
50
52
56
44
42
52
56
52
102

FIG. 11

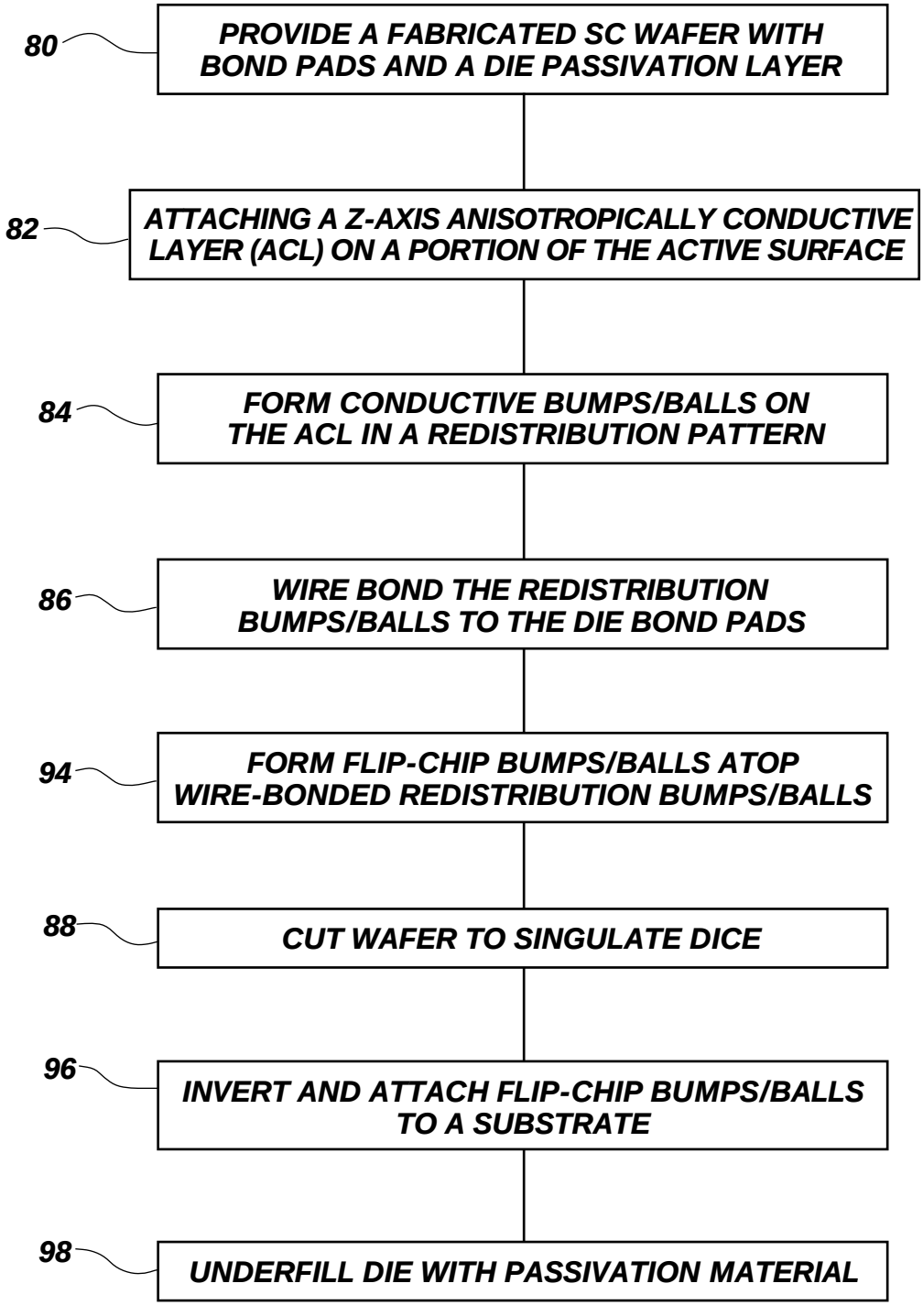

80
PROVIDE A FABRICATED SC WAFER WITH BOND PADS AND A DIE PASSIVATION LAYER
82
ATTACHING A Z-AXIS ANISOTROPICALLY CONDUCTIVE LAYER (ACL) ON A PORTION OF THE ACTIVE SURFACE
84
FORM CONDUCTIVE BUMPS/BALLS ON THE ACL IN A REDISTRIBUTION PATTERN
86
WIRE BOND THE REDISTRIBUTION BUMPS/BALLS TO THE DIE BOND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

FIG. 13

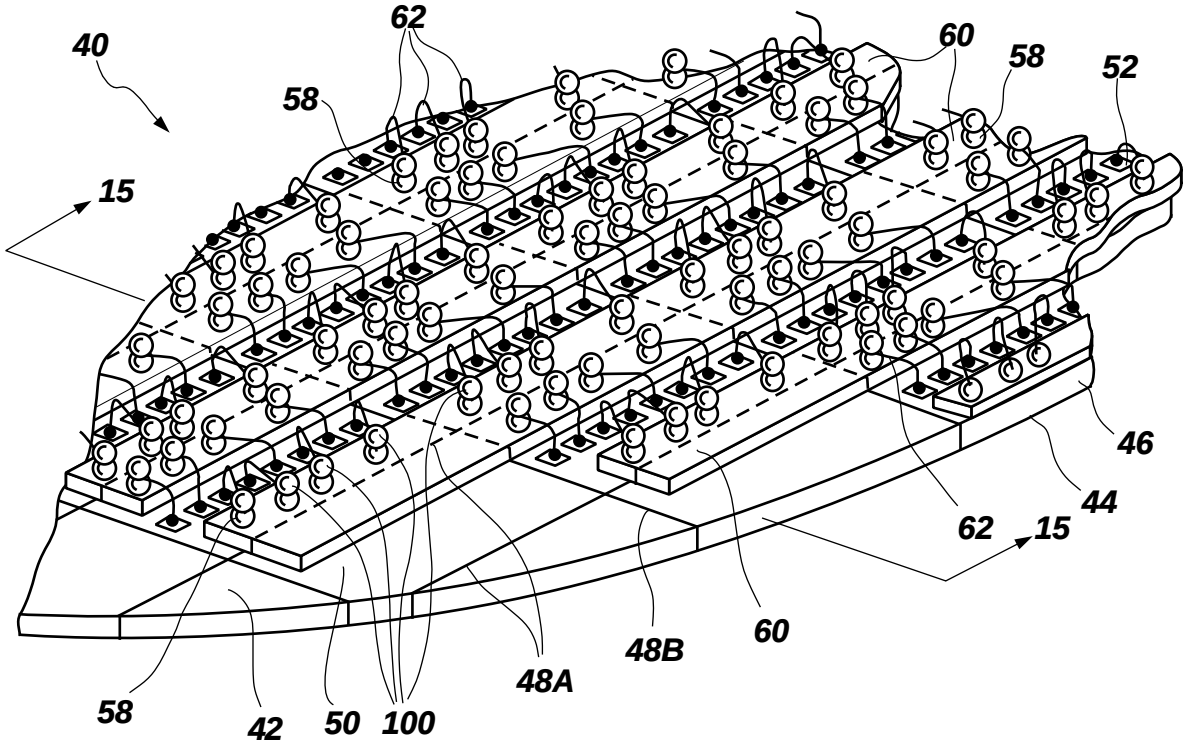

40
62
58
60
58
52
15
46
44
62
15
48B
60
48A
58
42
50
100

FIG. 14

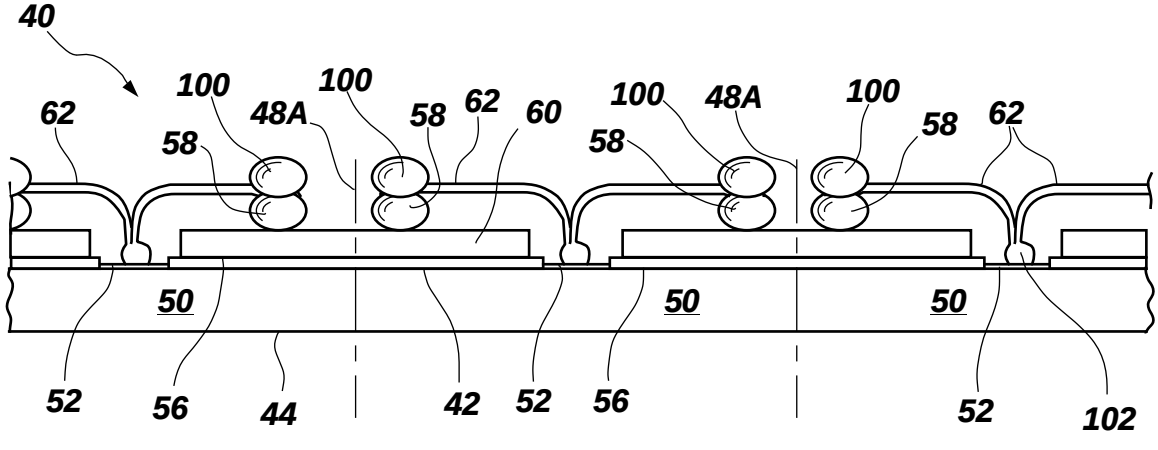

40
100
100
100
62
48A
58
62
60
48A
62
58
58
58
50
50
50
52
56
44
42
52
56
52
102

FIG. 15

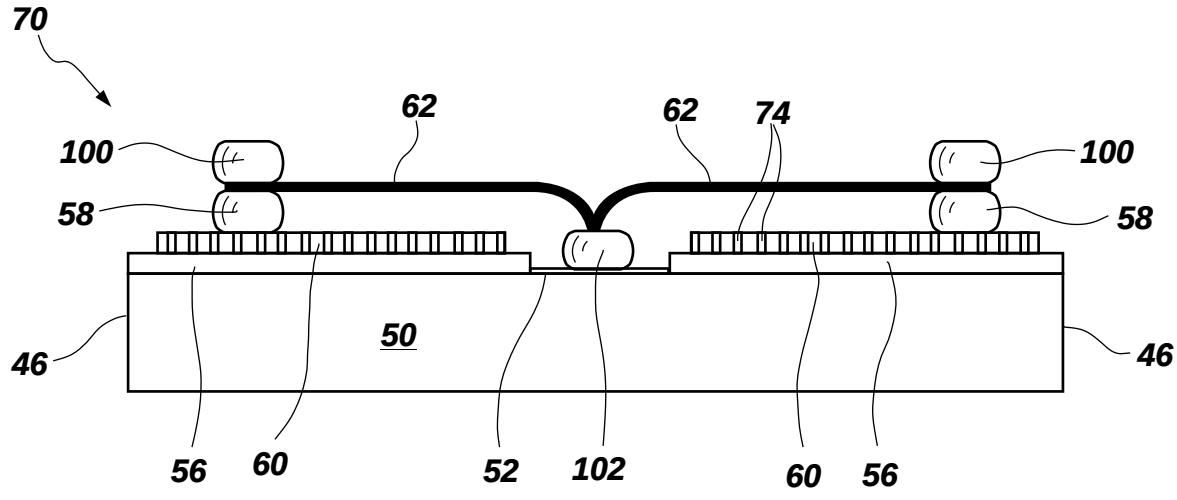

70
62
62
74
100
100
58
58
50
46
46
56
60
52
102
60
56

FIG. 16

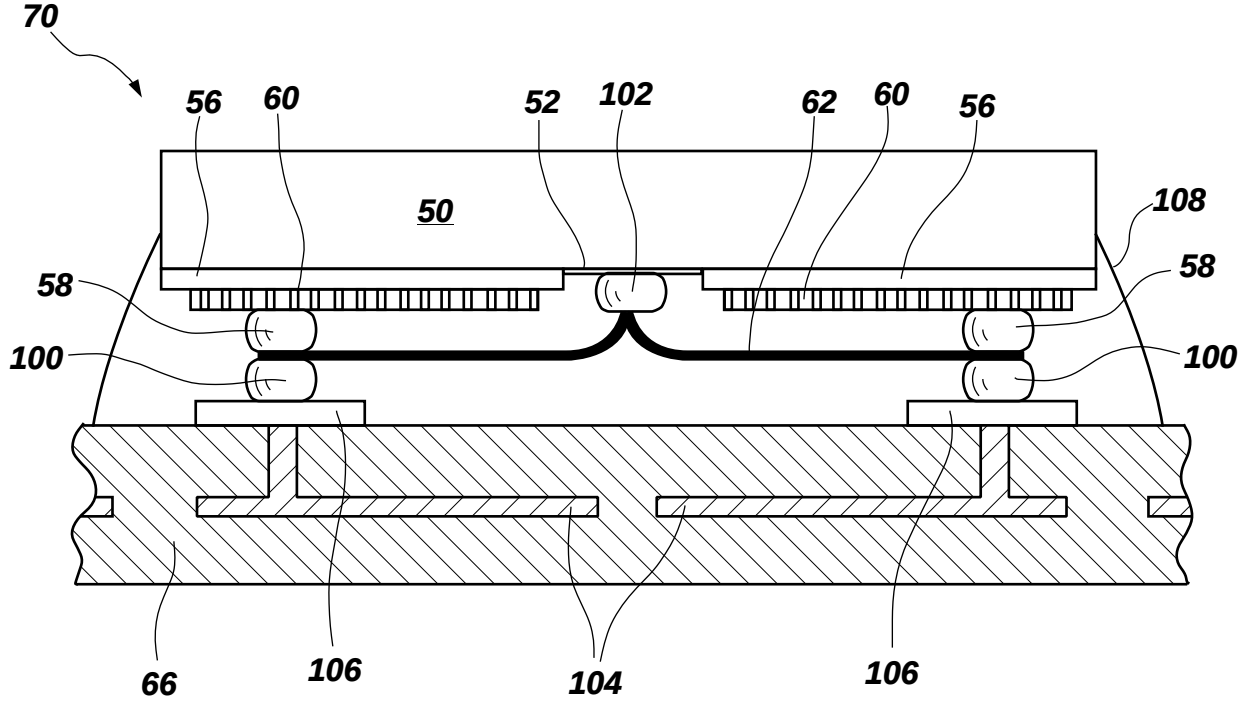

70
56
60
52
102
62
60
56
50
108
58
58
100
100
66
106
104
106

FIG. 17