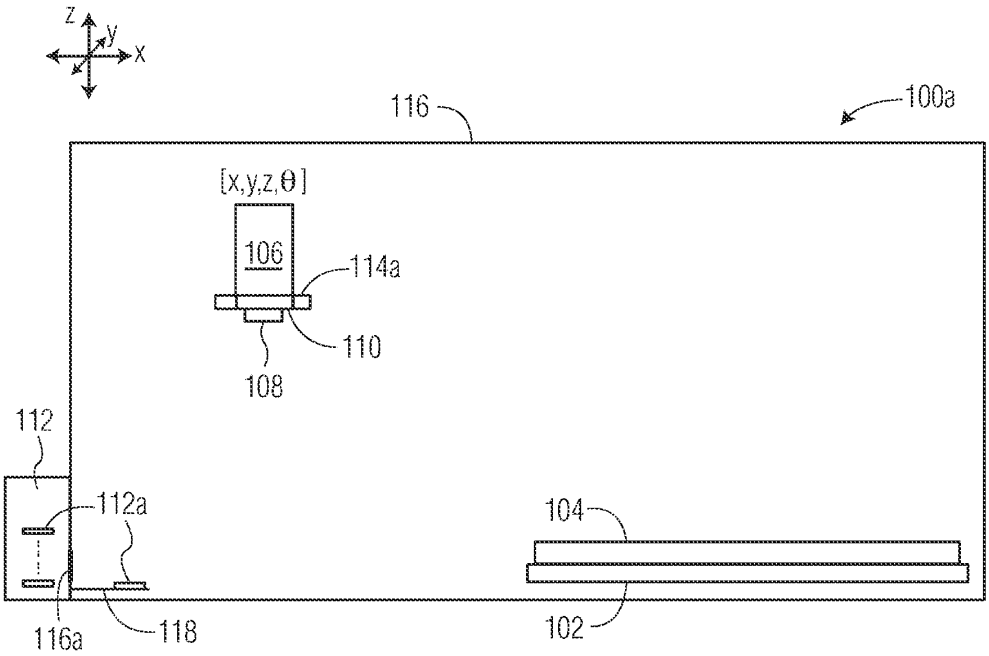

z
y
x
116
100a
[x,y,z,θ]
106
114a
110
108
112
112a
104
116a
118
102

FIG. 1A

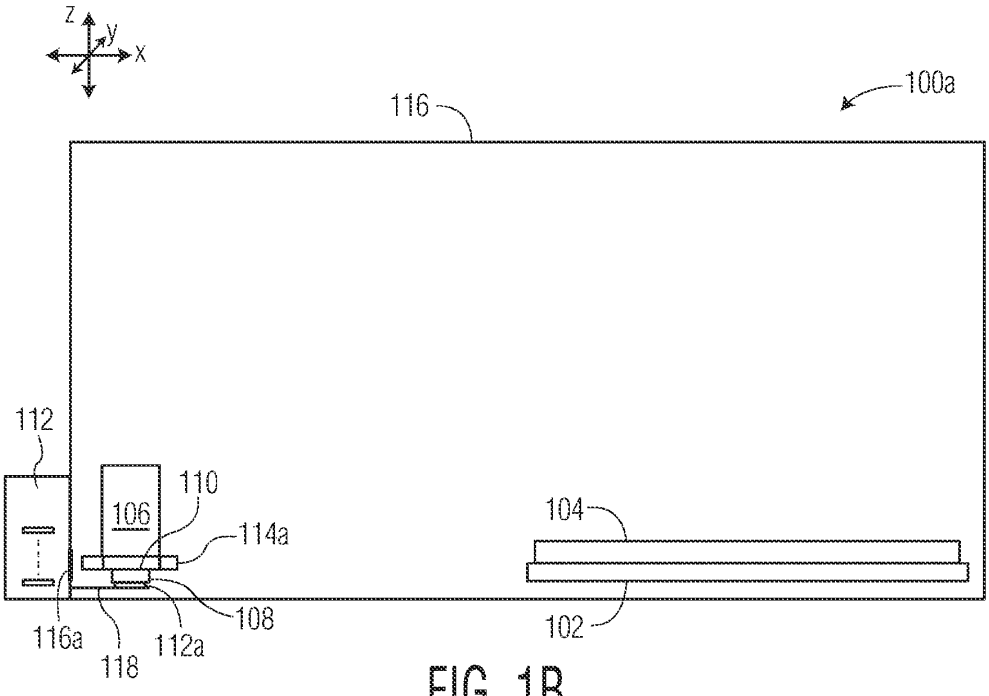

z
y
x
116
100a
112
110
106
114a
104
116a
118
112a
108
102

FIG. 1B

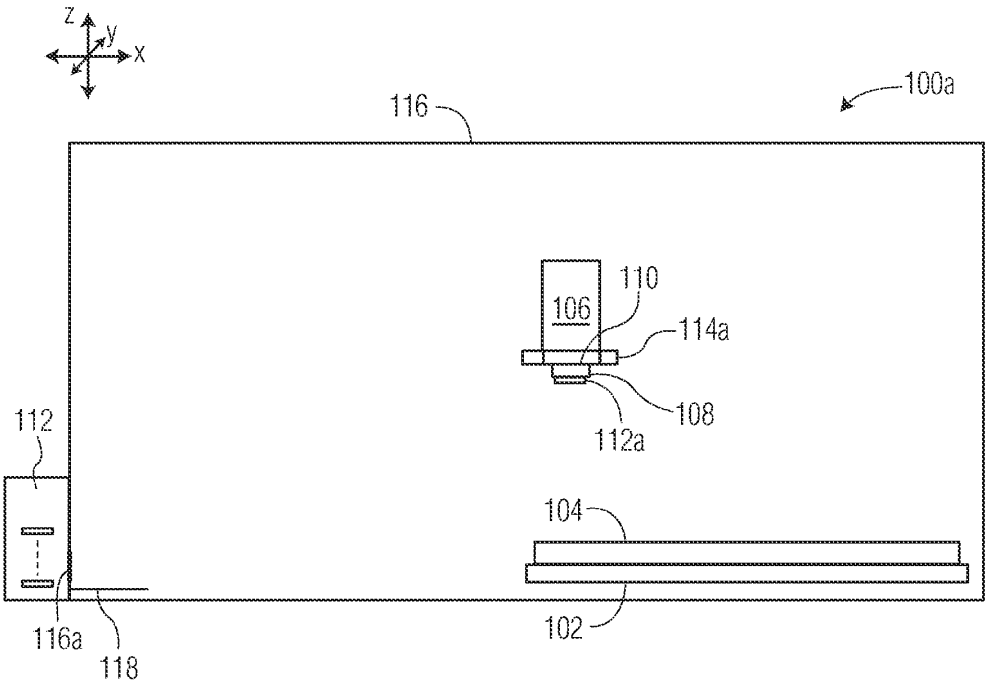

z
y
x
100a
116
110
106
114a
108
112a
112
104
102
116a
118

FIG. 1C

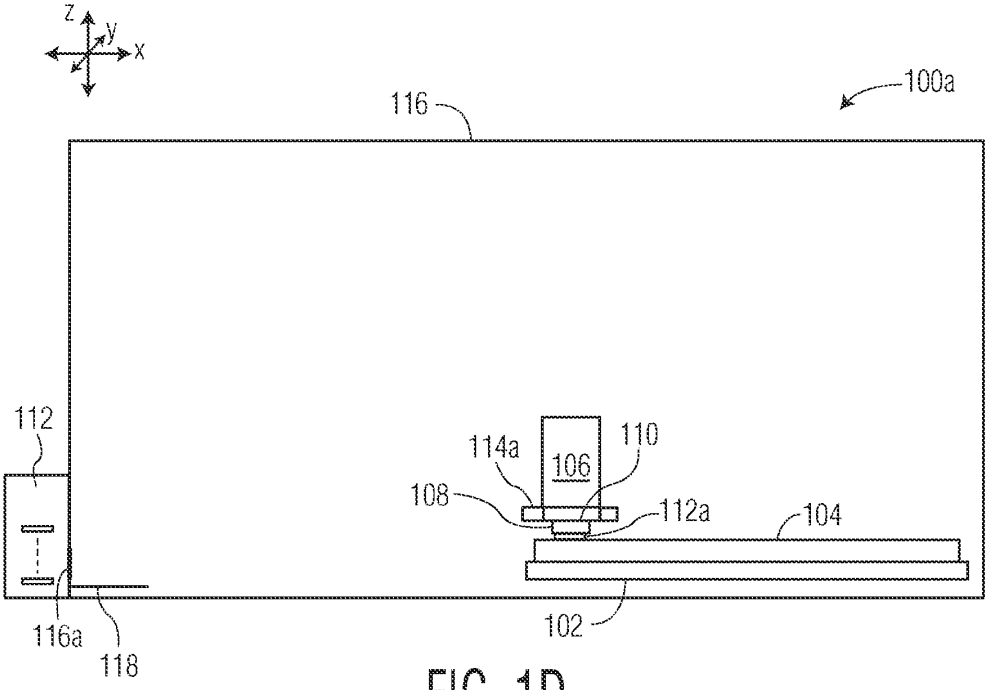

z
y
x
100a
116
112
114a
110
106
108
112a
104
102
116a
118

FIG. 1D

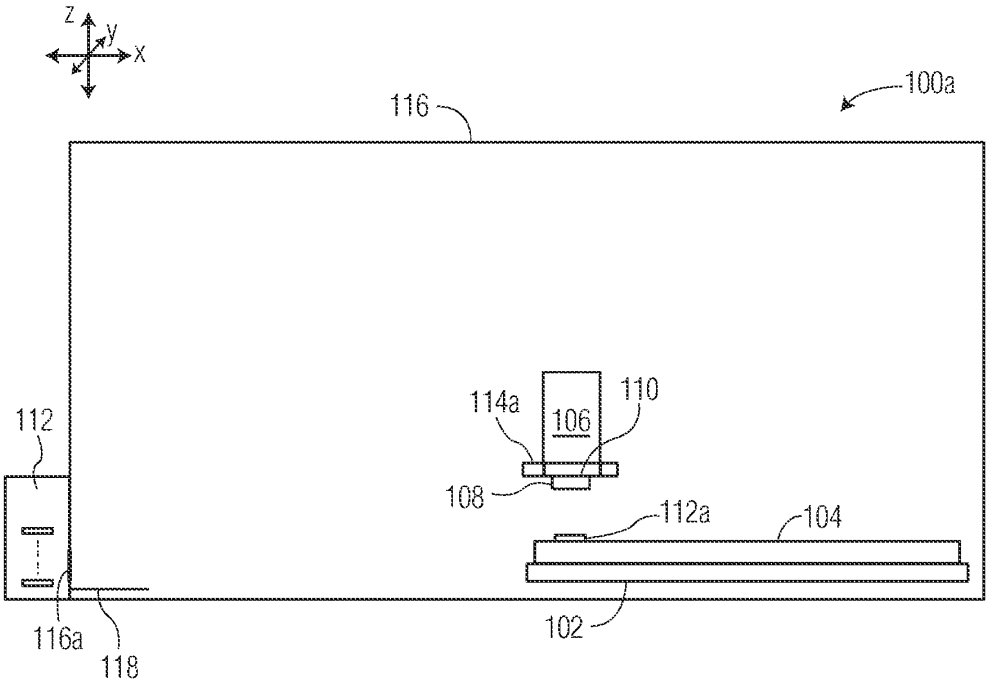

z
y
x
116
100a
112
114a
106
110
108
112a
104
102
116a
118

FIG. 1E

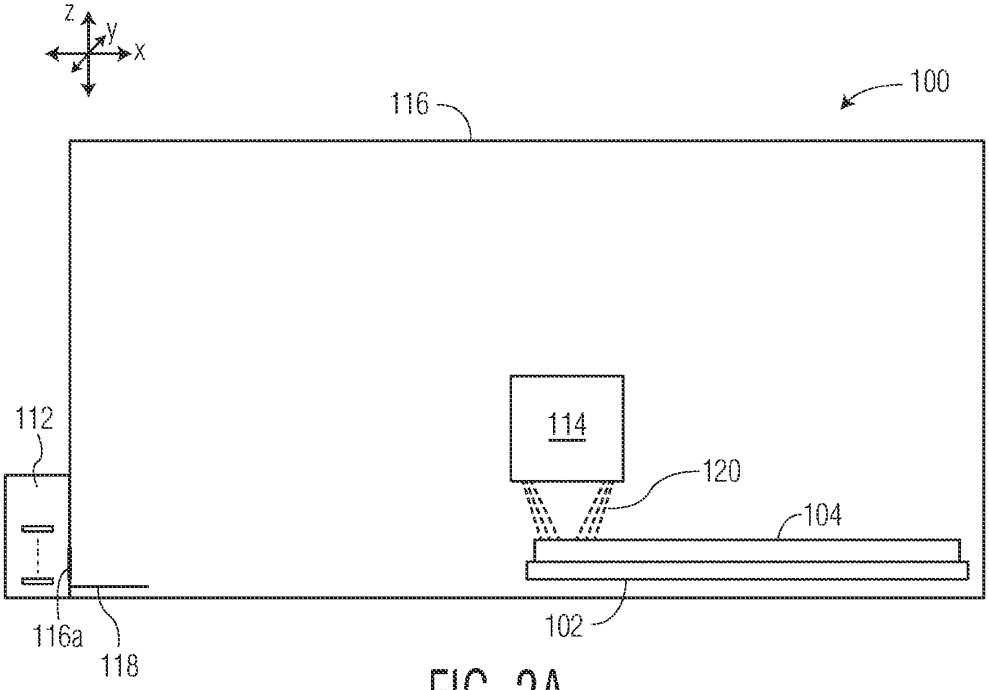

z
y
x
116
100
112
114
120
104
102
116a
118

FIG. 2A

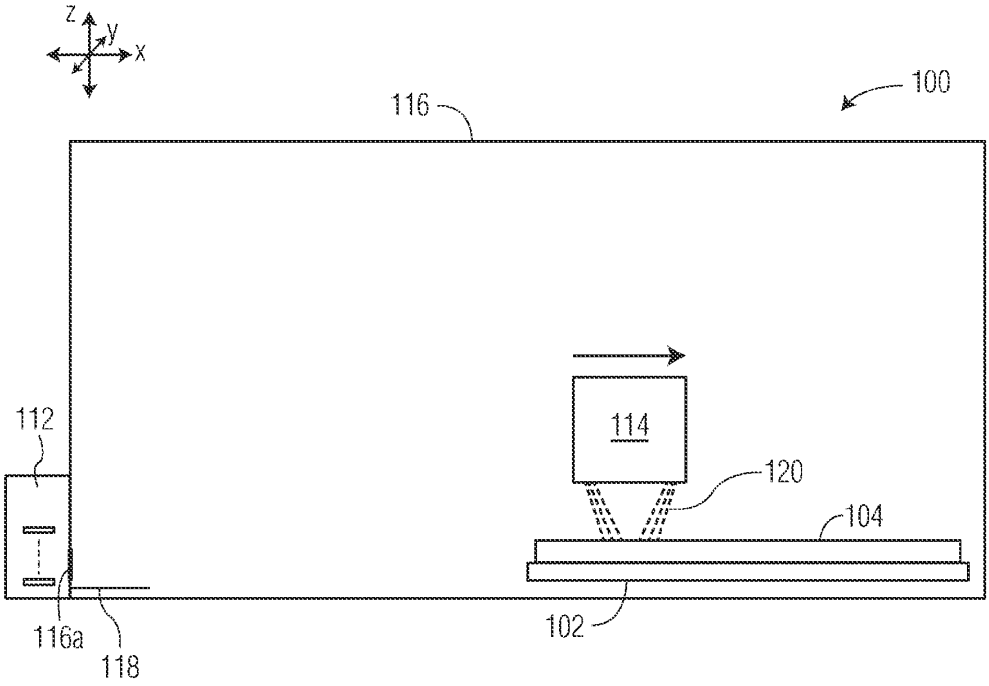

z
y
x
100
116
112
114
120
104
102
116a
118

FIG. 2B

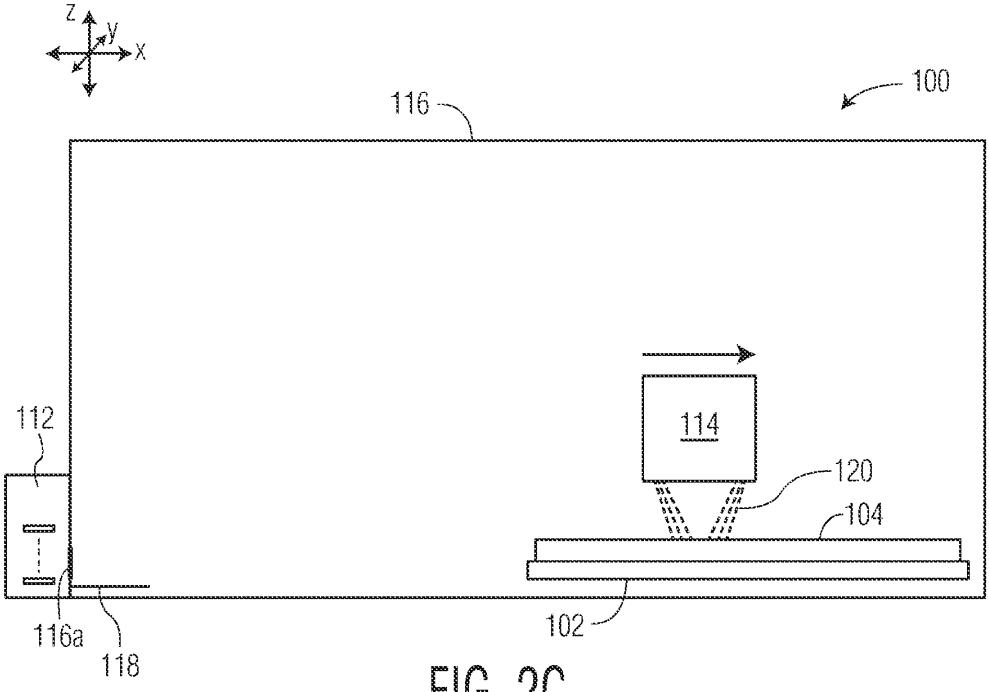

z
y
x
100
116
112
114
120
104
102
116a
118

FIG. 2C

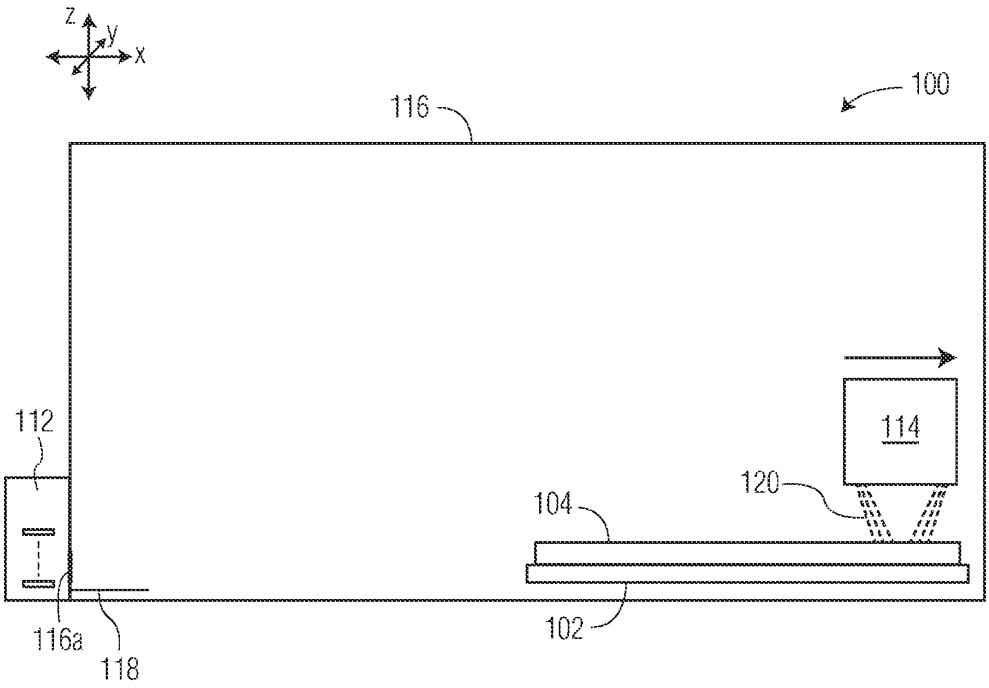

z
y
x
116
100
112
114
120
104
102
116a
118

FIG. 2D

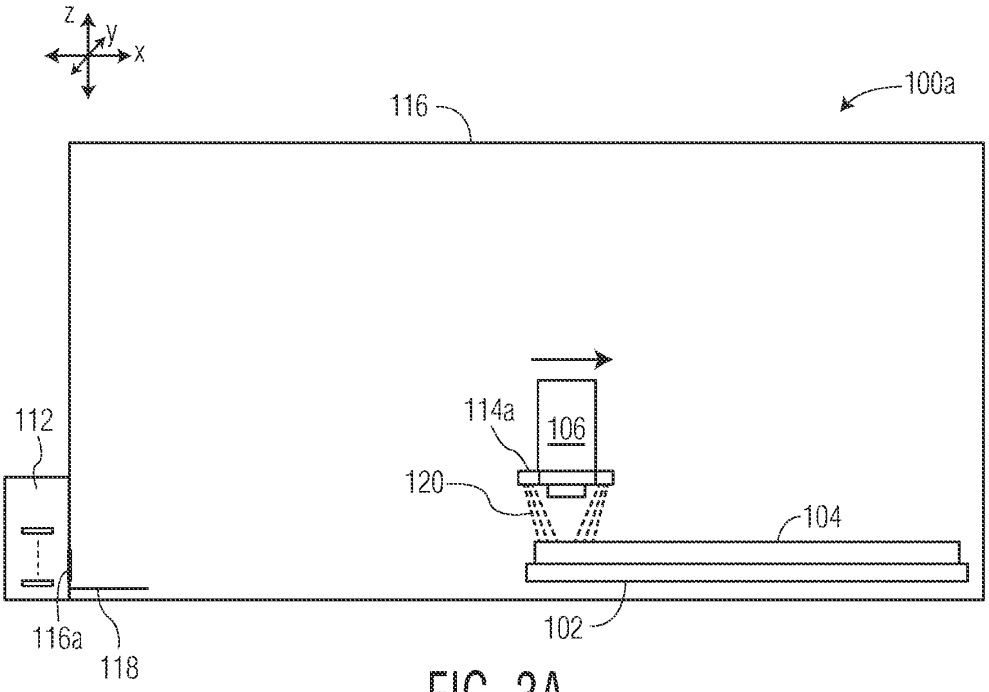

z
y
x
116
100a
112
114a
106
120
104
102
116a
118

FIG. 3A

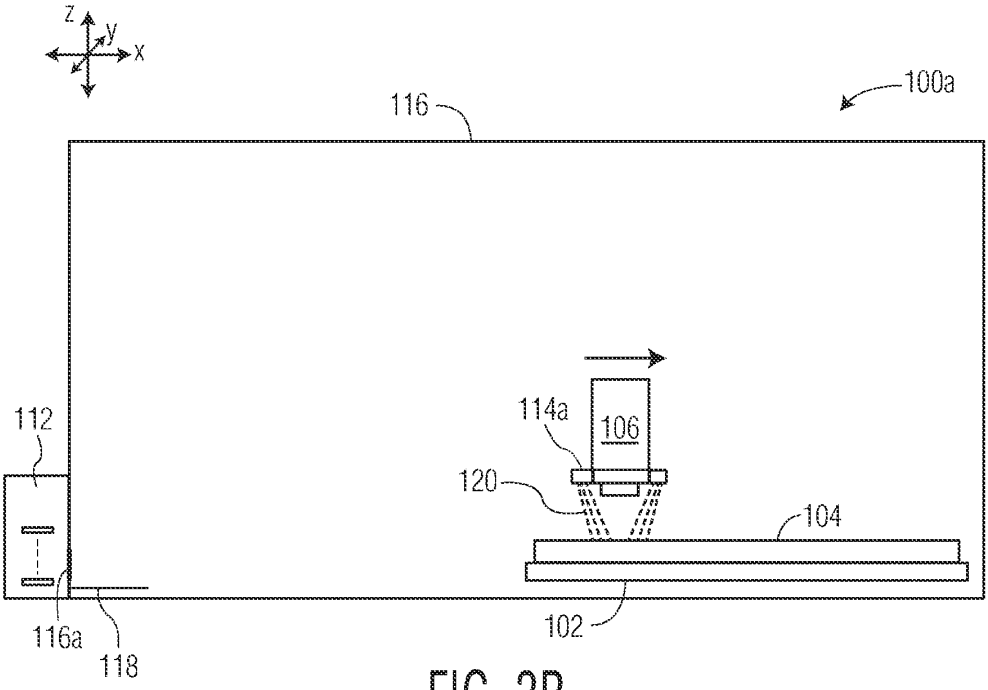

z
y
x
116
100a
112
114a
106
120
104
116a
118
102

FIG. 3B

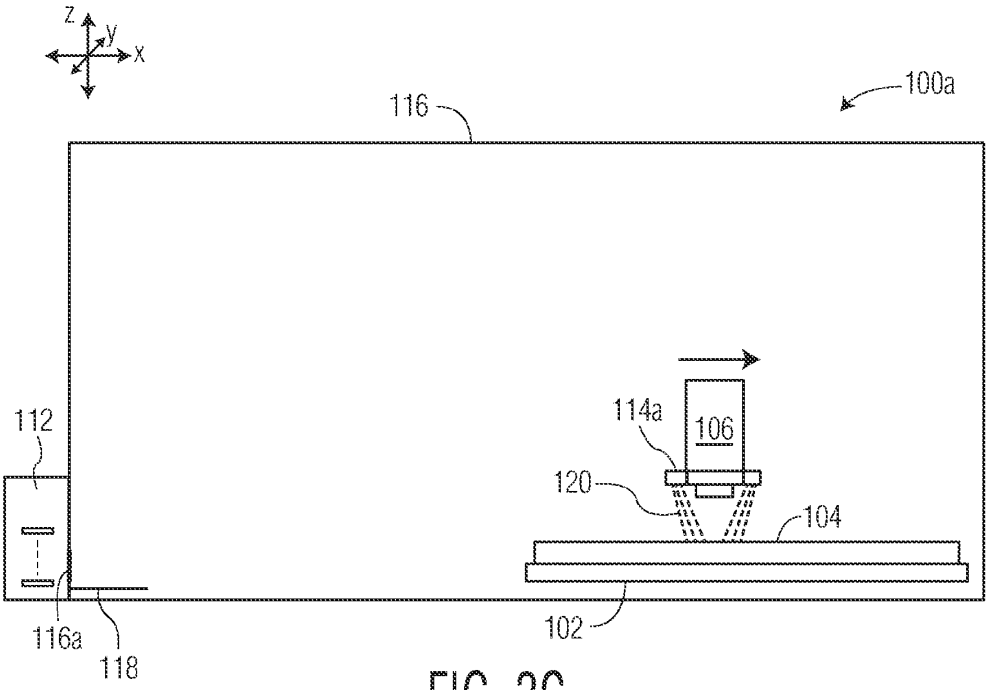

z
y
x
116
100a
112
114a
106
120
104
116a
118
102

FIG. 3C

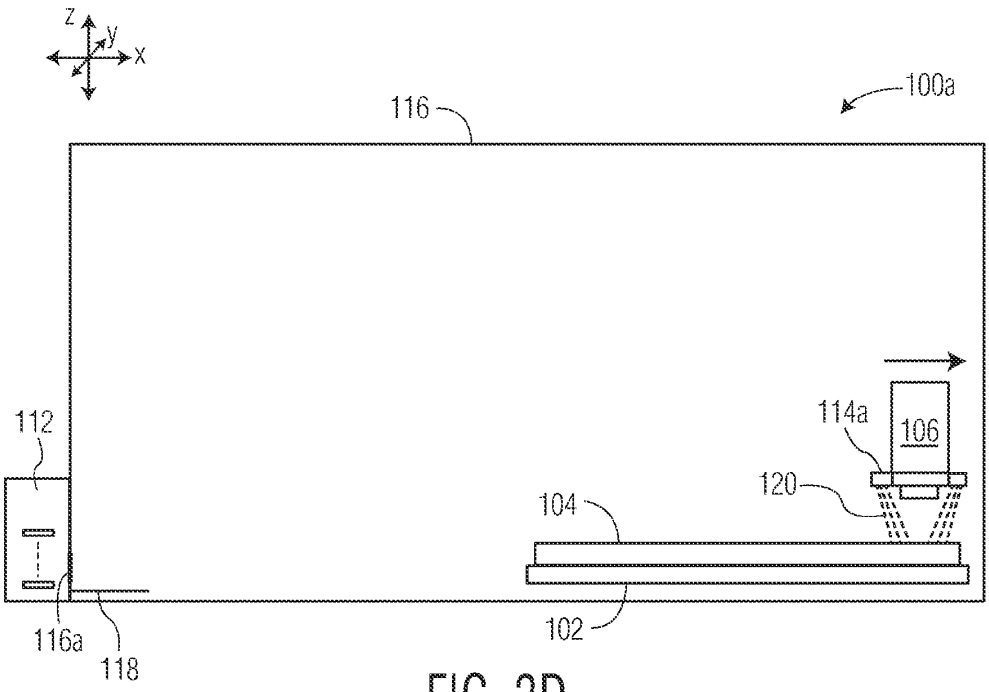


FIG. 3D

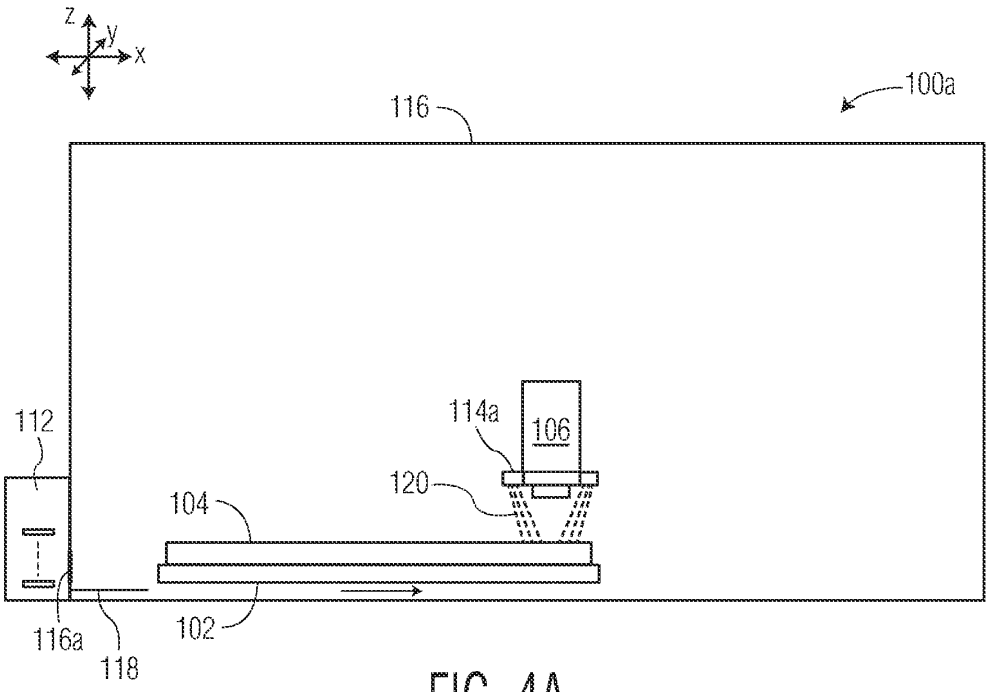

z
y
x
100a
116
112
114a
106
120
104
102
116a
118

FIG. 4A

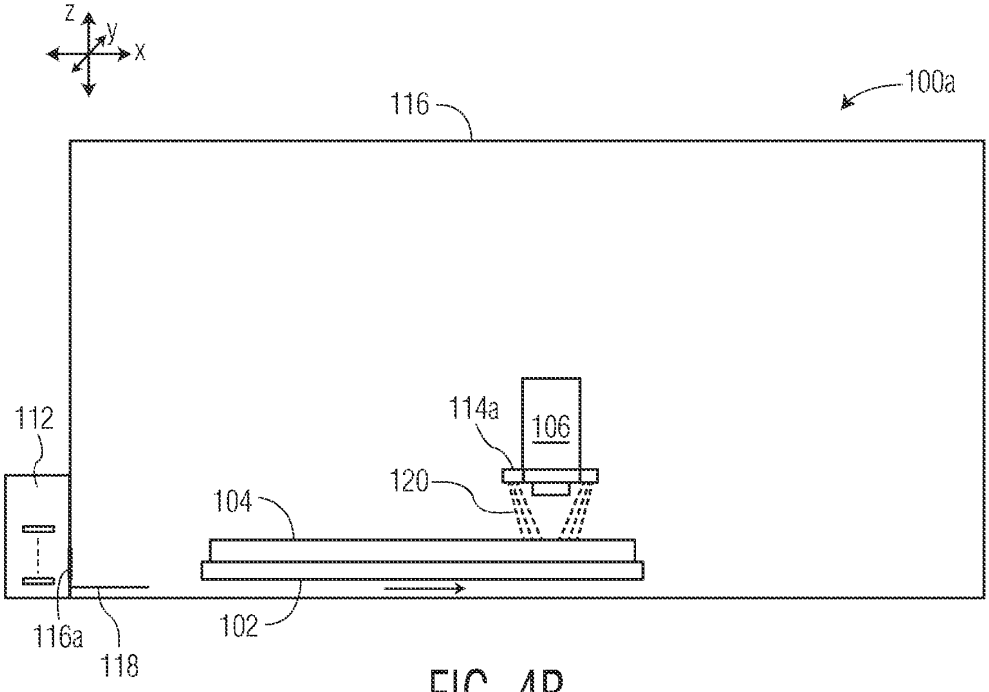

z
y
x
100a
116
112
114a
106
120
104
102
116a
118

FIG. 4B

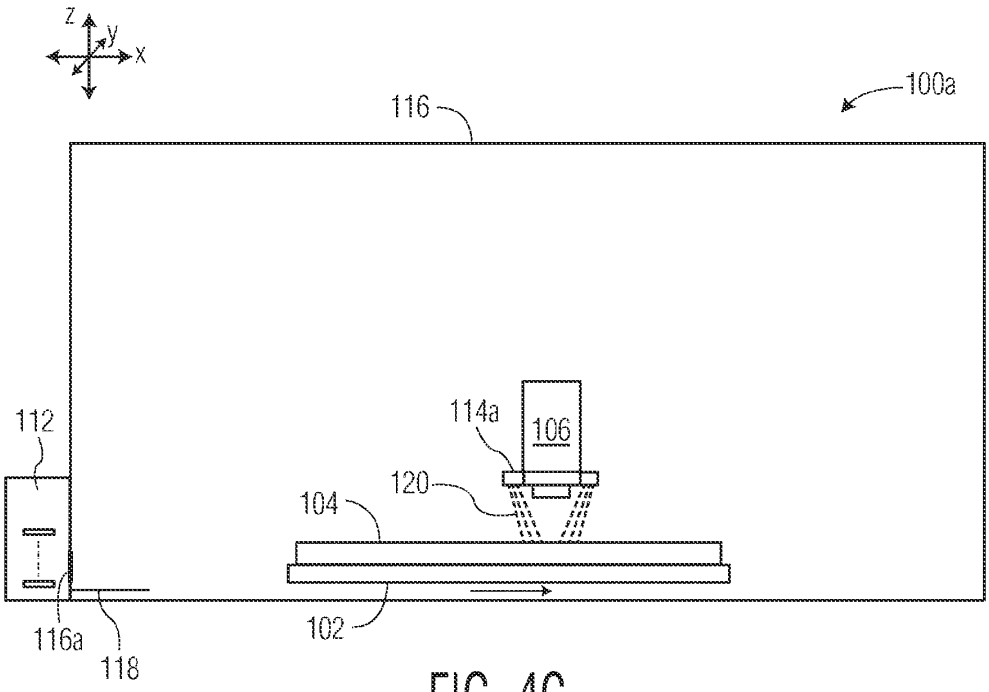

z
y
x
116
100a
112
114a
106
120
104
102
116a
118

FIG. 4C

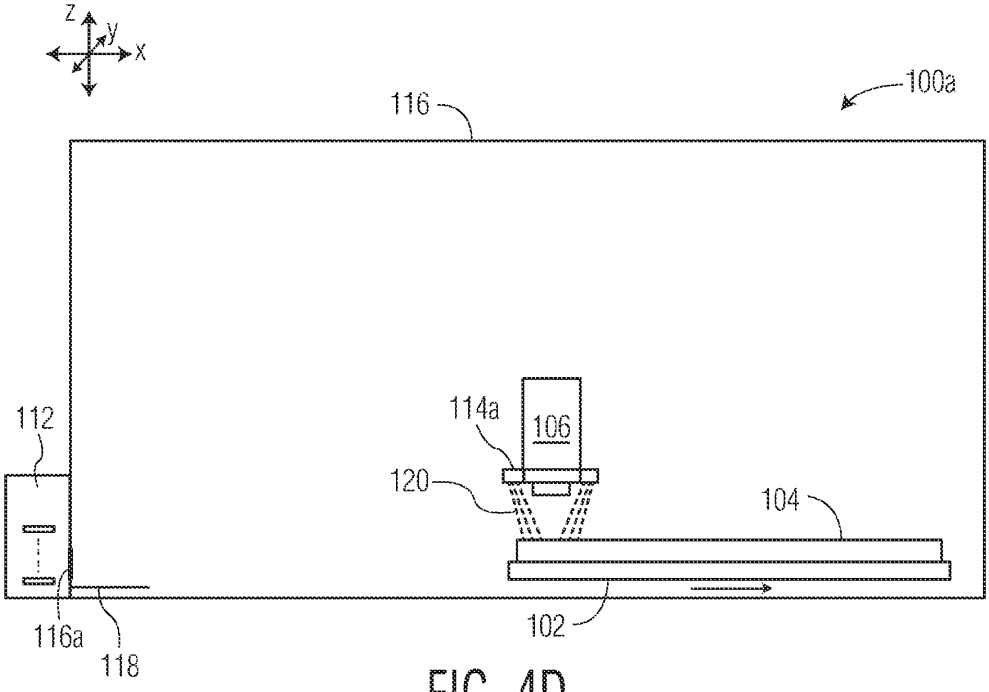

z
y
x
116
100a
112
114a
106
120
104
102
116a
118

FIG. 4D

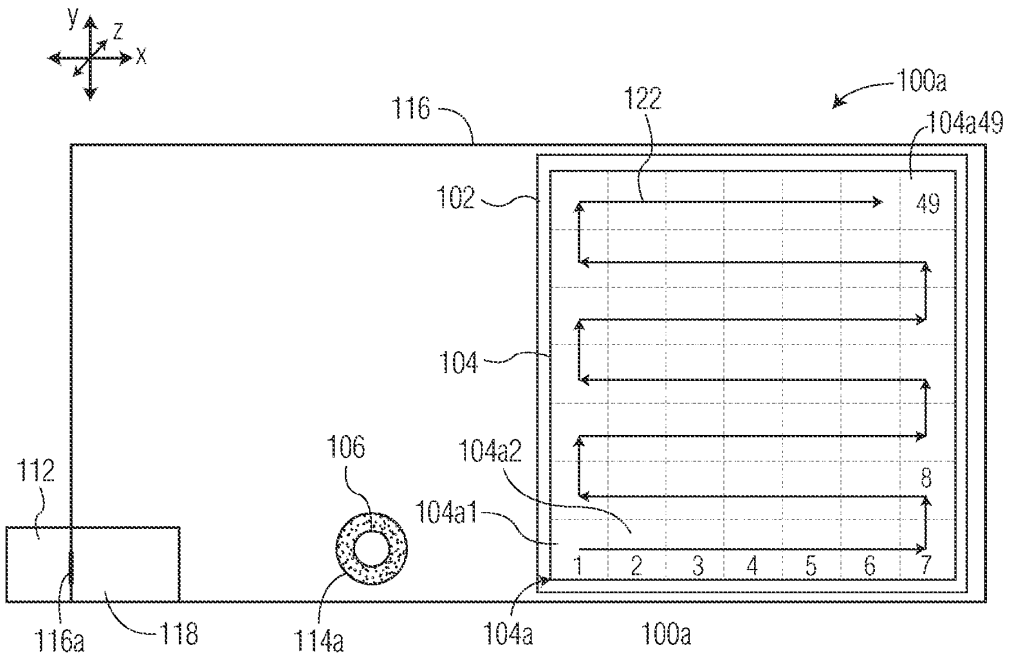

y
z
x
100a
116
122
104a49
102
49
104
106
104a2
112
8
104a1
1
2
3
4
5
6
7
116a
118
114a
104a
100a

FIG. 5A

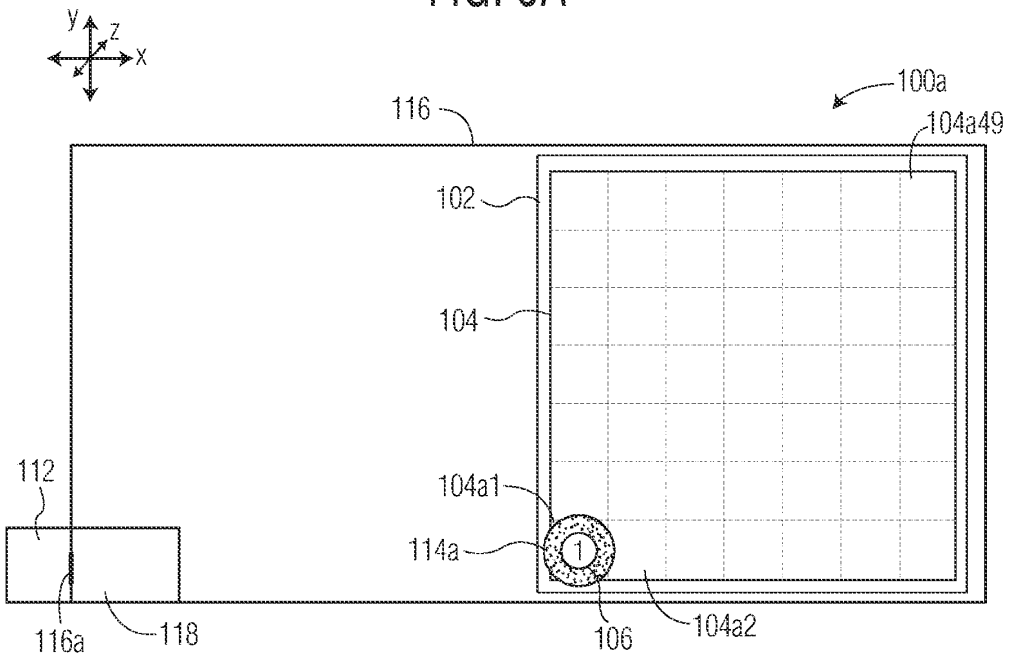

y
z
x
100a
116
104a49
102
104
112
104a1
114a
1
116a
118
106
104a2

FIG. 5B

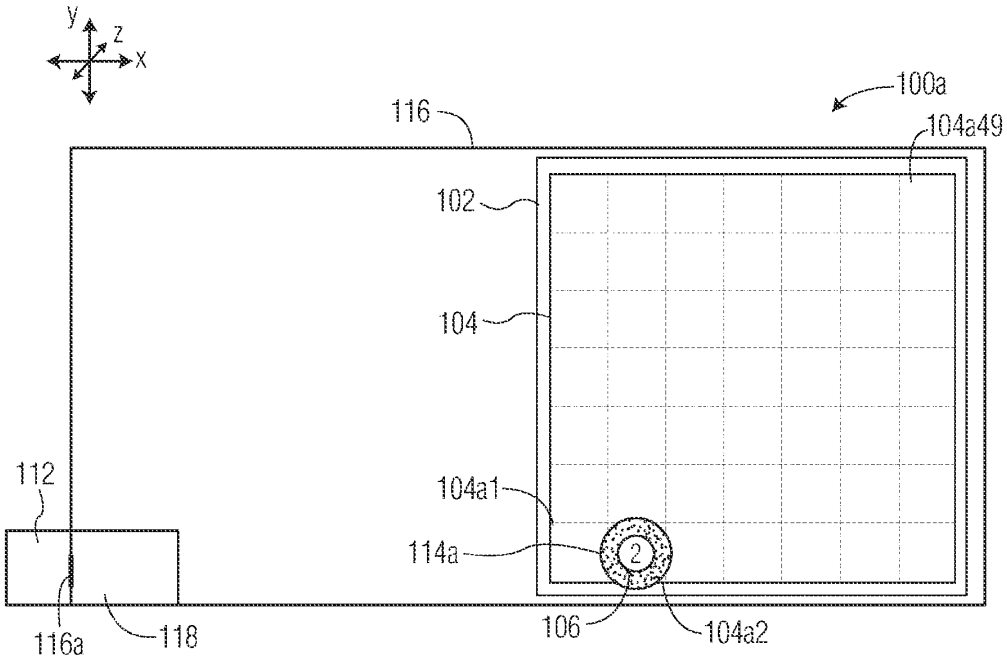

y
z
x
100a
116
104a49
102
104
112
104a1
114a
2
116a
118
106
104a2

FIG. 5C

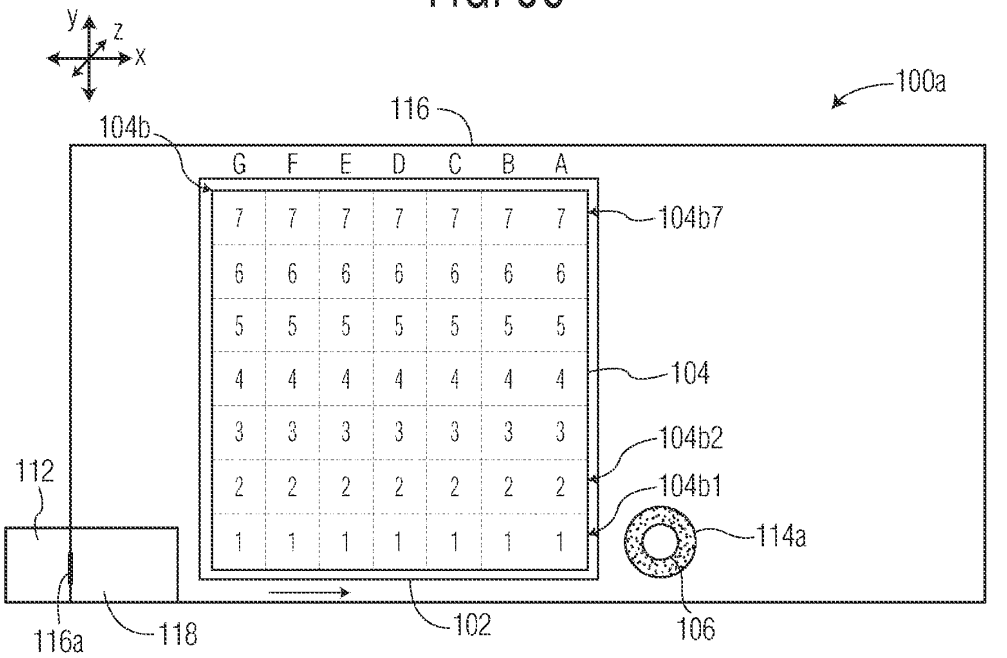

y
z
x
100a
116
104b
G F E D C B A
7 7 7 7 7 7 7
6 6 6 6 6 6 6
5 5 5 5 5 5 5
4 4 4 4 4 4 4
3 3 3 3 3 3 3
2 2 2 2 2 2 2
1 1 1 1 1 1 1
104b7
104
104b2
104b1
114a
112
116a
118
102
106

FIG. 6A

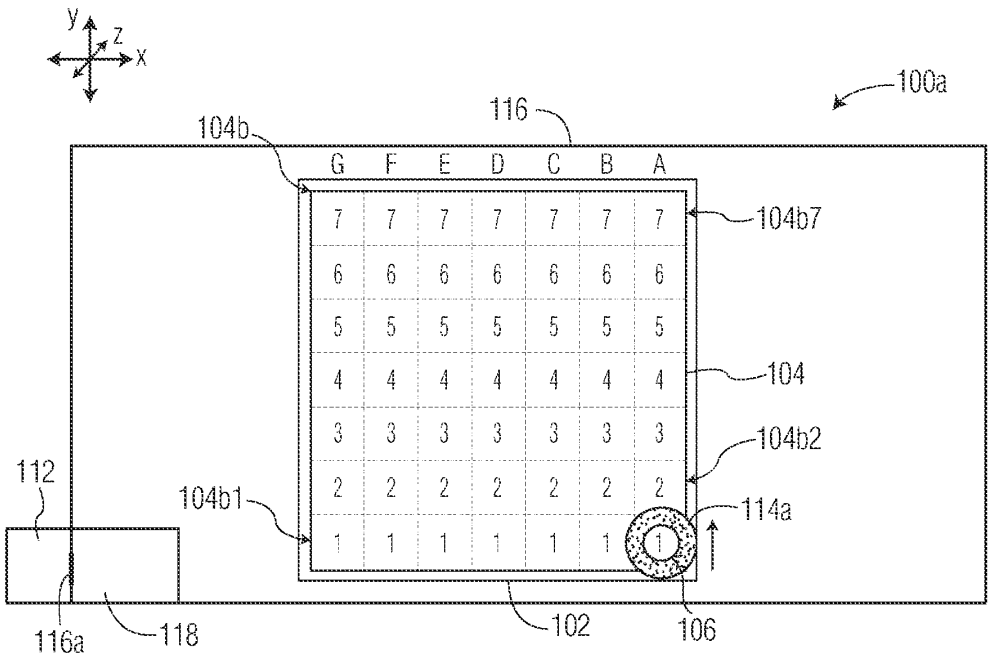

y
z
x
100a
116
104b
G F E D C B A
7 7 7 7 7 7 7
6 6 6 6 6 6 6
5 5 5 5 5 5 5
4 4 4 4 4 4 4
3 3 3 3 3 3 3
2 2 2 2 2 2 2
1 1 1 1 1 1 1
104b7
104
104b2
114a
112
104b1
116a
118
102
106

FIG. 6B

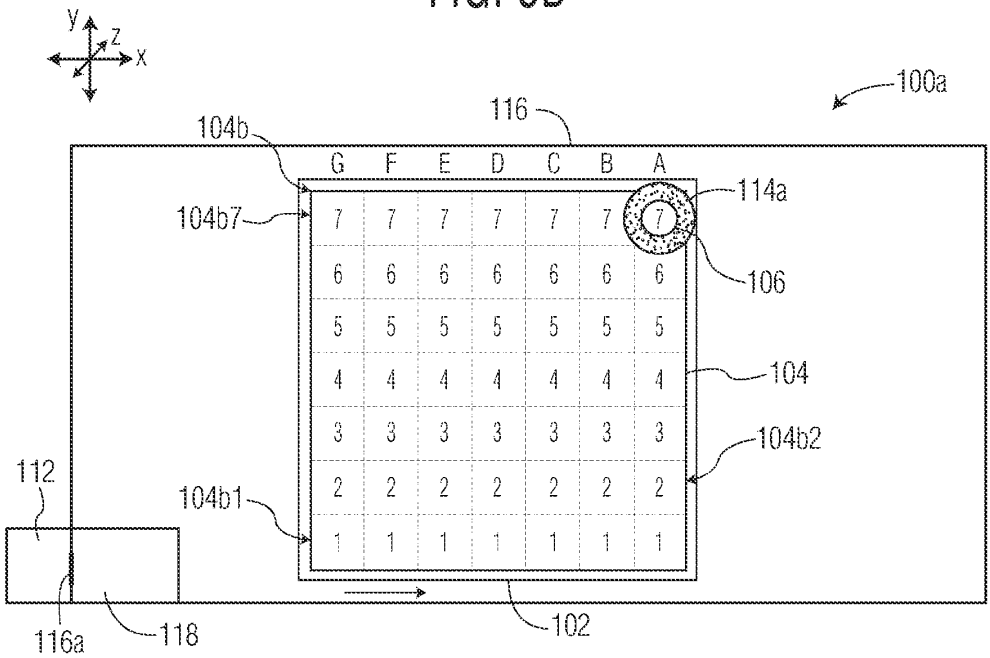

y
z
x
100a
116
104b
G F E D C B A
7 7 7 7 7 7 7
6 6 6 6 6 6 6
5 5 5 5 5 5 5
4 4 4 4 4 4 4
3 3 3 3 3 3 3
2 2 2 2 2 2 2
1 1 1 1 1 1 1
114a
104b7
106
104
104b2
112
104b1
116a
118
102

FIG. 6C

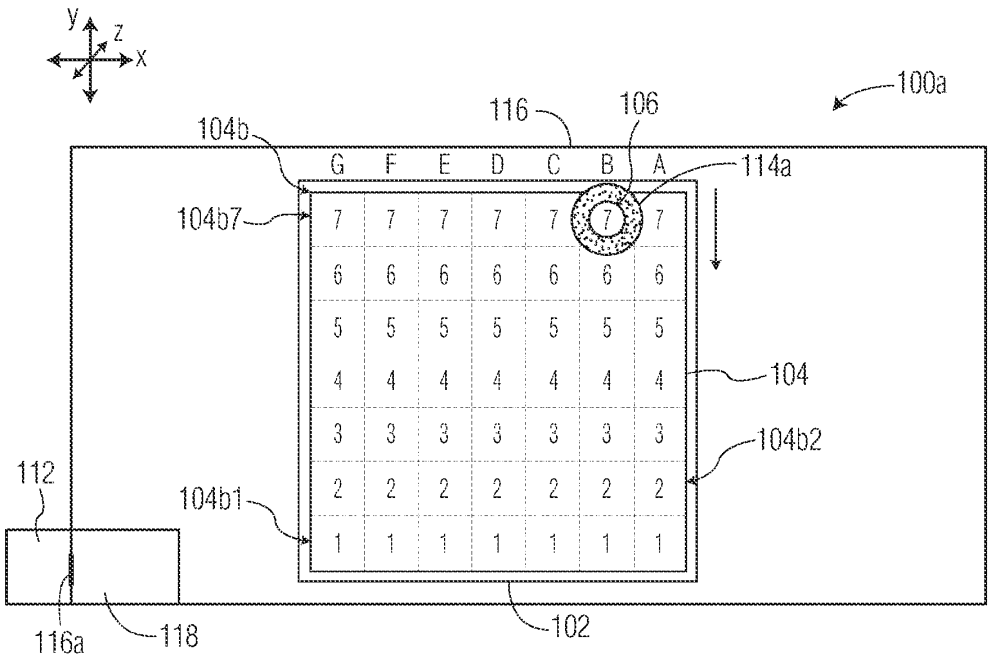

y
z
x
100a
116
106
104b
G F E D C B A
114a
104b7
7 7 7 7 7 7 7
6 6 6 6 6 6 6
5 5 5 5 5 5 5
4 4 4 4 4 4 4
3 3 3 3 3 3 3
2 2 2 2 2 2 2
1 1 1 1 1 1 1
104
104b2
112
104b1
116a
118
102

FIG. 6D

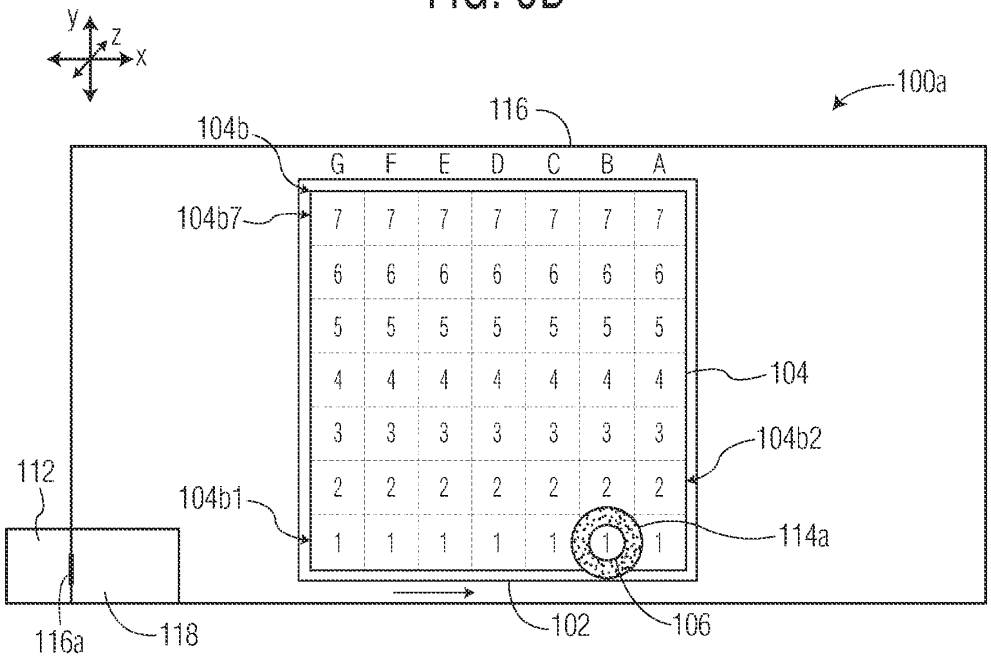

y
z
x
100a
116
104b
G F E D C B A
104b7
7 7 7 7 7 7 7
6 6 6 6 6 6 6
5 5 5 5 5 5 5
4 4 4 4 4 4 4
3 3 3 3 3 3 3
2 2 2 2 2 2 2
1 1 1 1 1 1 1
104
104b2
112
104b1
114a
116a
118
102
106

FIG. 6E

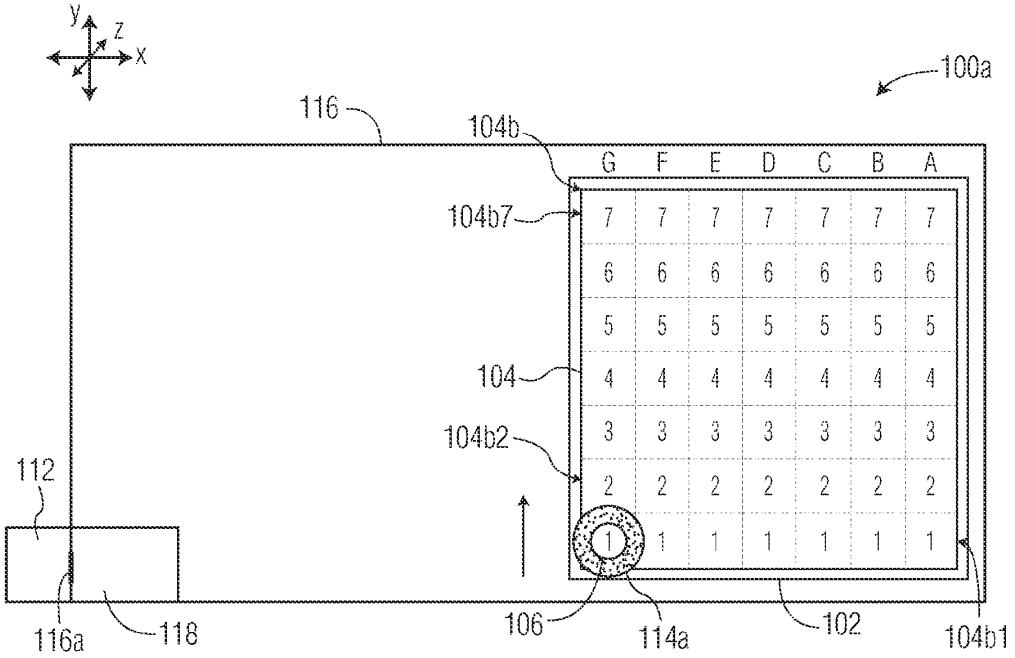

y
z
x
100a
116
104b
G F E D C B A
104b7
7 7 7 7 7 7 7
6 6 6 6 6 6 6
5 5 5 5 5 5 5
104
4 4 4 4 4 4 4
3 3 3 3 3 3 3
104b2
2 2 2 2 2 2 2
1 1 1 1 1 1 1
112
116a
118
106
114a
102
104b1

FIG. 6F

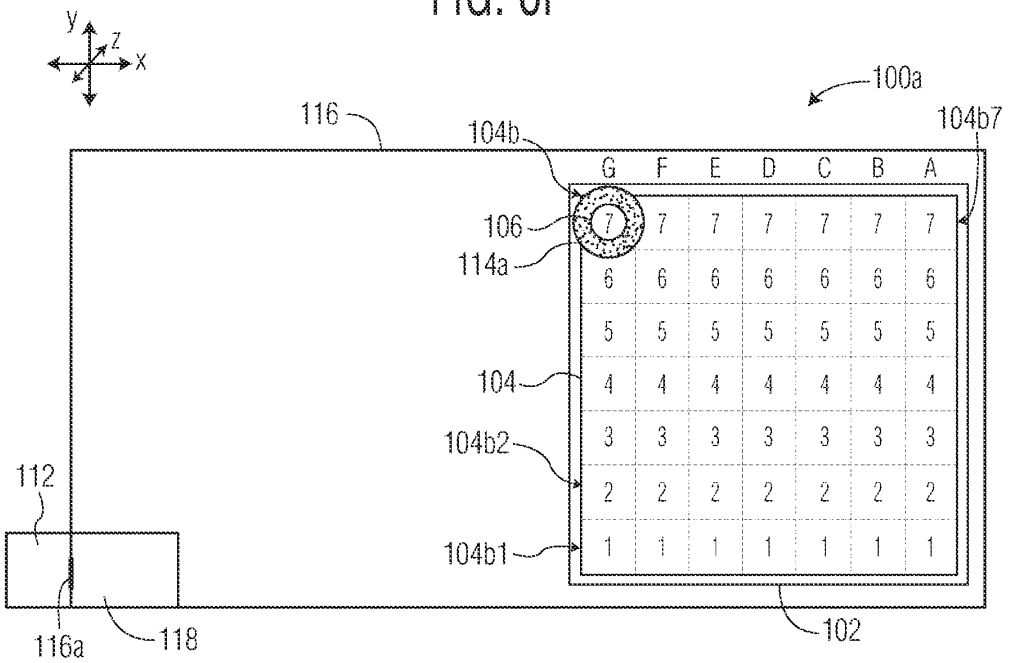

y
z
x
100a
116
104b
104b7
G F E D C B A
106
7 7 7 7 7 7 7
114a
6 6 6 6 6 6 6
5 5 5 5 5 5 5
104
4 4 4 4 4 4 4
3 3 3 3 3 3 3
104b2
2 2 2 2 2 2 2
112
104b1
1 1 1 1 1 1 1
116a
118
102

FIG. 6G

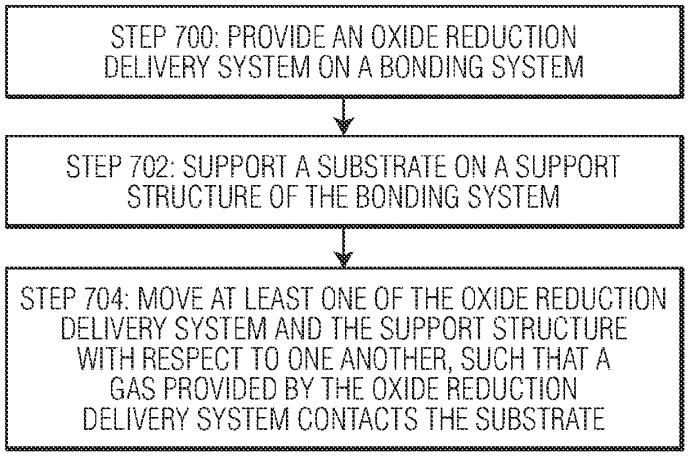

STEP 700: PROVIDE AN OXIDE REDUCTION DELIVERY SYSTEM ON A BONDING SYSTEM
STEP 702: SUPPORT A SUBSTRATE ON A SUPPORT STRUCTURE OF THE BONDING SYSTEM
STEP 704: MOVE AT LEAST ONE OF THE OXIDE REDUCTION DELIVERY SYSTEM AND THE SUPPORT STRUCTURE WITH RESPECT TO ONE ANOTHER, SUCH THAT A GAS PROVIDED BY THE OXIDE REDUCTION DELIVERY SYSTEM CONTACTS THE SUBSTRATE

FIG. 7

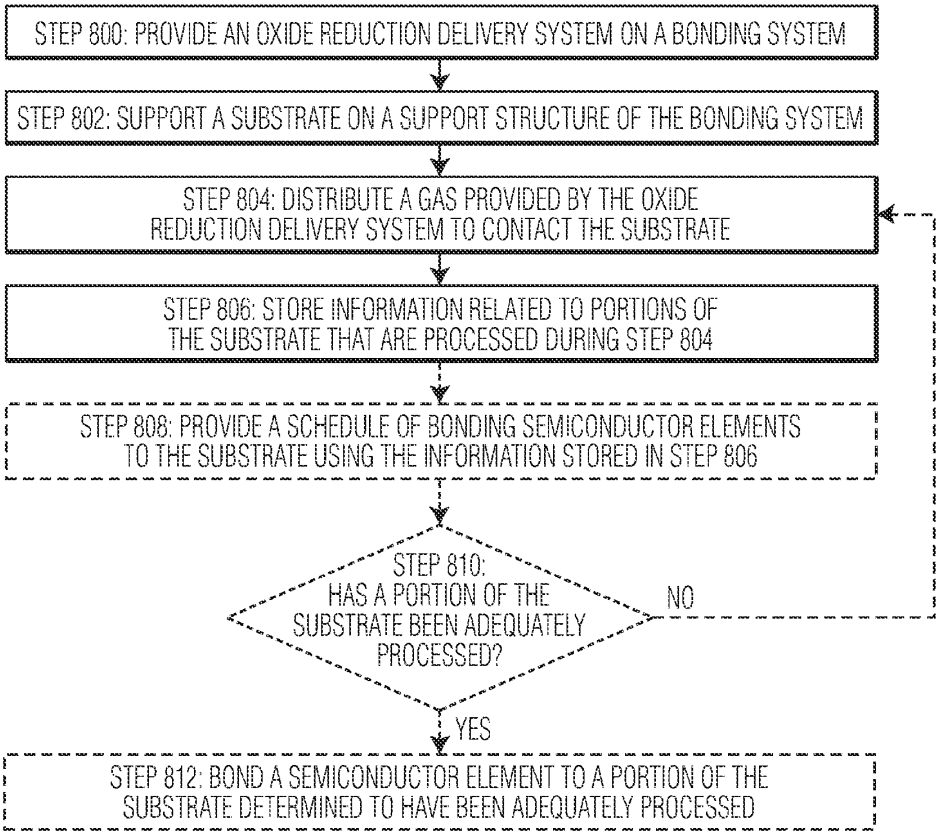

STEP 800: PROVIDE AN OXIDE REDUCTION DELIVERY SYSTEM ON A BONDING SYSTEM
STEP 802: SUPPORT A SUBSTRATE ON A SUPPORT STRUCTURE OF THE BONDING SYSTEM
STEP 804: DISTRIBUTE A GAS PROVIDED BY THE OXIDE REDUCTION DELIVERY SYSTEM TO CONTACT THE SUBSTRATE
STEP 806: STORE INFORMATION RELATED TO PORTIONS OF THE SUBSTRATE THAT ARE PROCESSED DURING STEP 804
STEP 808: PROVIDE A SCHEDULE OF BONDING SEMICONDUCTOR ELEMENTS TO THE SUBSTRATE USING THE INFORMATION STORED IN STEP 806
STEP 810: HAS A PORTION OF THE SUBSTRATE BEEN ADEQUATELY PROCESSED?
NO
YES
STEP 812: BOND A SEMICONDUCTOR ELEMENT TO A PORTION OF THE SUBSTRATE DETERMINED TO HAVE BEEN ADEQUATELY PROCESSED

FIG. 8