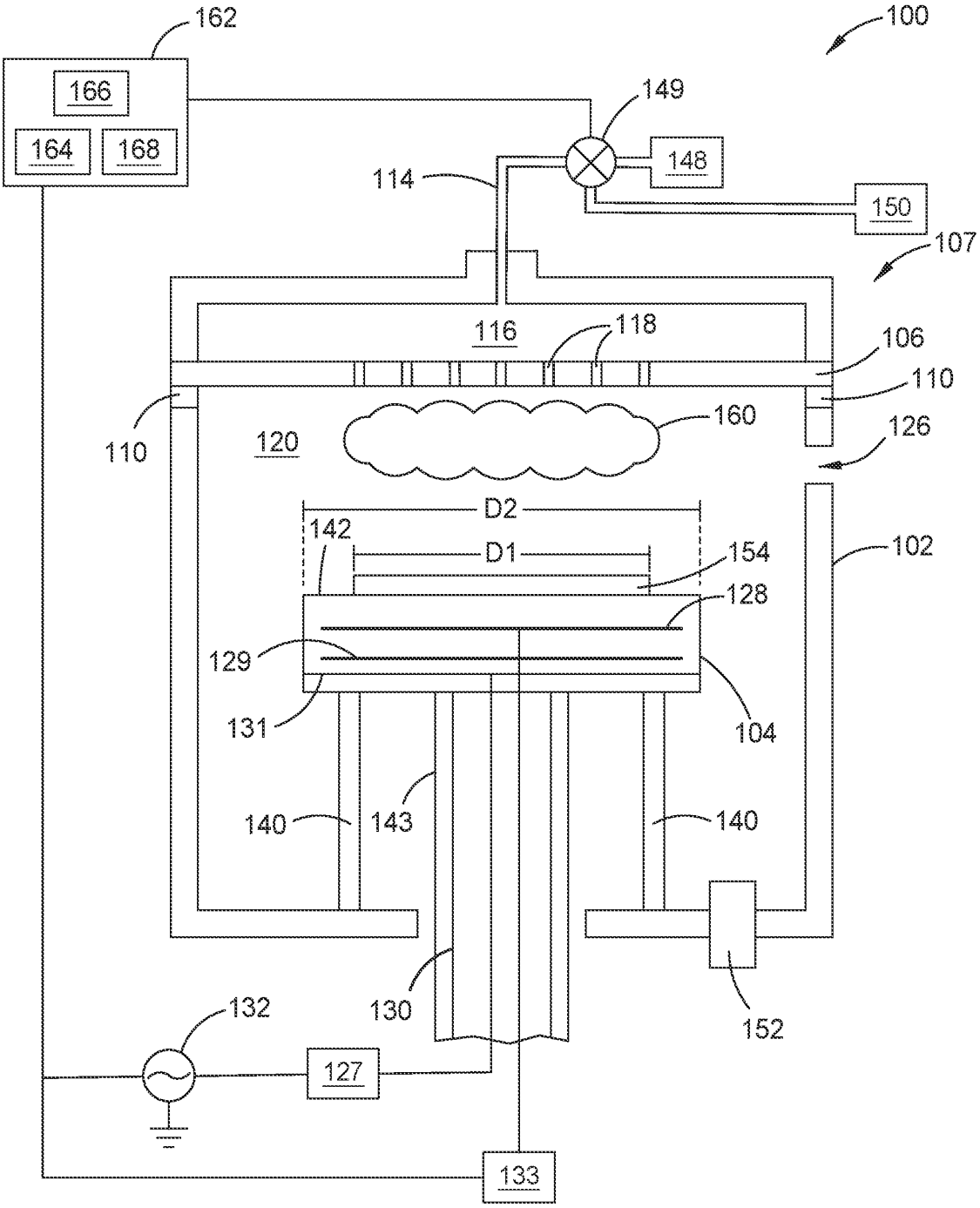

162
166
164
168
100
149
148
114
150
107
116
118
106
110
110
120
160
126
D2
142
D1
154
102
128
129
131
104
140
143
140
132
130
152
127
133

FIG. 1

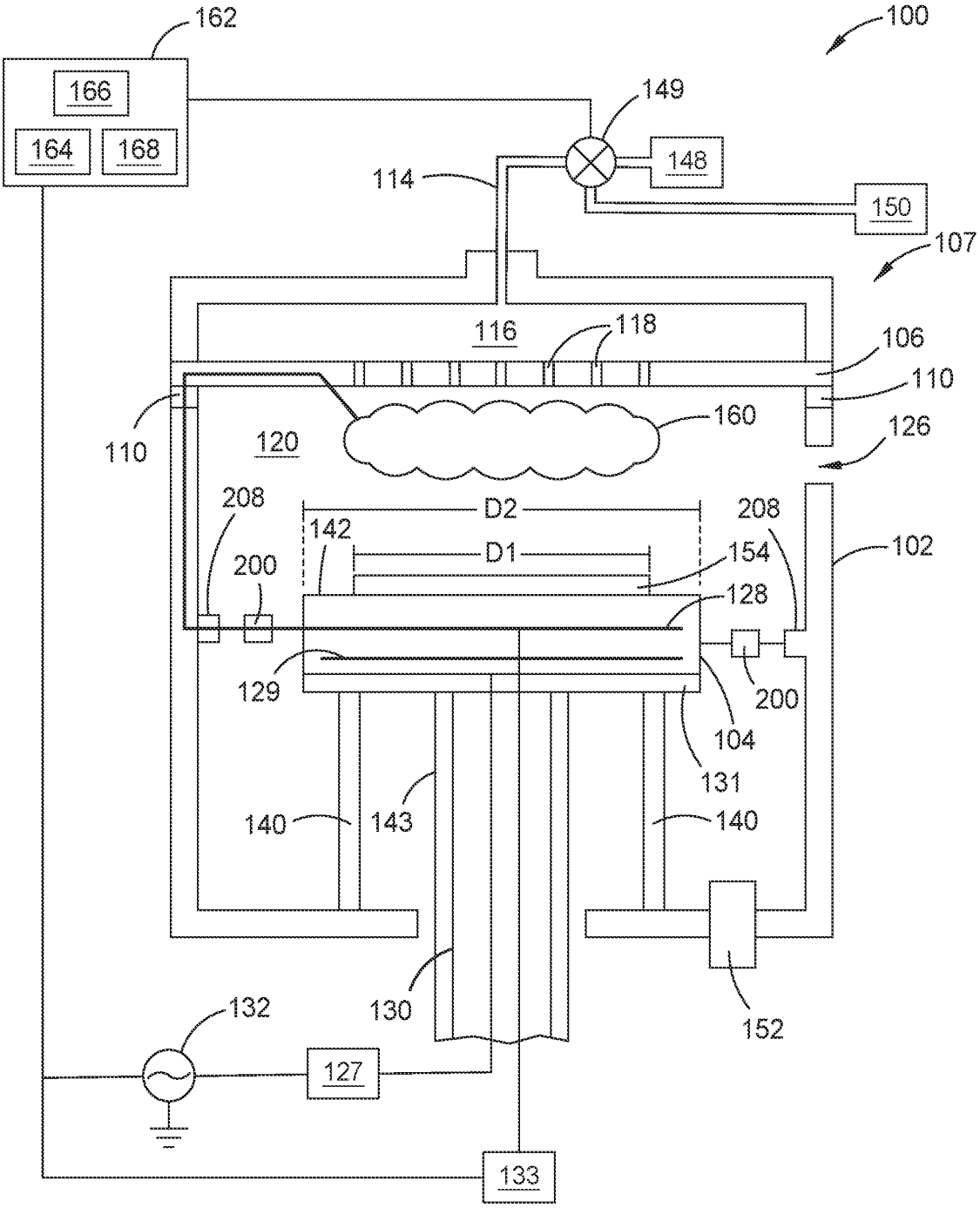

162
166
164
168
100
149
148
114
150
107
116
118
106
110
110
160
120
126
208
D2
208
142
D1
102
200
154
128
200
129
104
131
140
143
140
130
132
152
127
133

FIG. 2A

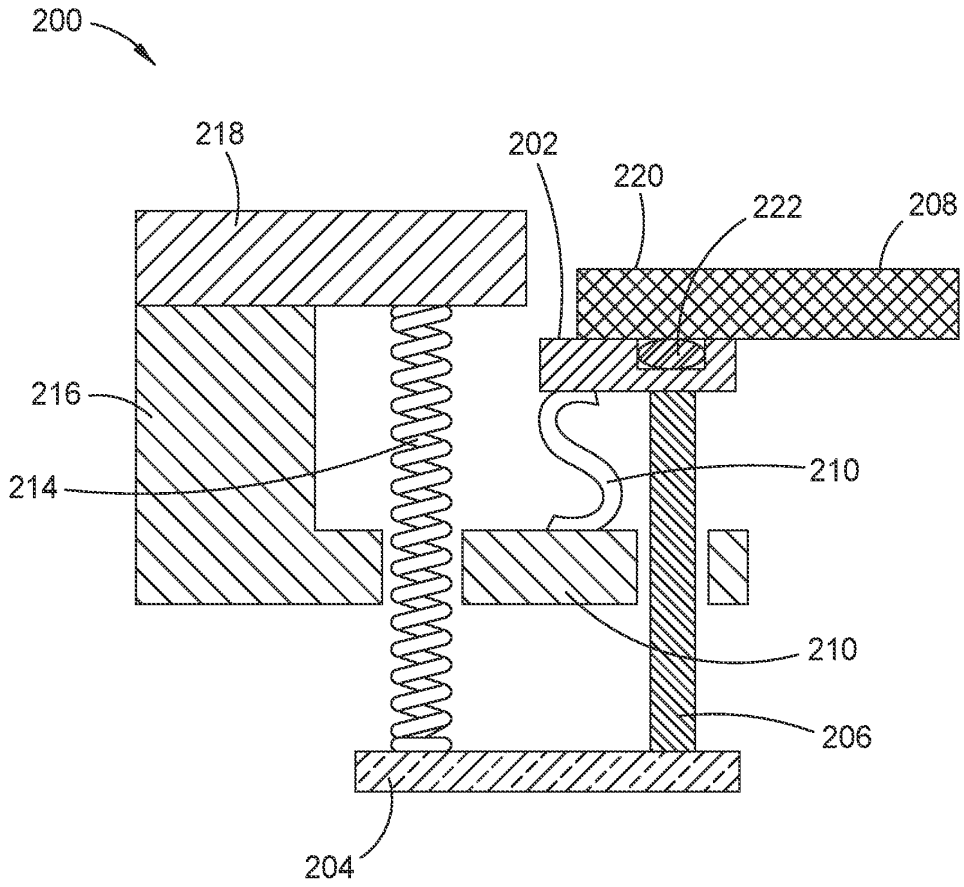



FIG. 2B

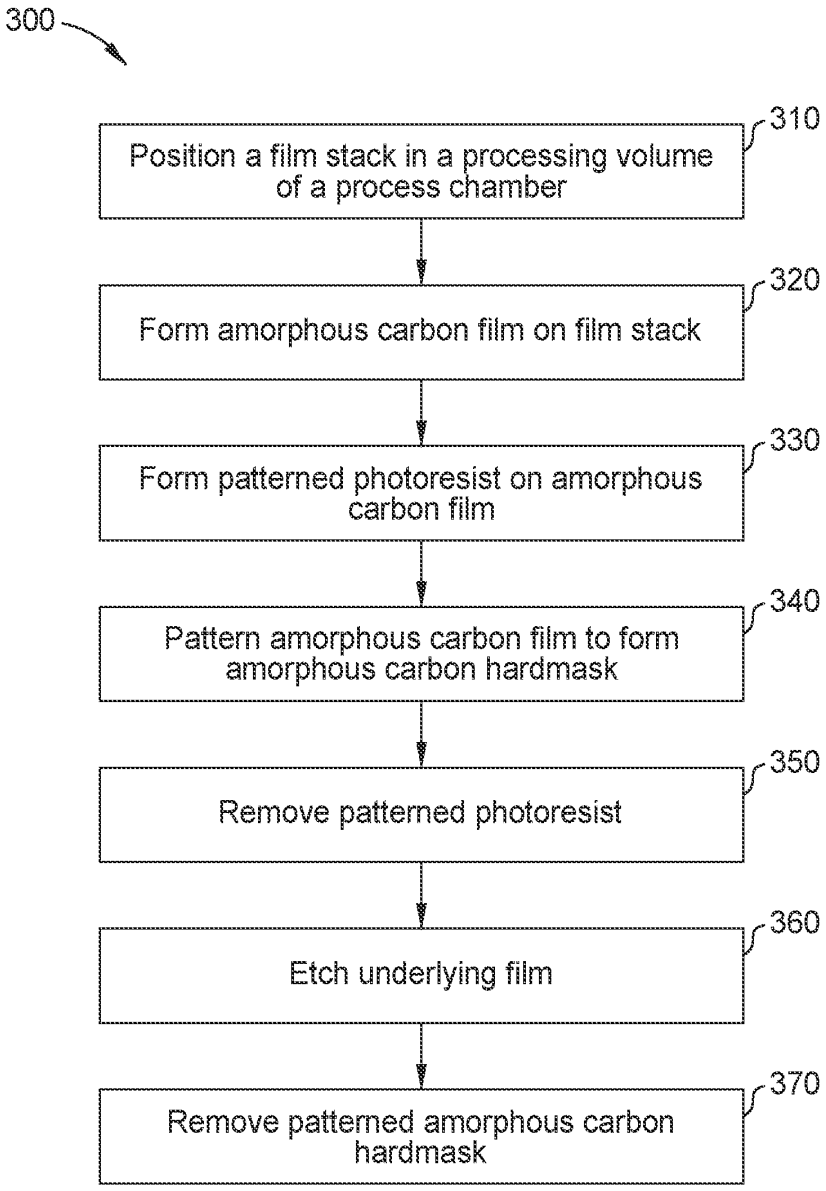

300
Position a film stack in a processing volume of a process chamber
310
Form amorphous carbon film on film stack
320
Form patterned photoresist on amorphous carbon film
330
Pattern amorphous carbon film to form amorphous carbon hardmask
340
Remove patterned photoresist
350
Etch underlying film
360
Remove patterned amorphous carbon hardmask
370

FIG. 3

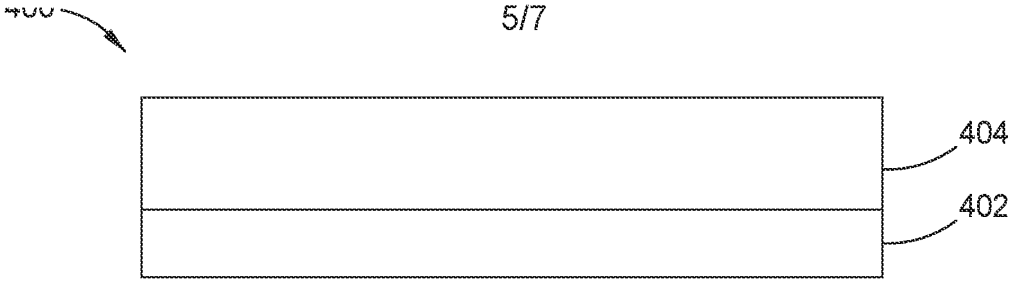



FIG. 4A

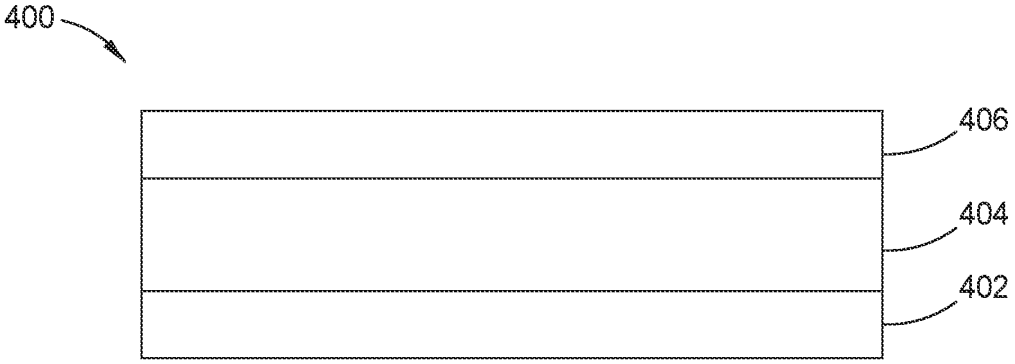



FIG. 4B

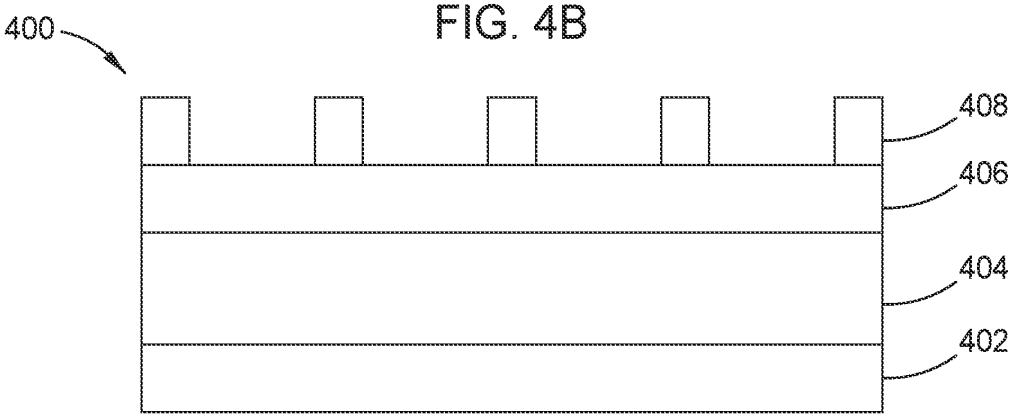



FIG. 4C

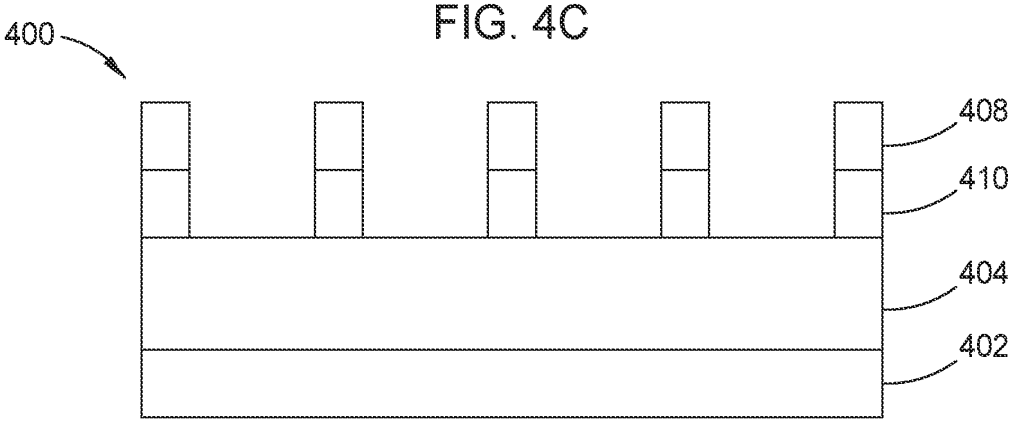



FIG. 4D

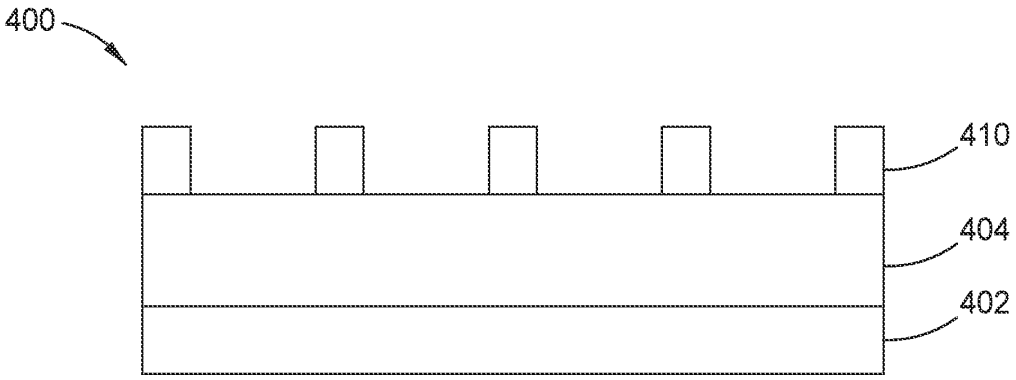



FIG. 4E

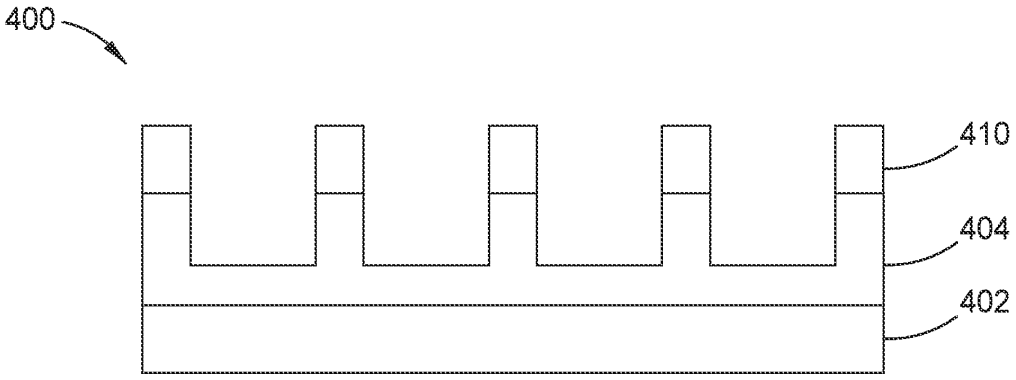



FIG. 4F

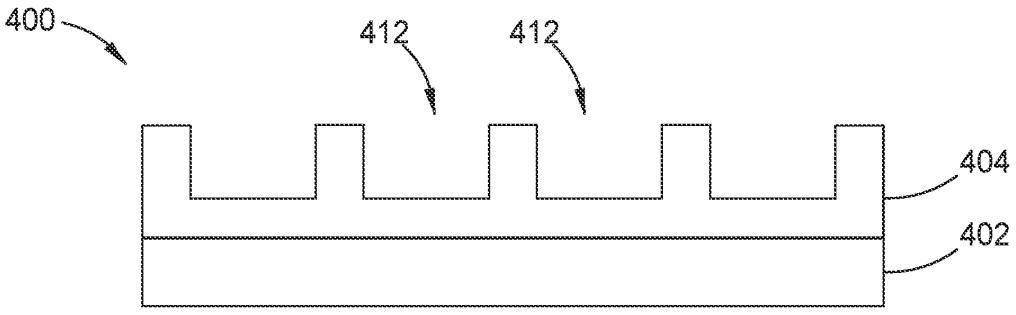



FIG. 4G

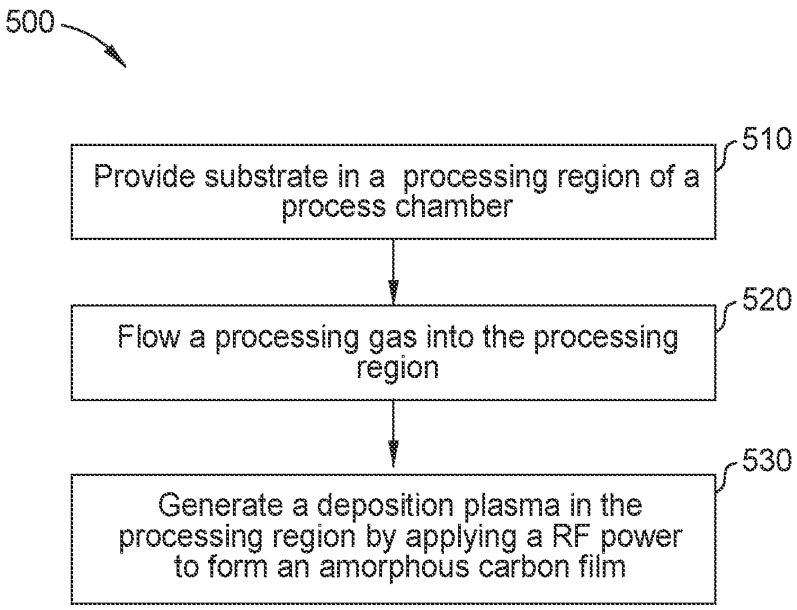

500
Provide substrate in a processing region of a process chamber
510
Flow a processing gas into the processing region
520
Generate a deposition plasma in the processing region by applying a RF power to form an amorphous carbon film
530

FIG. 5