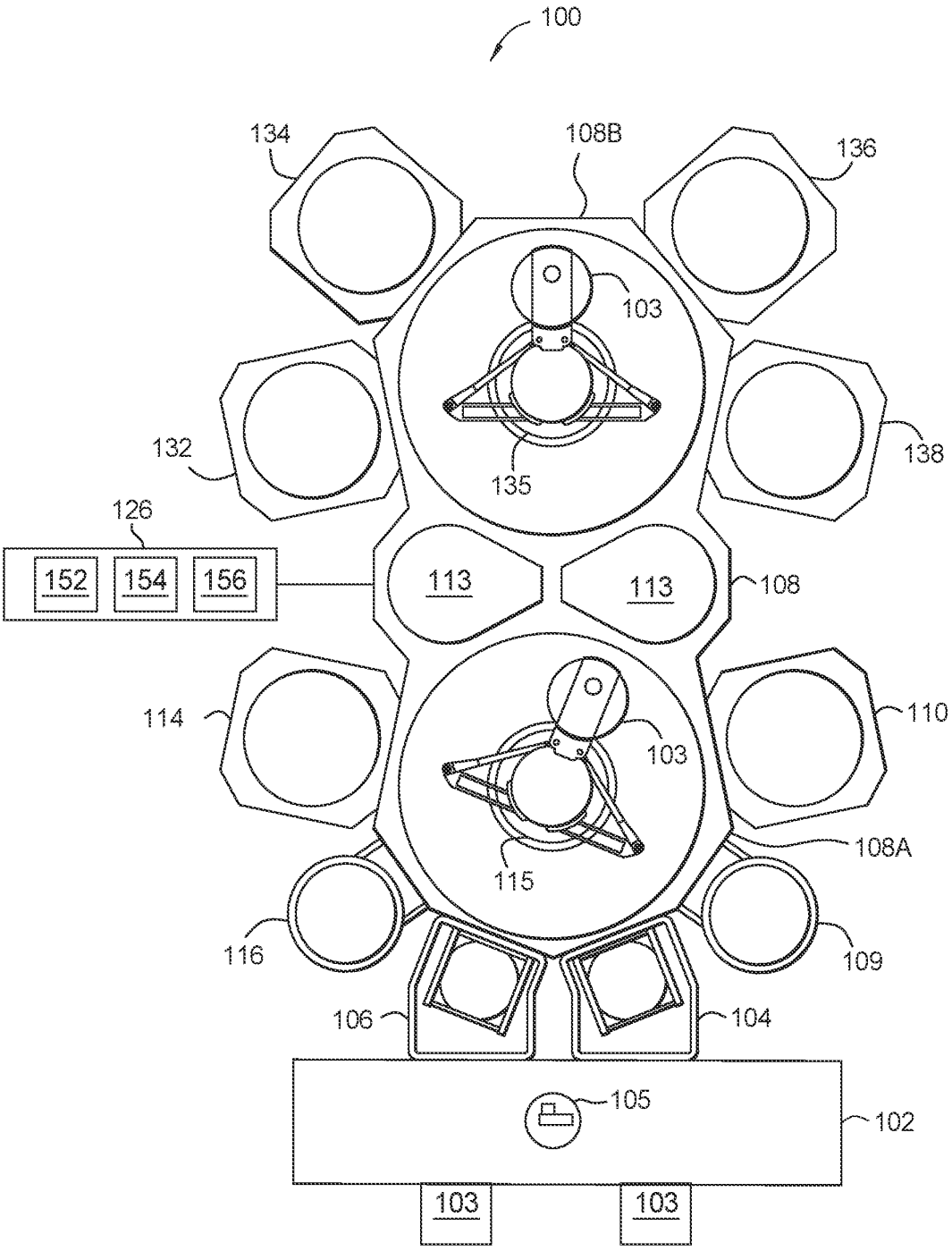
100
134
108B
136
103
132
135
138
126
152
154
156
113
113
108
114
110
103
108A
115
116
109
106
104
105
102
103
103

FIG. 1

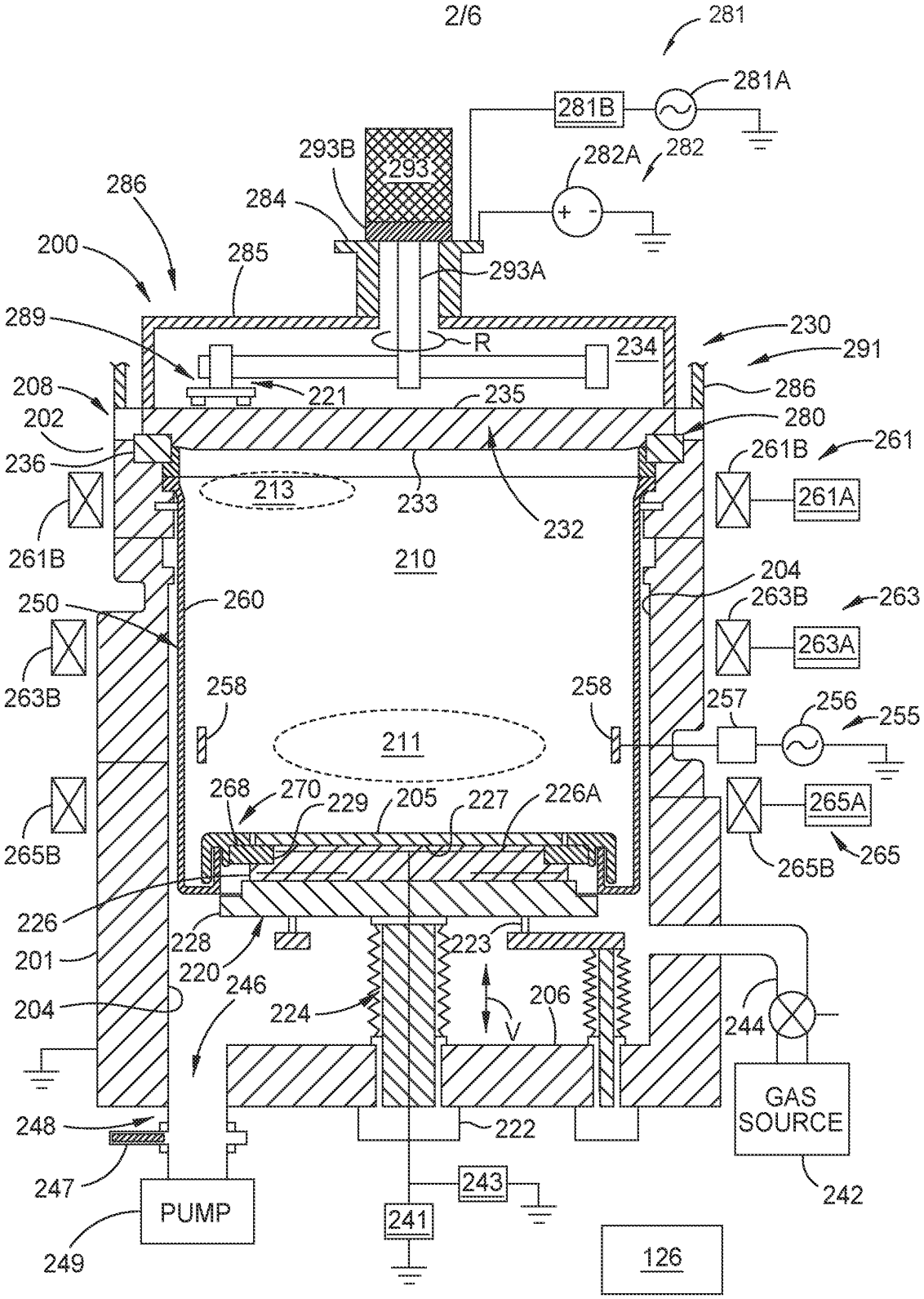
281
281A
281B
282
282A
293
293B
284
286
200
285
293A
289
R
234
230
291
208
202
221
235
286
280
236
261B
261
213
233
232
261A
210
204
250
260
263B
263
263A
258
258
257
256
255
211
268
270
229
205
227
226A
265A
265B
265
226
228
223
201
220
246
206
244
204
224
V
GAS SOURCE
248
222
247
243
242
PUMP
241
249
126

FIG. 2

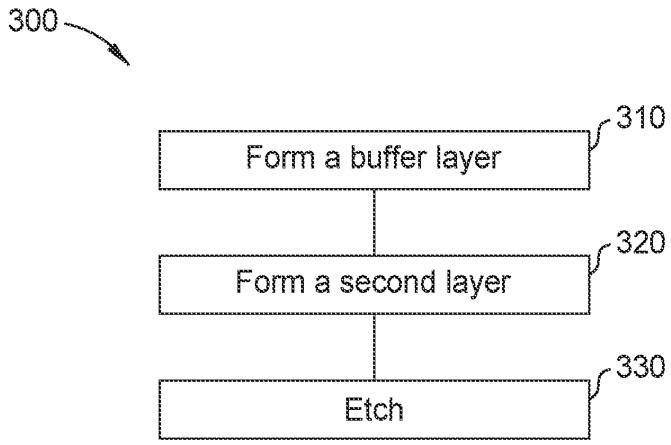

FIG. 3

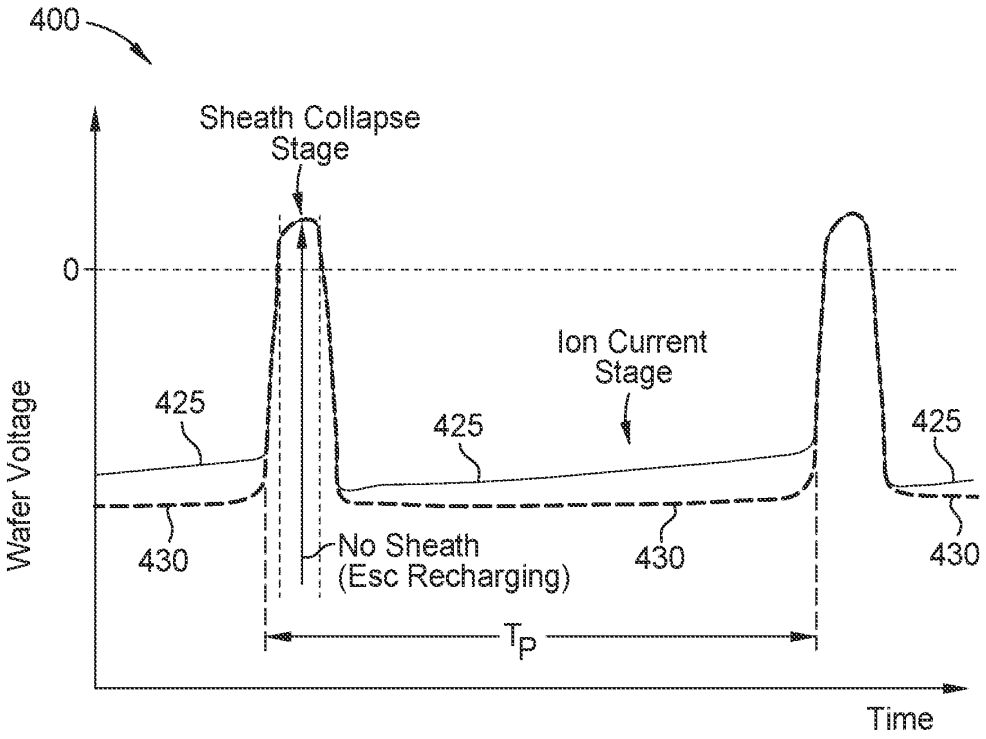
400
Sheath Collapse Stage
0
Wafer Voltage
425
425
425
Ion Current Stage
430
No Sheath (Esc Recharging)
430
430
T_P
Time

FIG. 4A

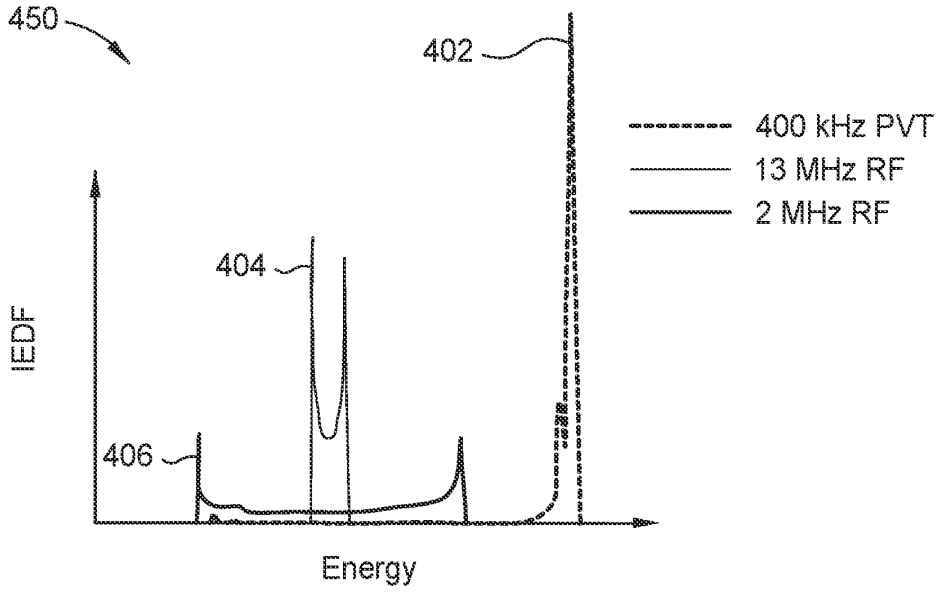
450
402
400 kHz PVT
13 MHz RF
2 MHz RF
404
IEDF
406
Energy

FIG. 4B

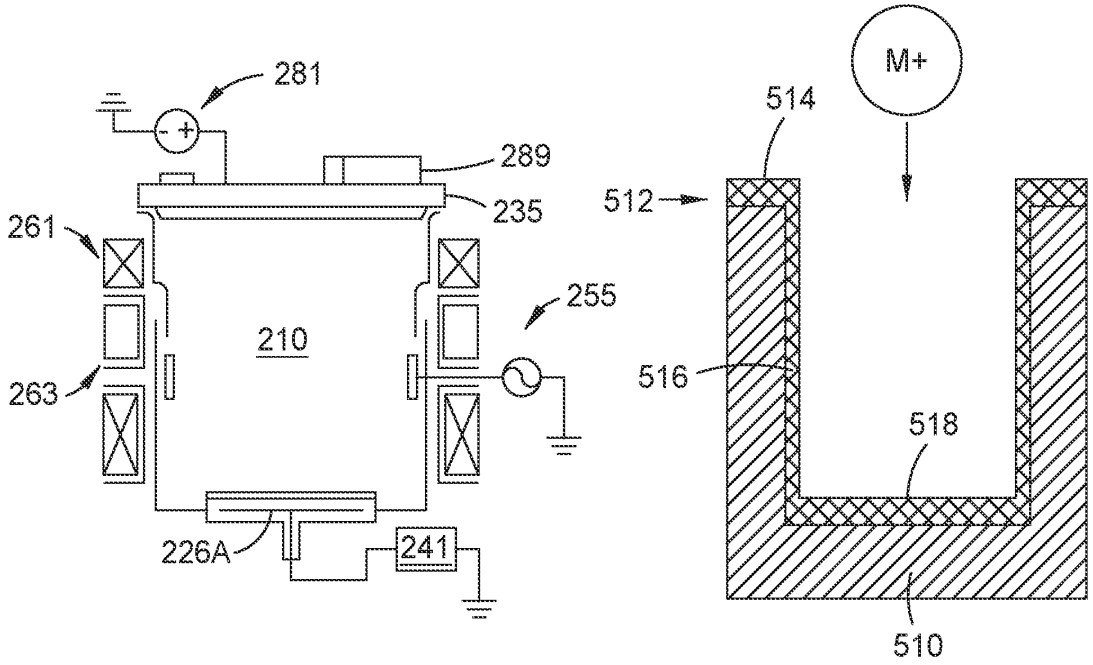
281
289
235
261
255
210
263
226A
241
M+
514
512
516
518
510

FIG. 5A

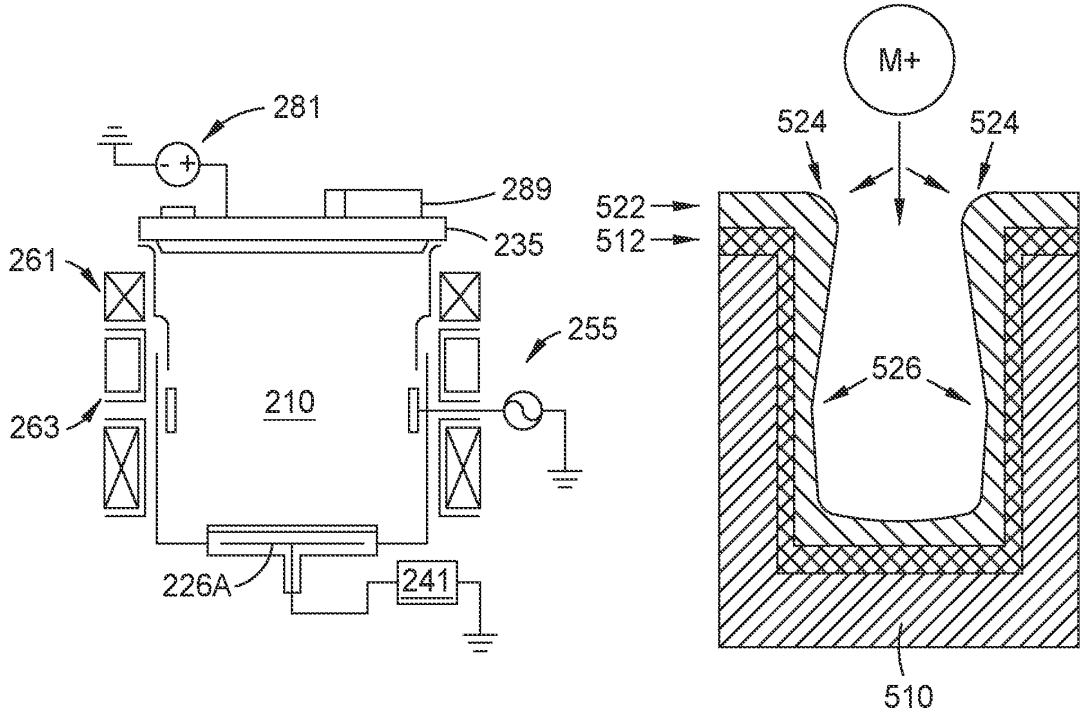
281
289
235
261
255
210
263
226A
241
M+
524
524
522
512
526
510

FIG. 5B

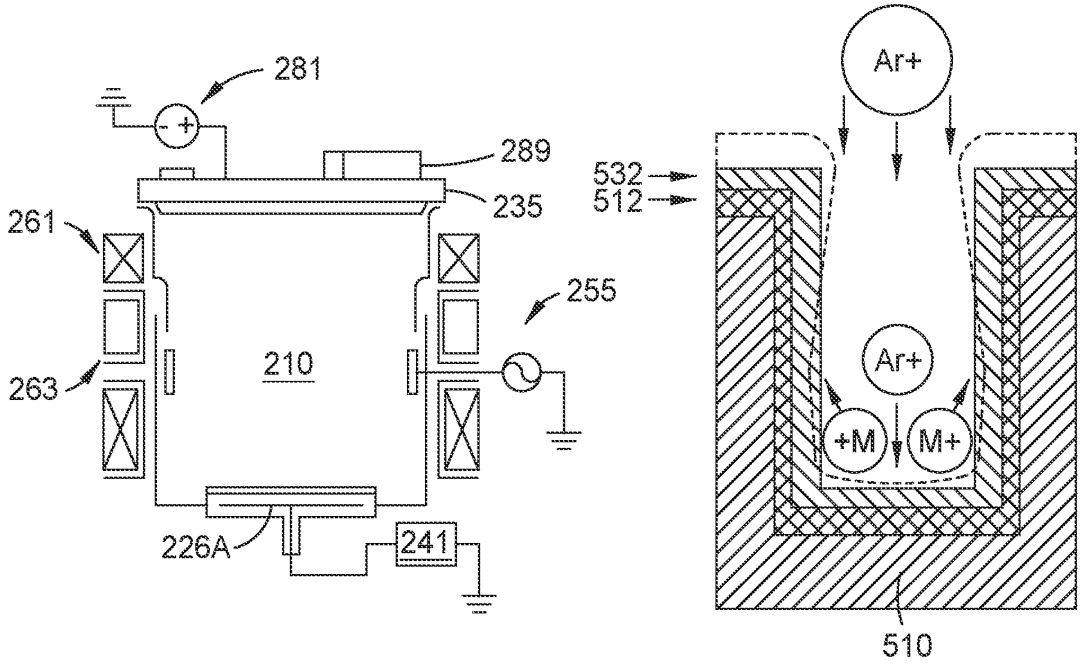
281
289
235
261
255
263
210
226A
241
Ar+
532
512
Ar+
+M
M+
510

FIG. 5C

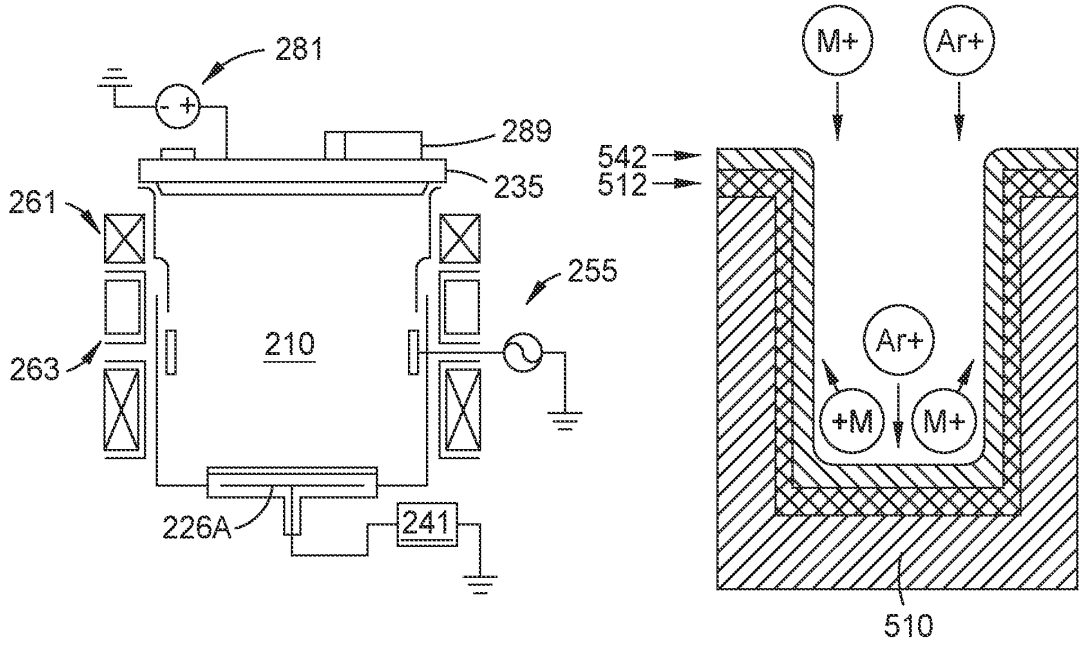
281
289
235
261
255
263
210
226A
241
M+
Ar+
542
512
Ar+
+M
M+
510

FIG. 5D