FIG. 1

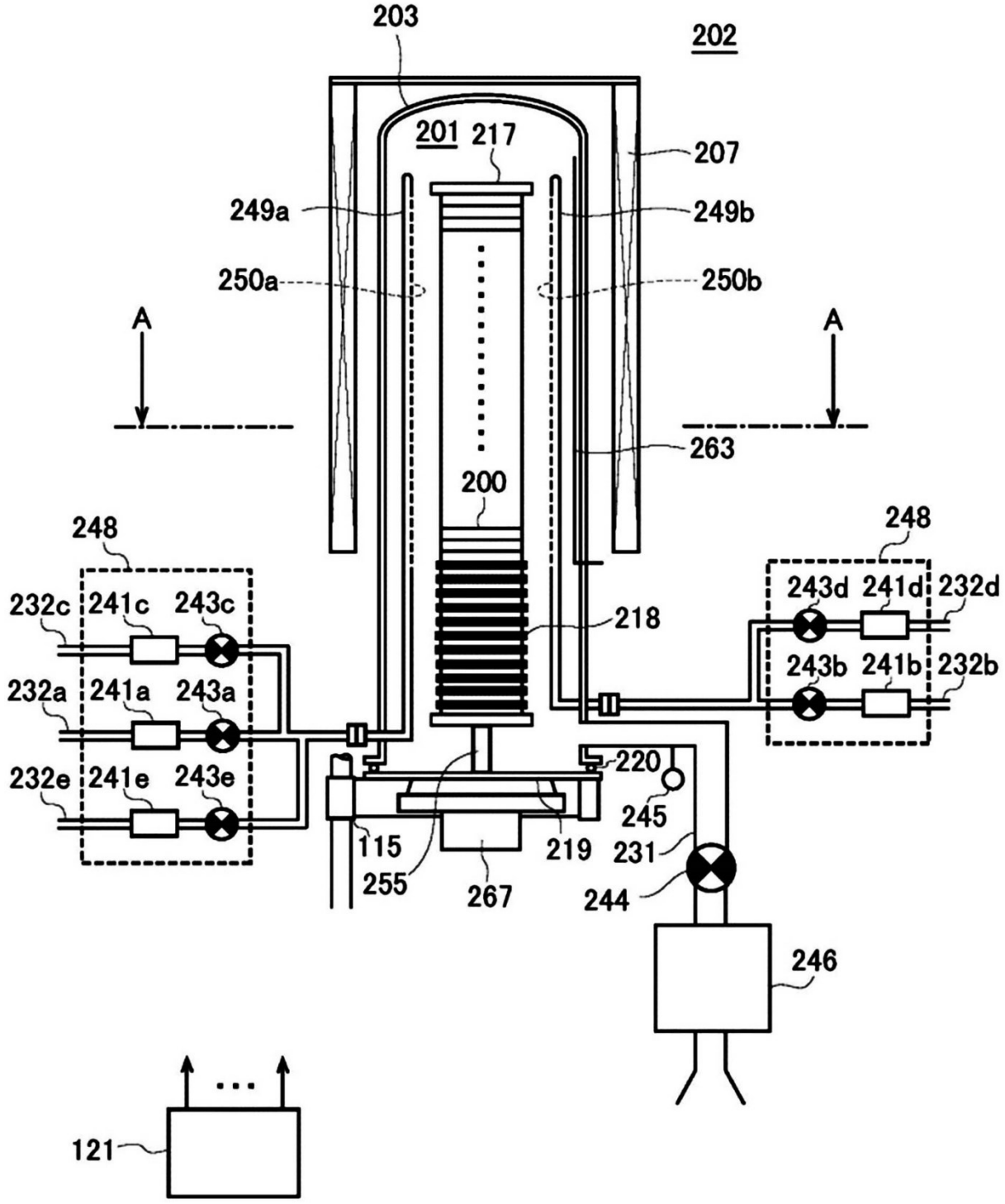

203
202
201
217
207
249a
249b
250a
250b
A
A
263
200
248
248
232c
241c
243c
243d
241d
232d
218
232a
241a
243a
243b
241b
232b
232e
241e
243e
220
245
231
115
255
267
219
244
246
121

FIG. 2

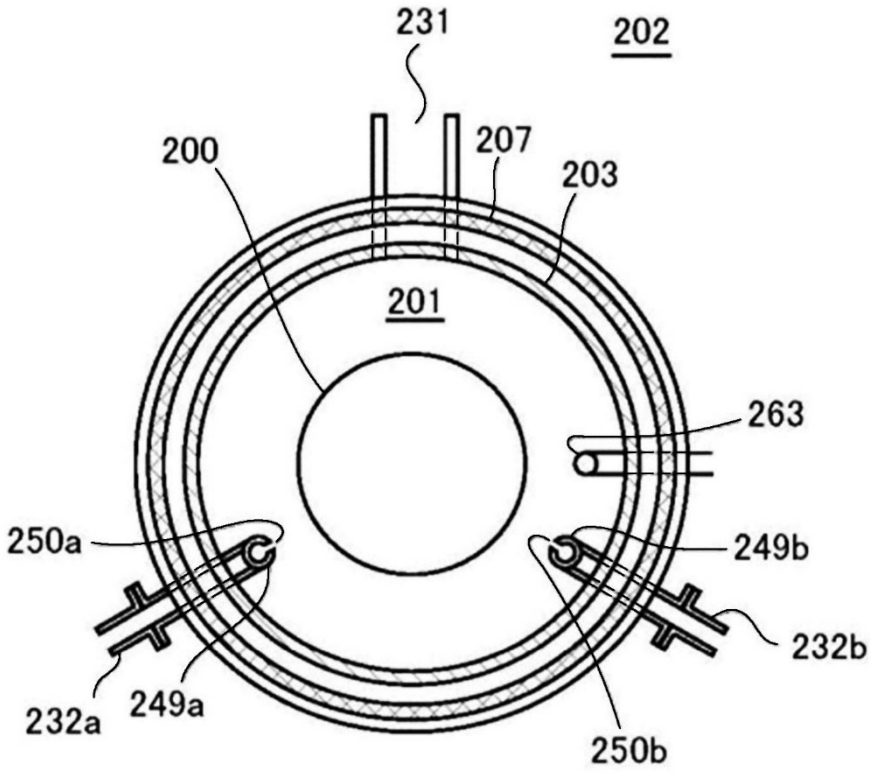


FIG. 3

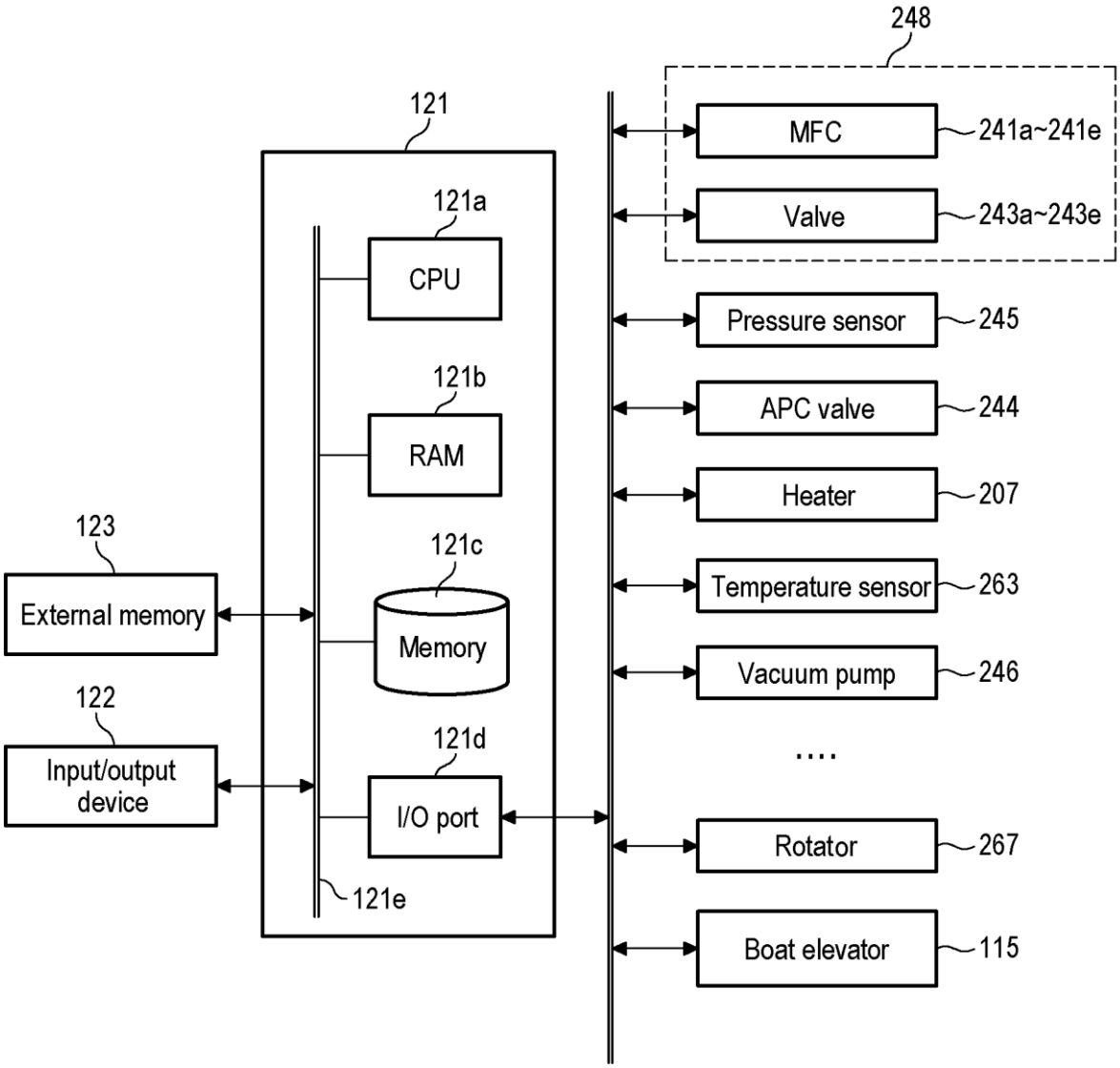

248
121
MFC
241a~241e
121a
Valve
243a~243e
CPU
Pressure sensor
245
121b
APC valve
244
RAM
Heater
207
123
121c
Temperature sensor
263
External memory
Memory
Vacuum pump
246
122
121d
....
Input/output device
I/O port
Rotator
267
121e
Boat elevator
115

FIG. 4

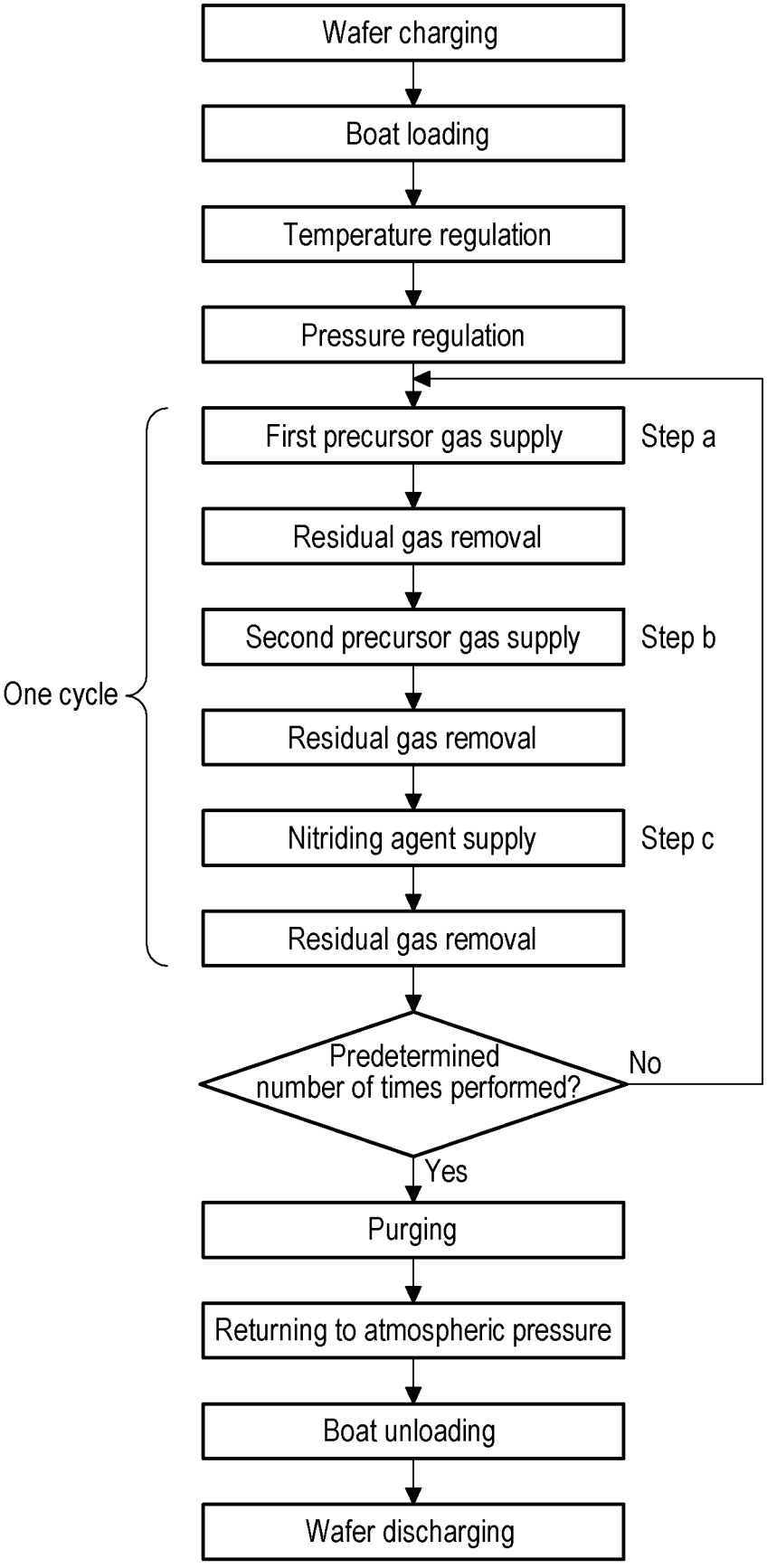
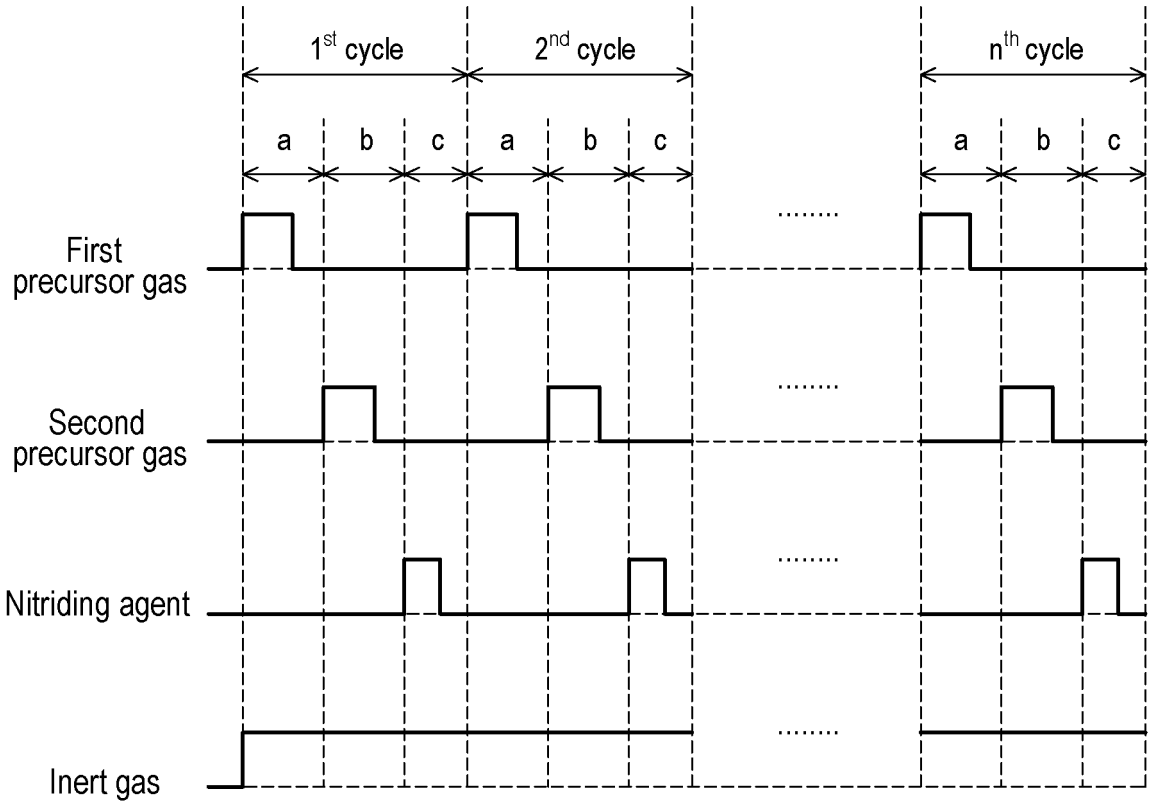

Wafer charging
Boat loading
Temperature regulation
Pressure regulation
First precursor gas supply
Step a
Residual gas removal
Second precursor gas supply
Step b
Residual gas removal
Nitriding agent supply
Step c
Residual gas removal
One cycle
Predetermined number of times performed?
No
Yes
Purging
Returning to atmospheric pressure
Boat unloading
Wafer discharging

FIG. 5


1st cycle
2nd cycle
nth cycle
a
b
c
a
b
c
a
b
c
.....
First precursor gas
.....
Second precursor gas
.....
Nitriding agent
.....
Inert gas