FIG. 1

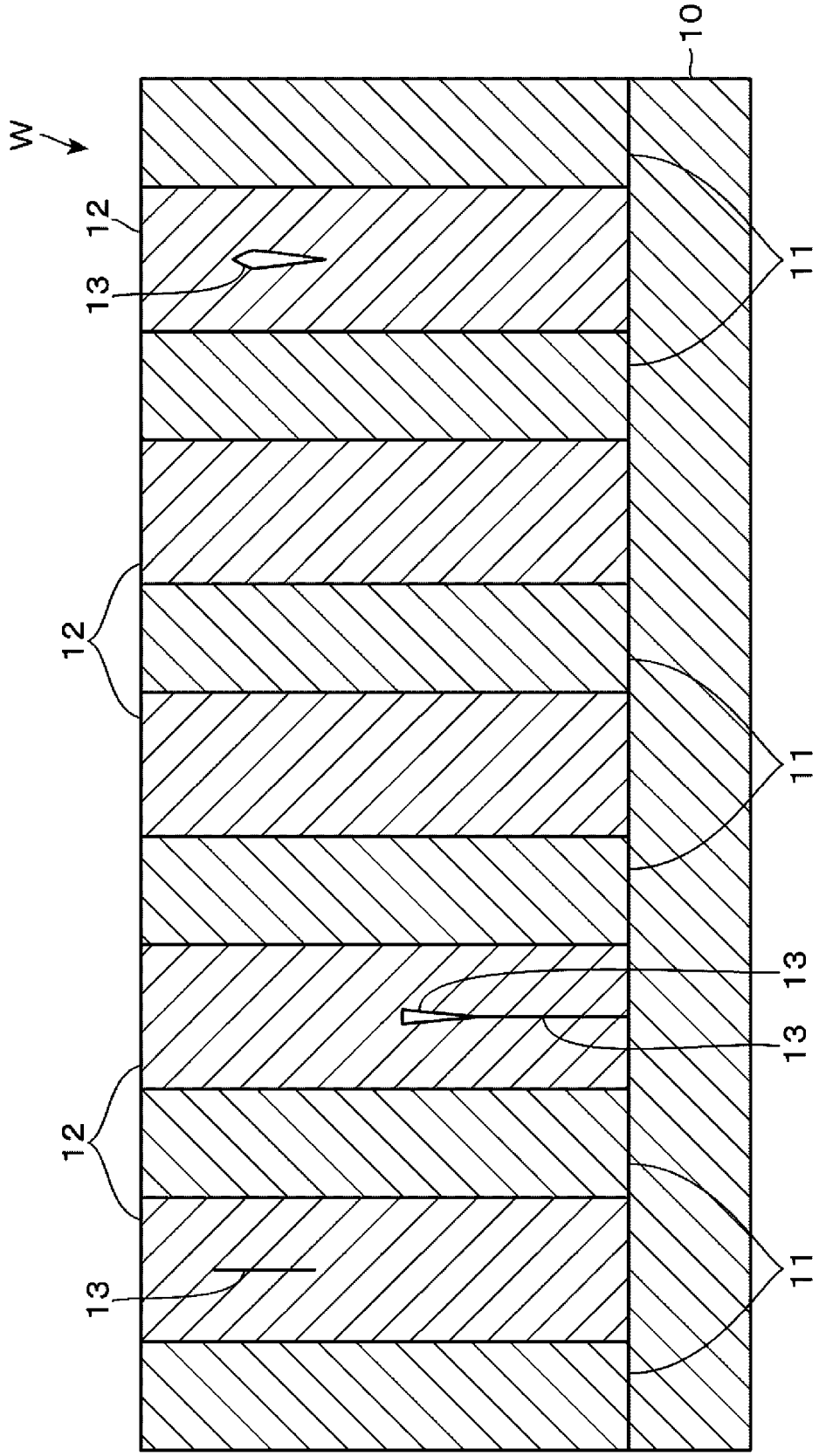


FIG. 2

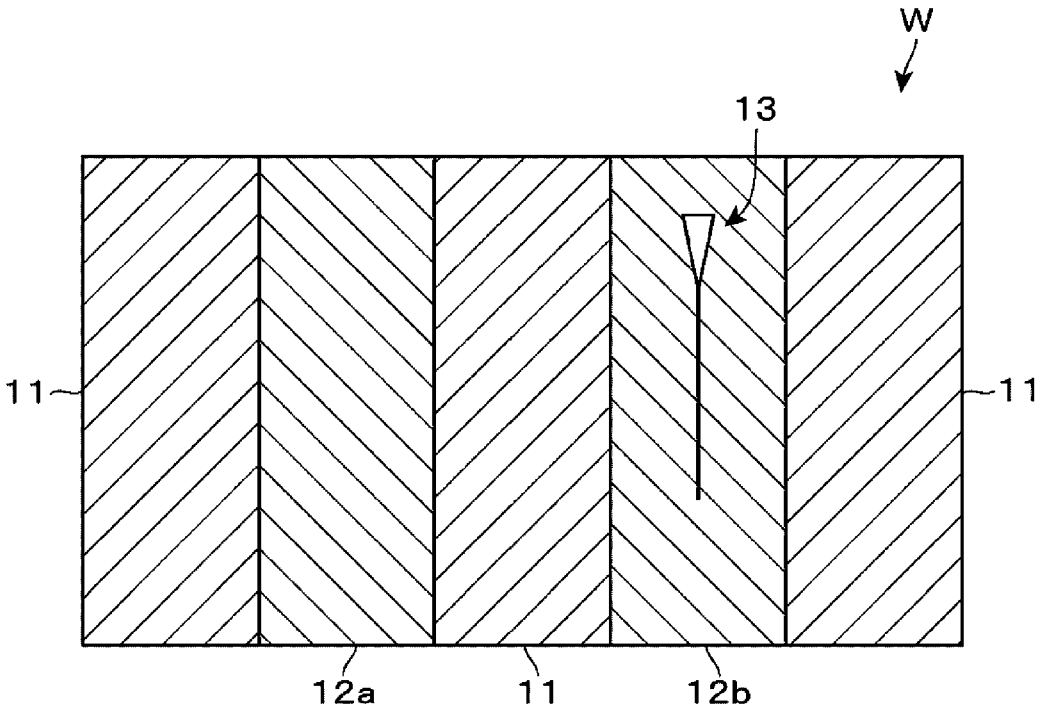


FIG. 3A

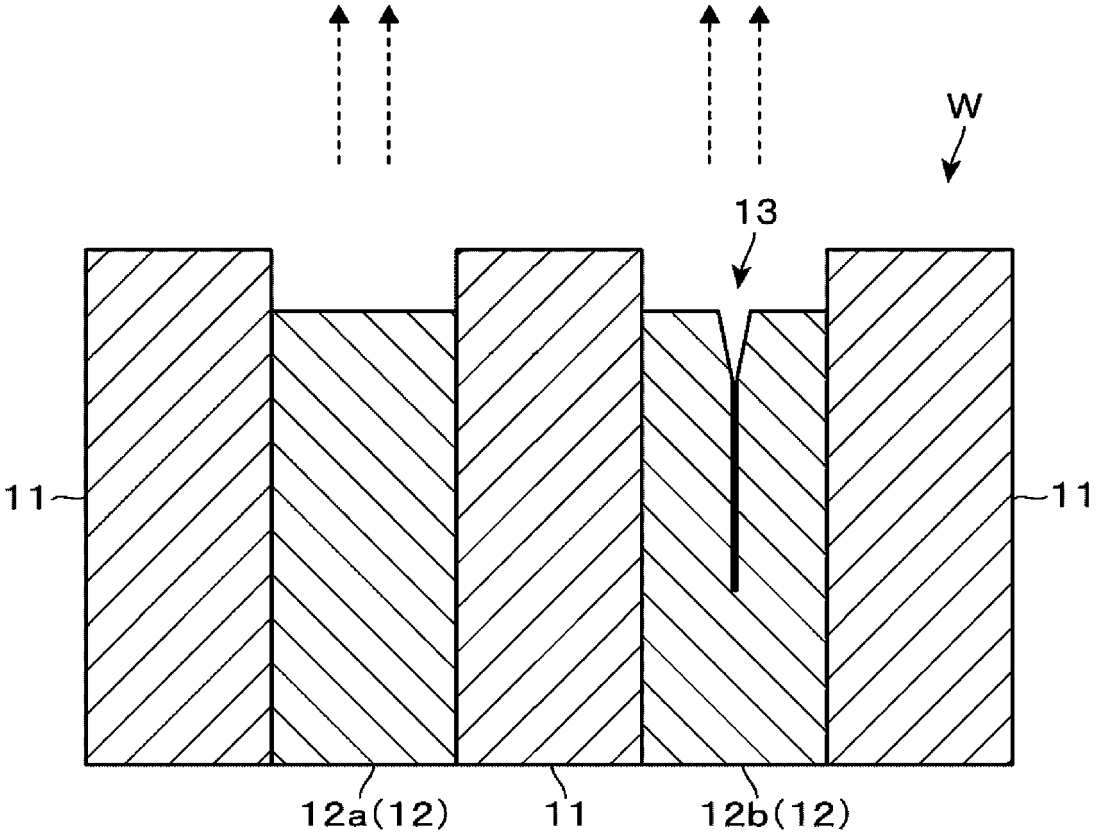


FIG. 3B

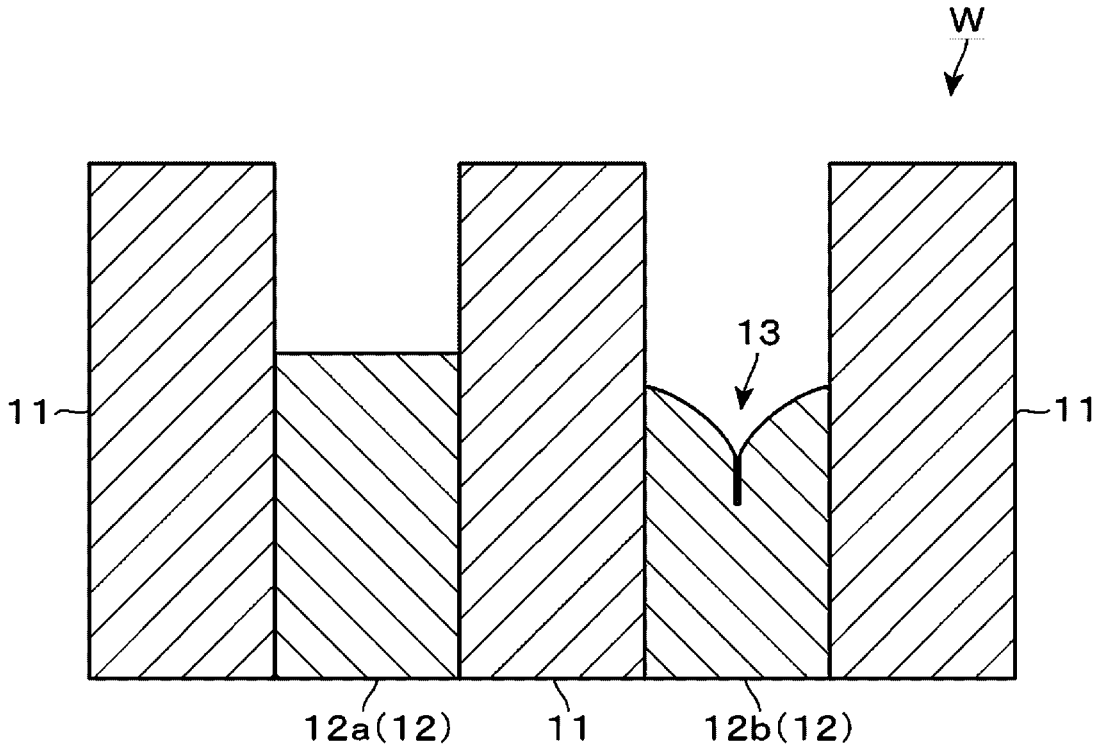


FIG. 4A

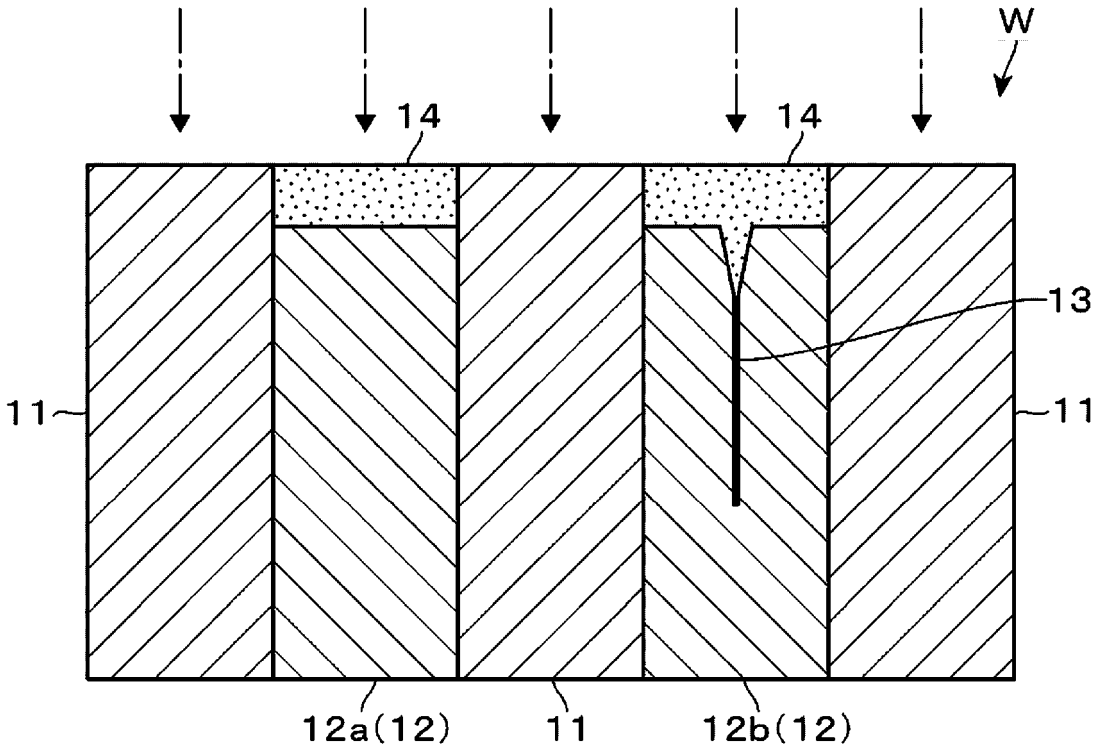


FIG. 4B

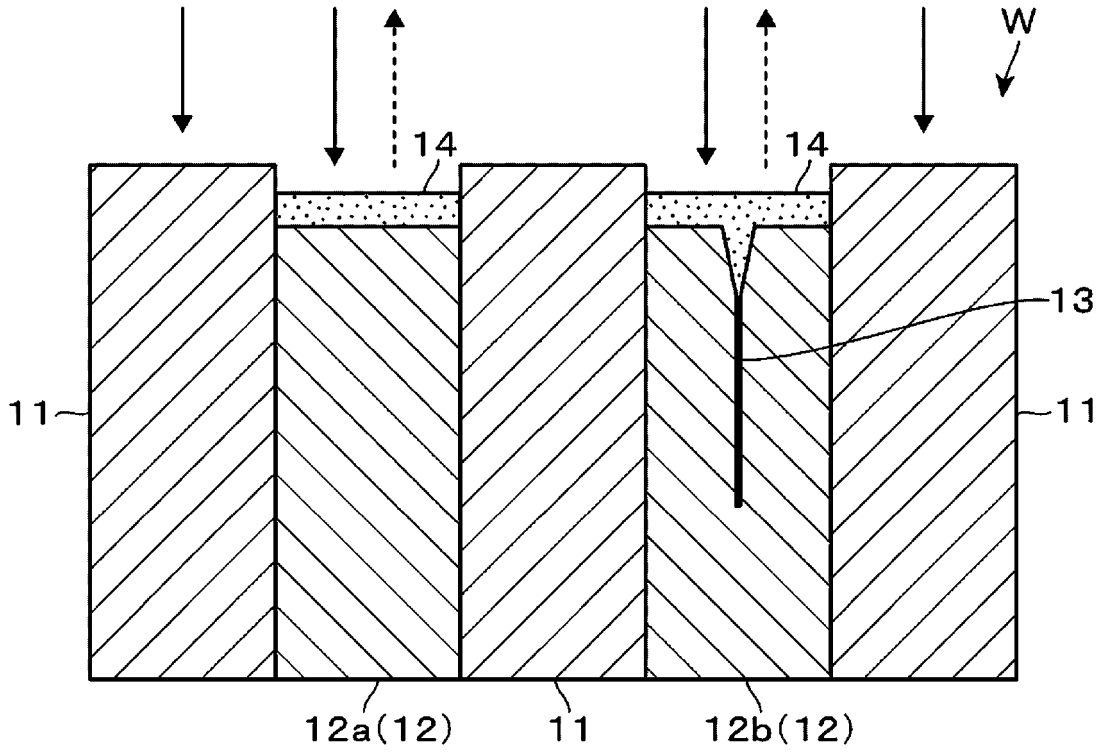


FIG. 4C

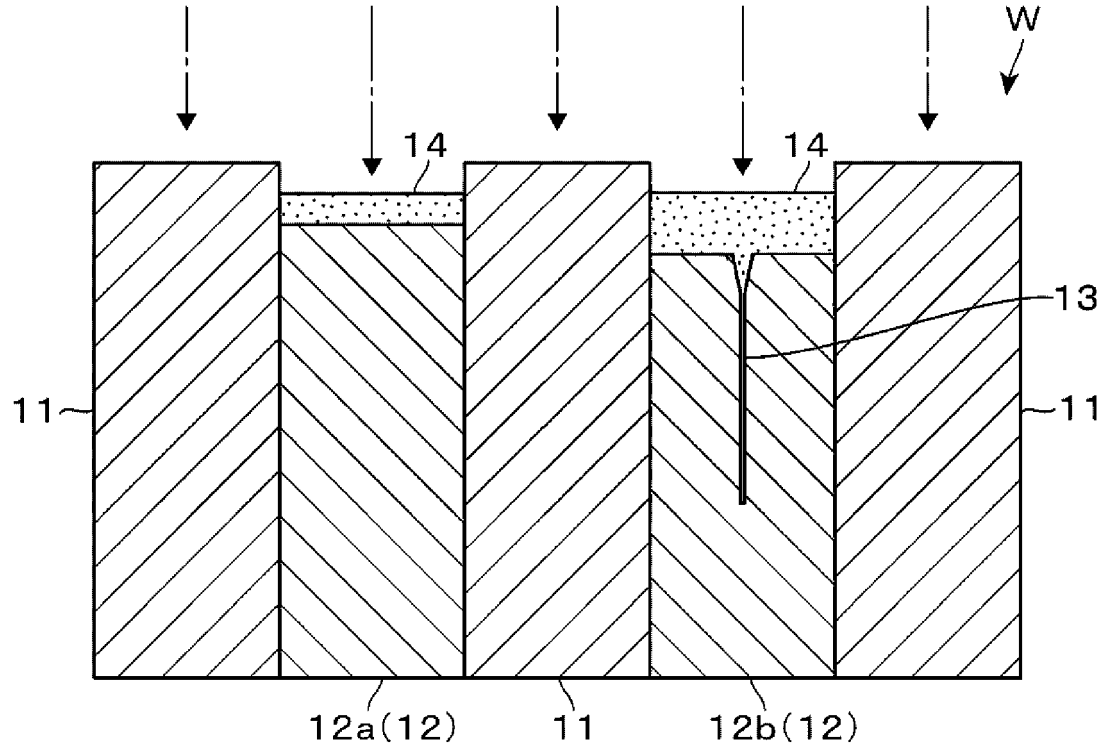


FIG. 4D

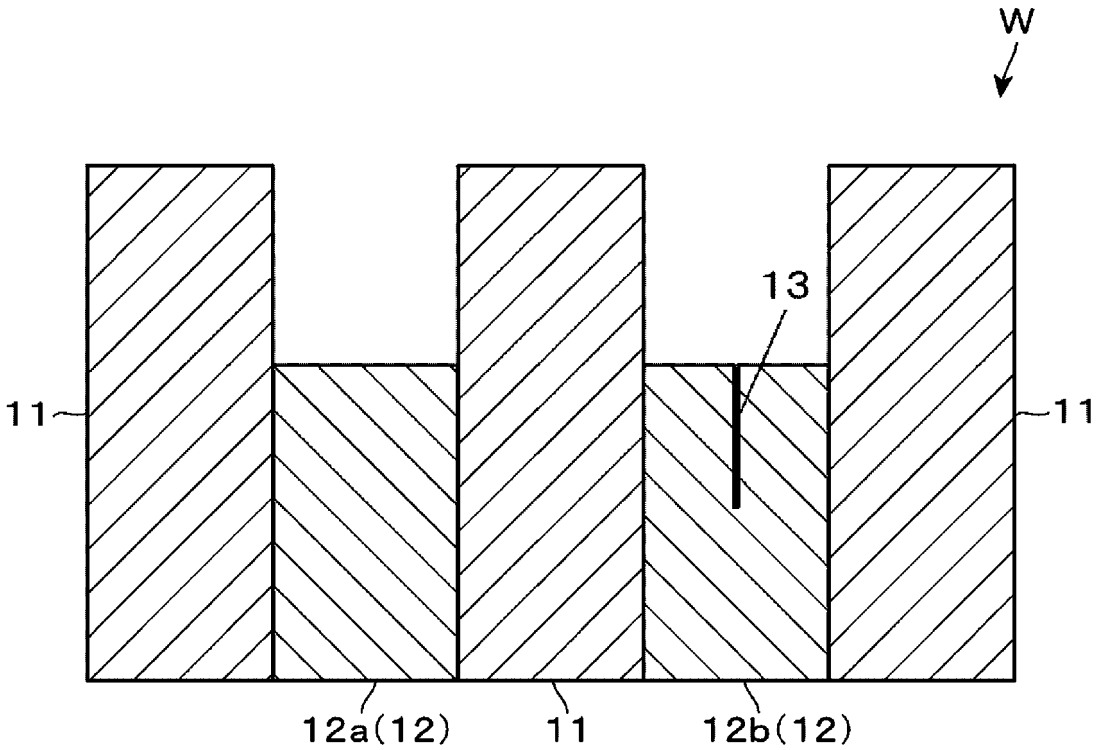


FIG. 5

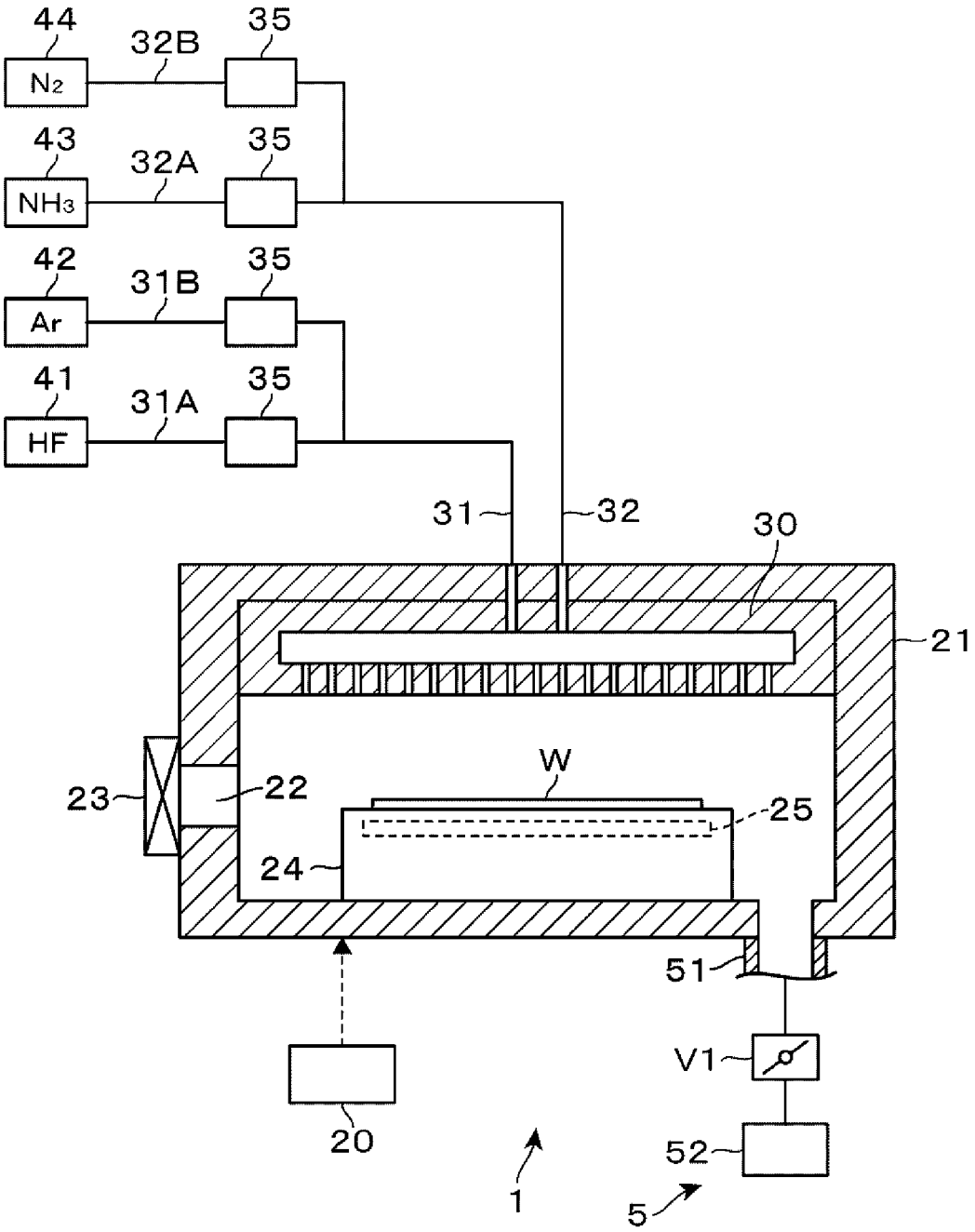

44
N2
32B
35
43
NH3
32A
35
42
Ar
31B
35
41
HF
31A
35
31
32
30
21
W
23
22
25
24
51
V1
20
52
1
5

FIG. 6

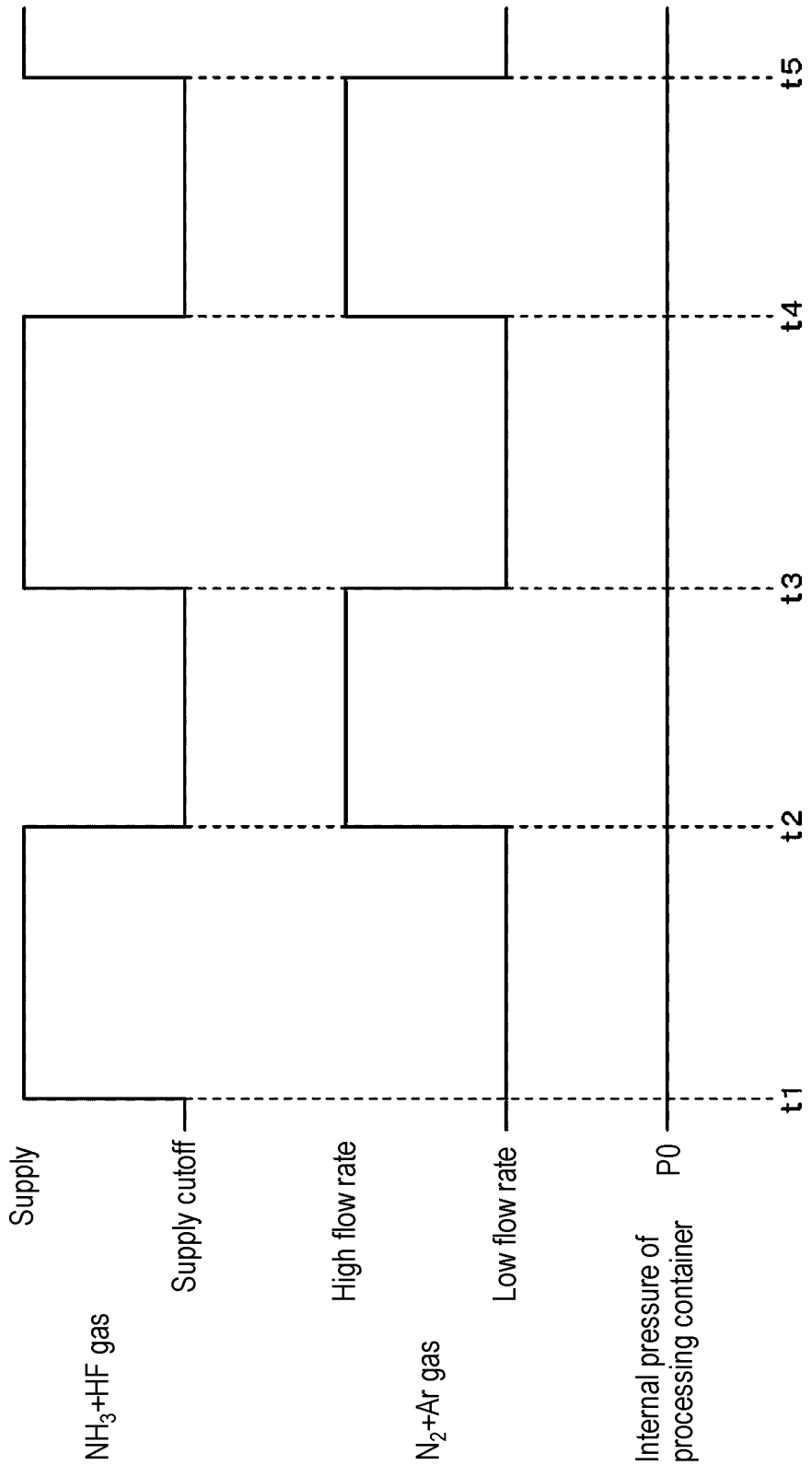

t1
t2
t3
t4
t5
Supply
Supply cutoff
High flow rate
Low flow rate
P0
NH_3+HF gas
N_2+Ar gas
Internal pressure of processing container

FIG. 7

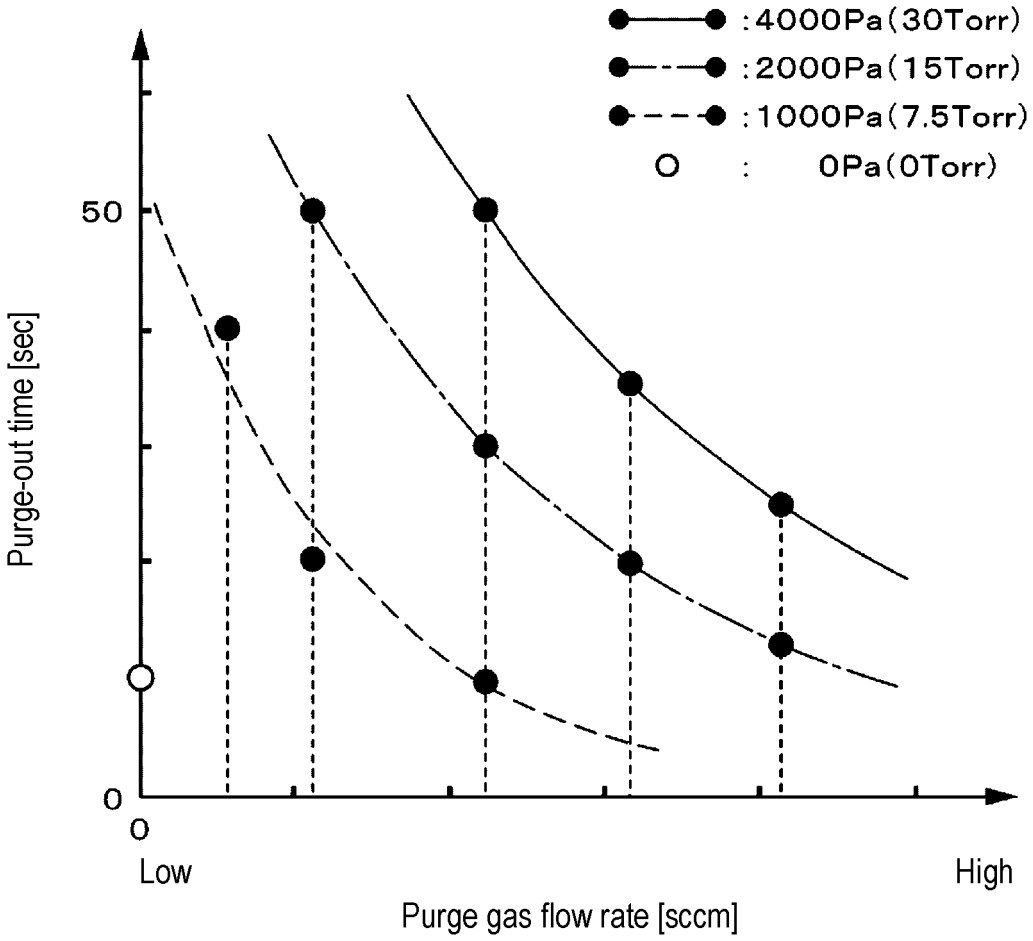
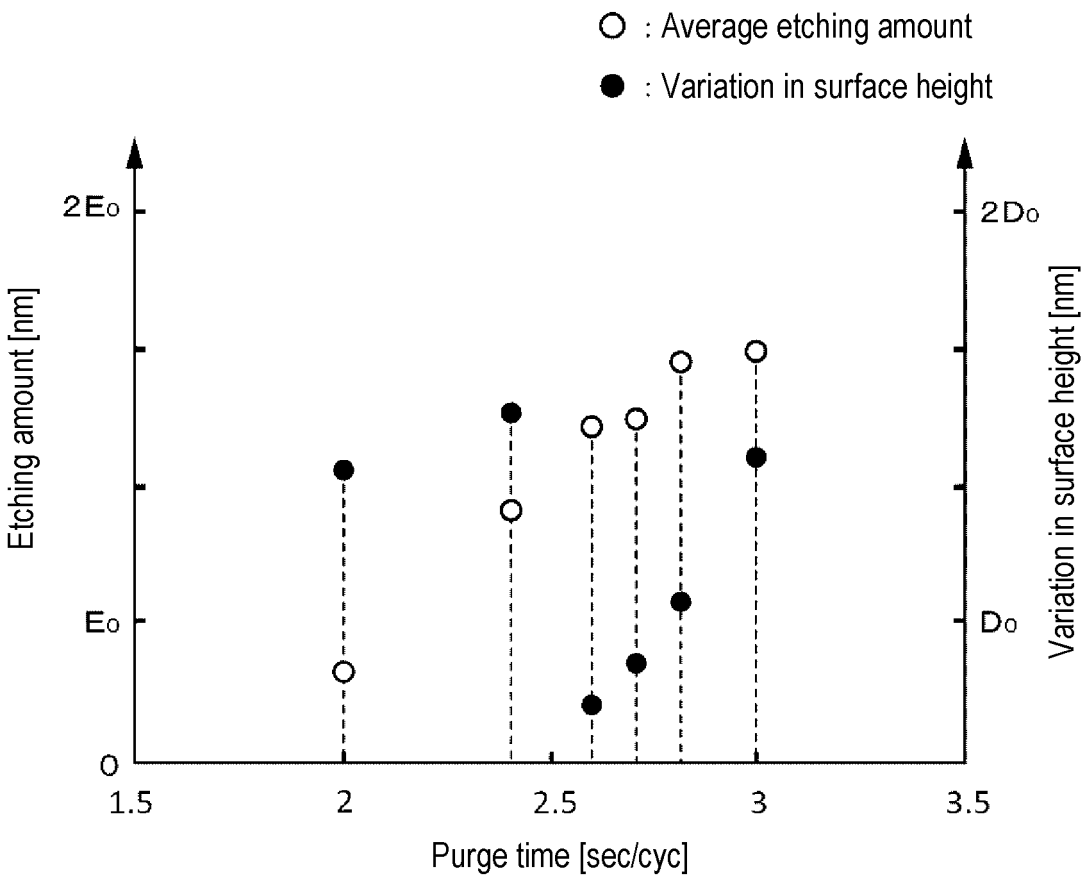

:4000Pa(30Torr)
:2000Pa(15Torr)
:1000Pa(7.5Torr)
O : 0Pa(0Torr)
50
0
0
Purge-out time [sec]
Low
High
Purge gas flow rate [sccm]

FIG. 8


○ : Average etching amount
● : Variation in surface height
2Eo
Eo
0
Etching amount [nm]
2Do
Do
Variation in surface height [nm]
1.5
2
2.5
3
3.5
Purge time [sec/cyc]