FIG. 1

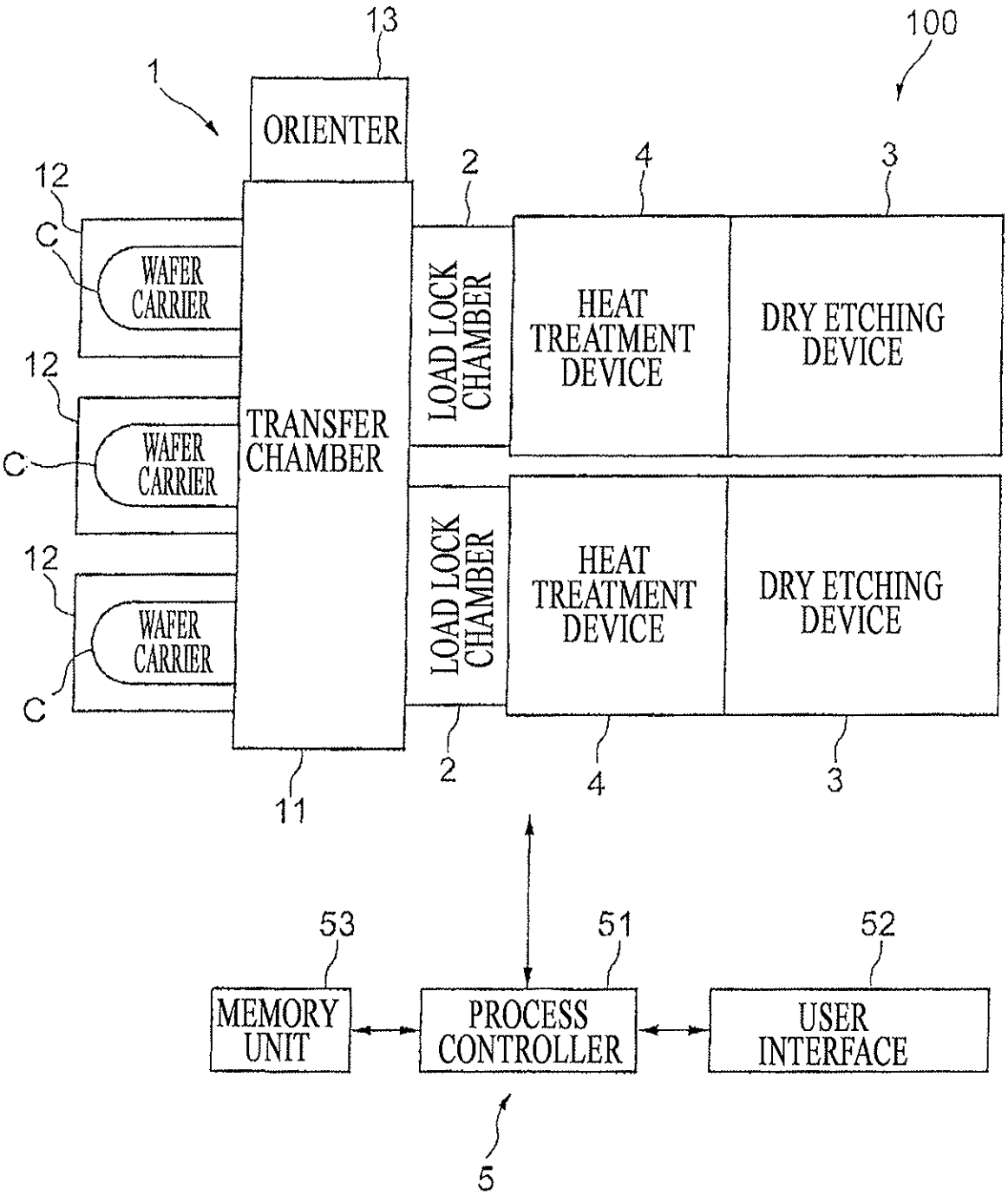

13
100
1
ORIENTER
12
C
WAFER CARRIER
12
C
WAFER CARRIER
12
C
WAFER CARRIER
TRANSFER CHAMBER
11
2
LOAD LOCK CHAMBER
LOAD LOCK CHAMBER
2
4
HEAT TREATMENT DEVICE
HEAT TREATMENT DEVICE
4
3
DRY ETCHING DEVICE
DRY ETCHING DEVICE
3
53
MEMORY UNIT
51
PROCESS CONTROLLER
52
USER INTERFACE
5

FIG. 2

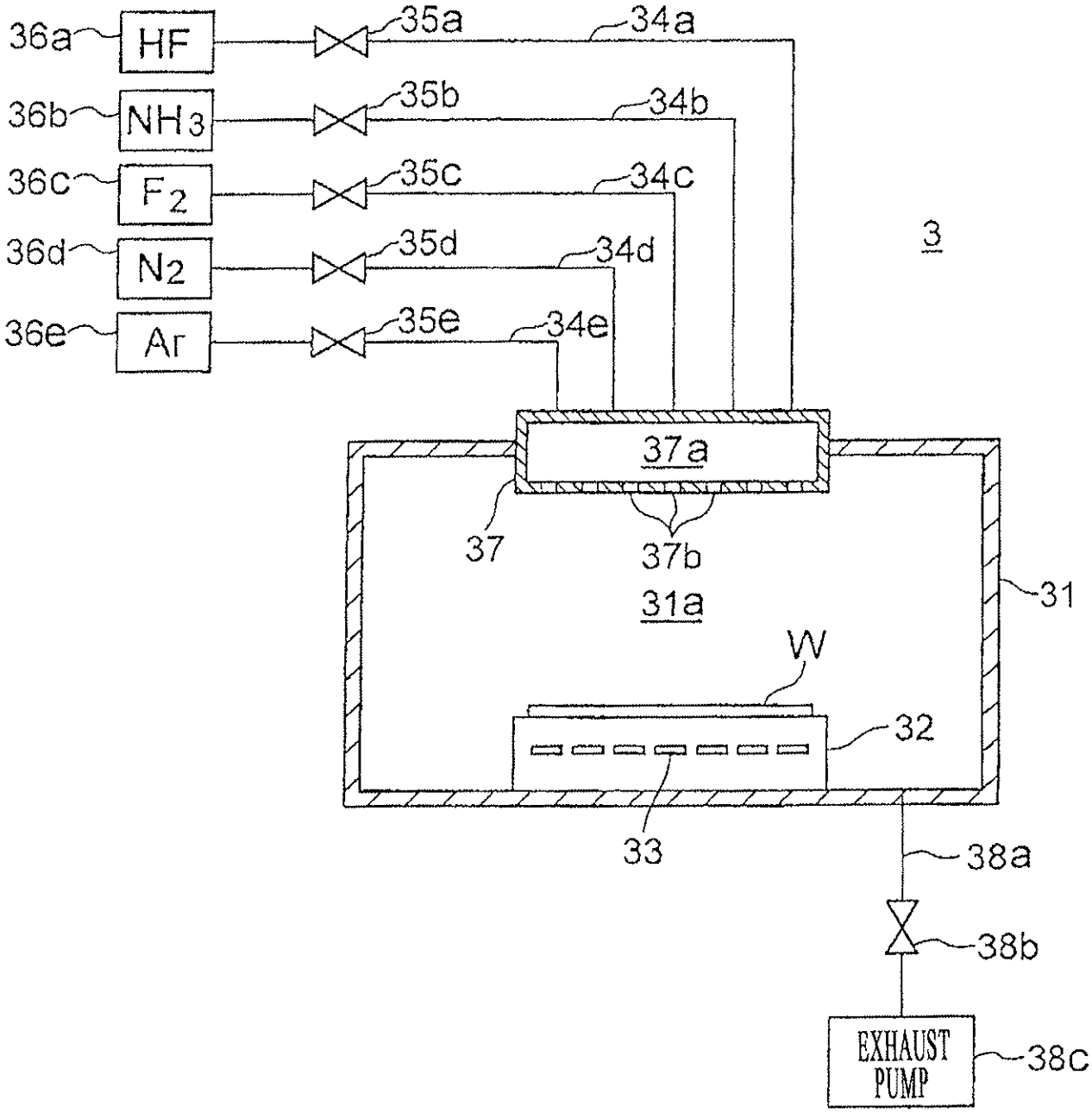

36a
HF
35a
34a
36b
NH3
35b
34b
36c
F2
35c
34c
36d
N2
35d
34d
36e
Ar
35e
34e
3
37a
37
37b
31a
31
W
32
33
38a
38b
EXHAUST PUMP
38c

FIG. 3

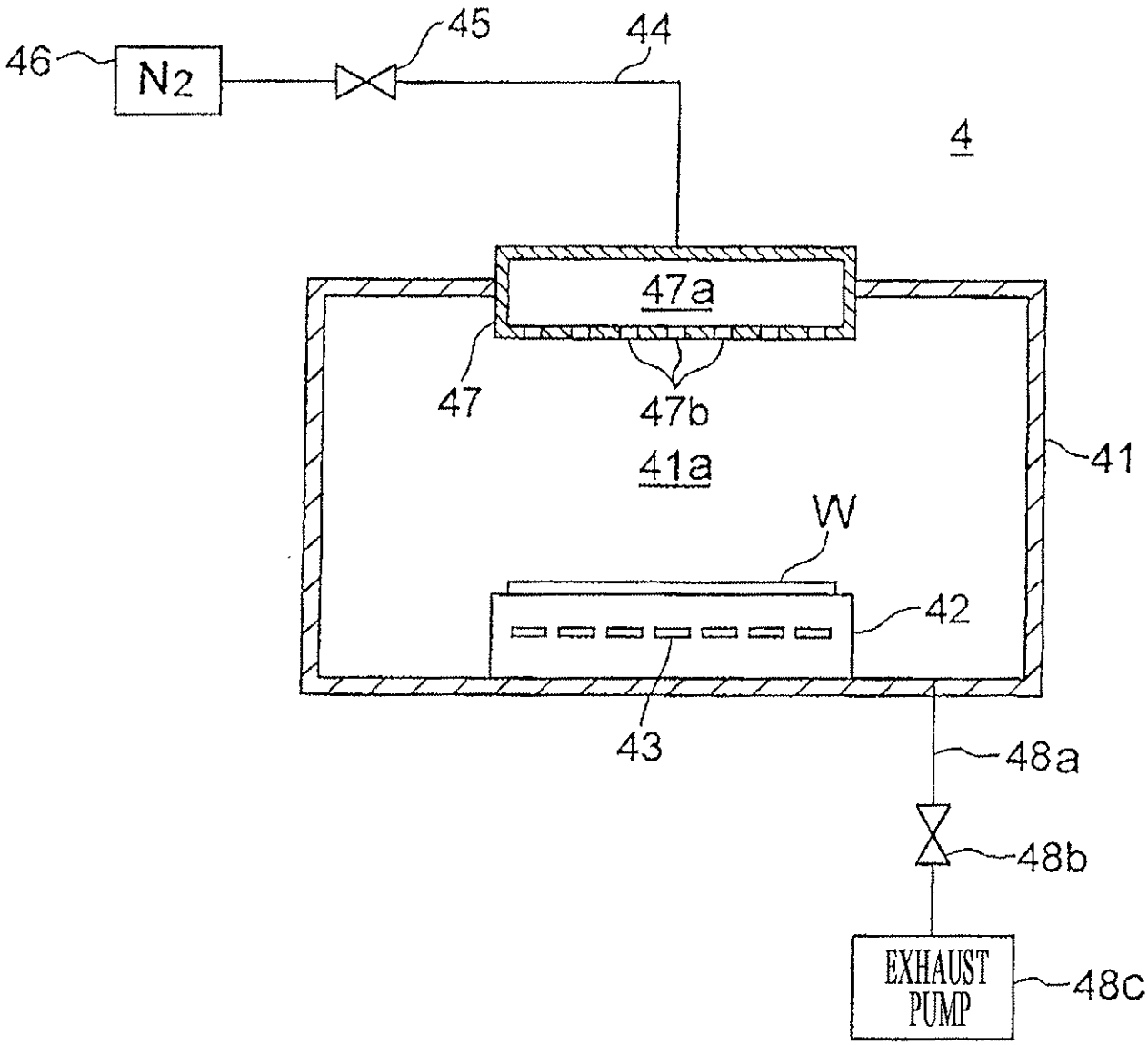


FIG. 4

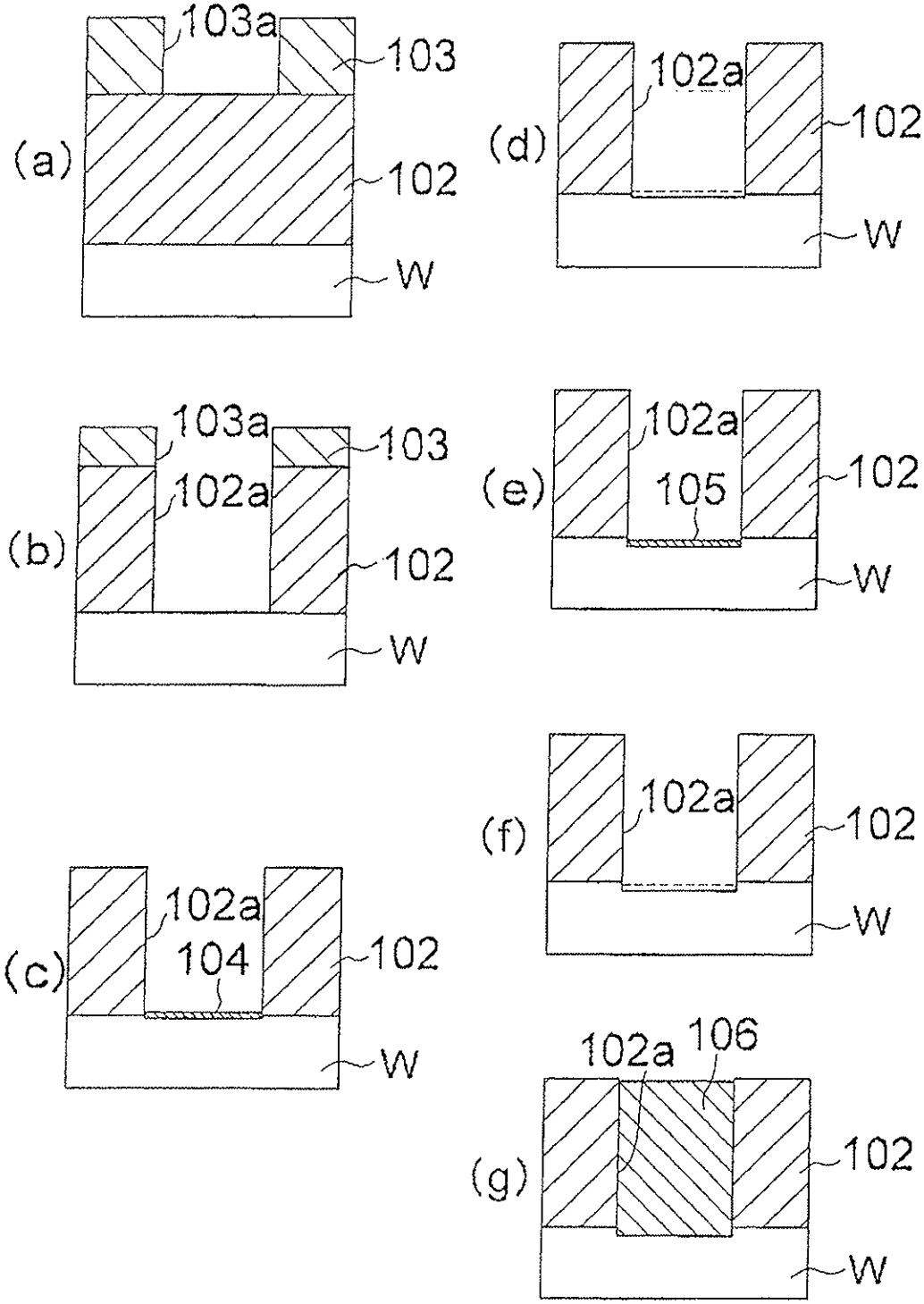

(a)
103a
103
102
W
(b)
103a
103
102a
102
W
(c)
102a
104
102
W
(d)
102a
102
W
(e)
102a
105
102
W
(f)
102a
102
W
(g)
102a
106
102
W

FIG. 5

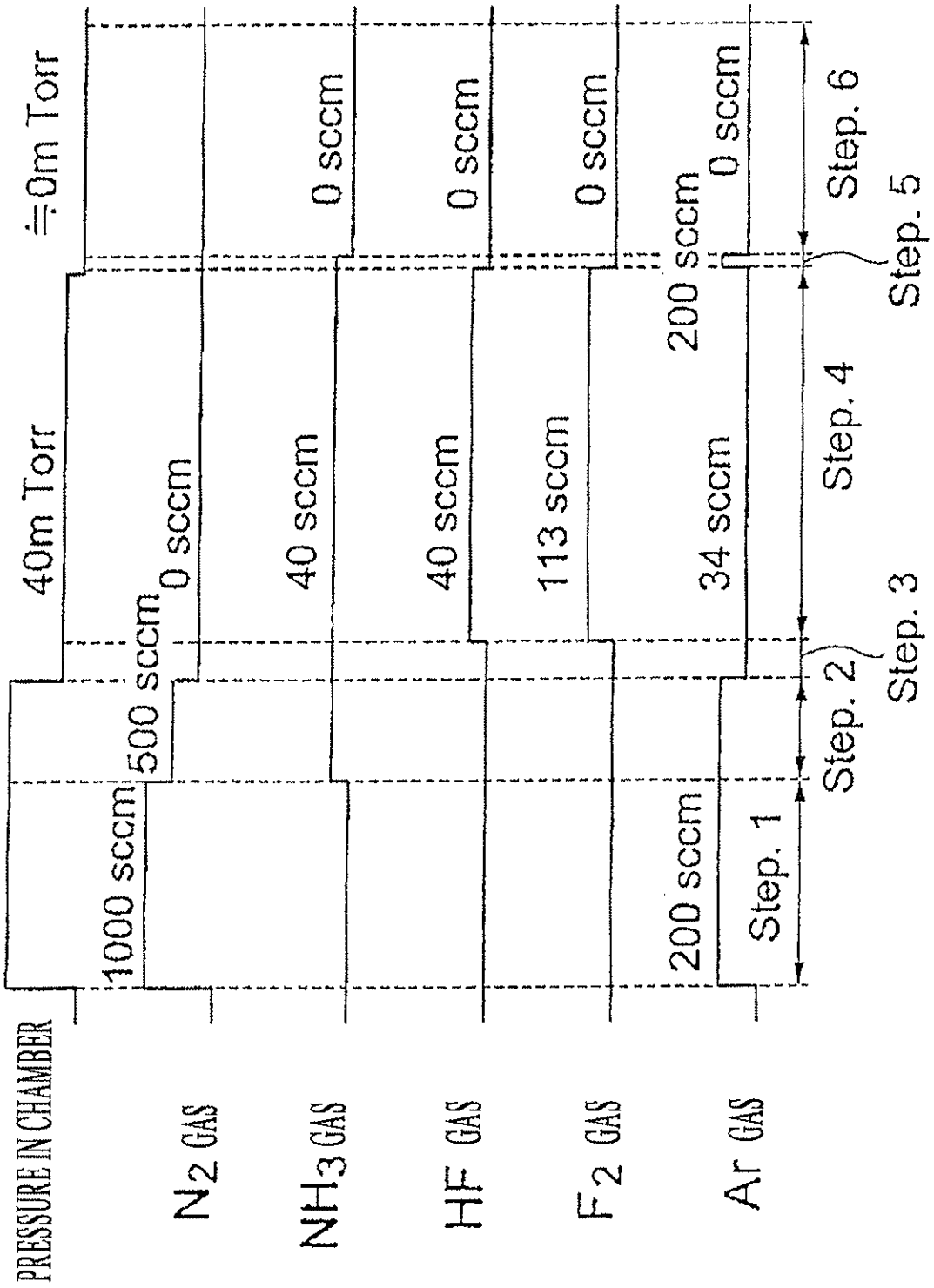
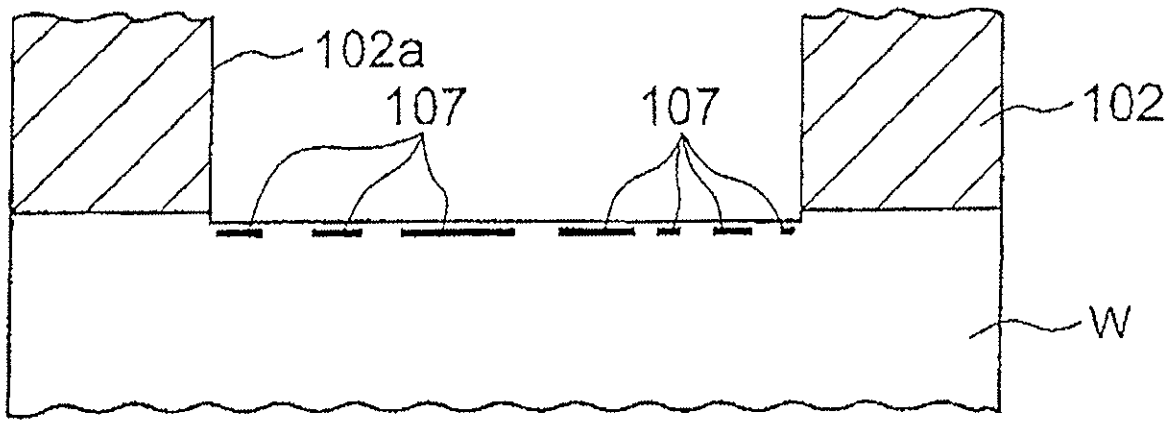

PRESSURE IN CHAMBER
2000m Torr
40m Torr
≒0m Torr
N2 GAS
1000 sccm
500 sccm
0 sccm
NH3 GAS
40 sccm
40 sccm
0 sccm
HF GAS
40 sccm
113 sccm
0 sccm
F2 GAS
200 sccm
34 sccm
200 sccm
0 sccm
Ar GAS
Step. 1
Step. 2
Step. 3
Step. 4
Step. 5
Step. 6

FIG. 6



REFERENCE EXAMPLE

FIG. 7

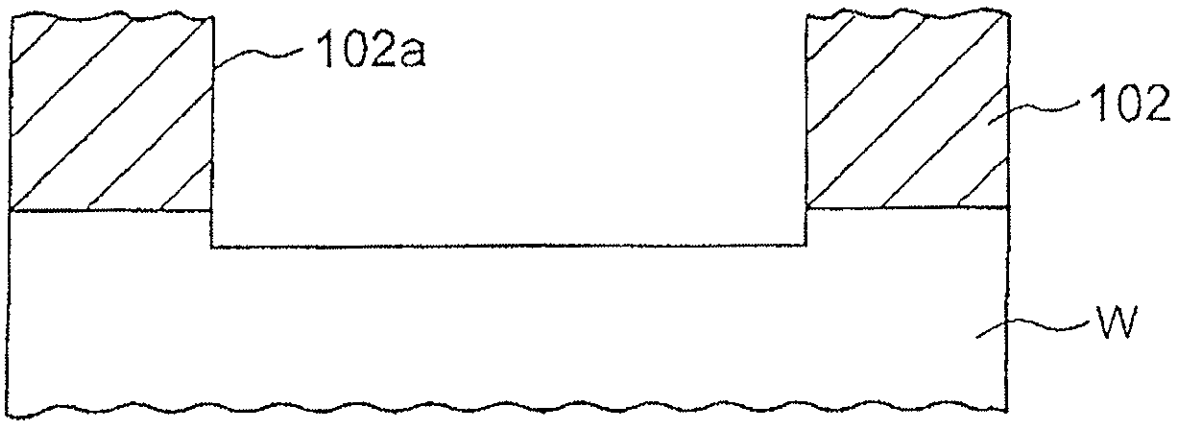


FIG. 8

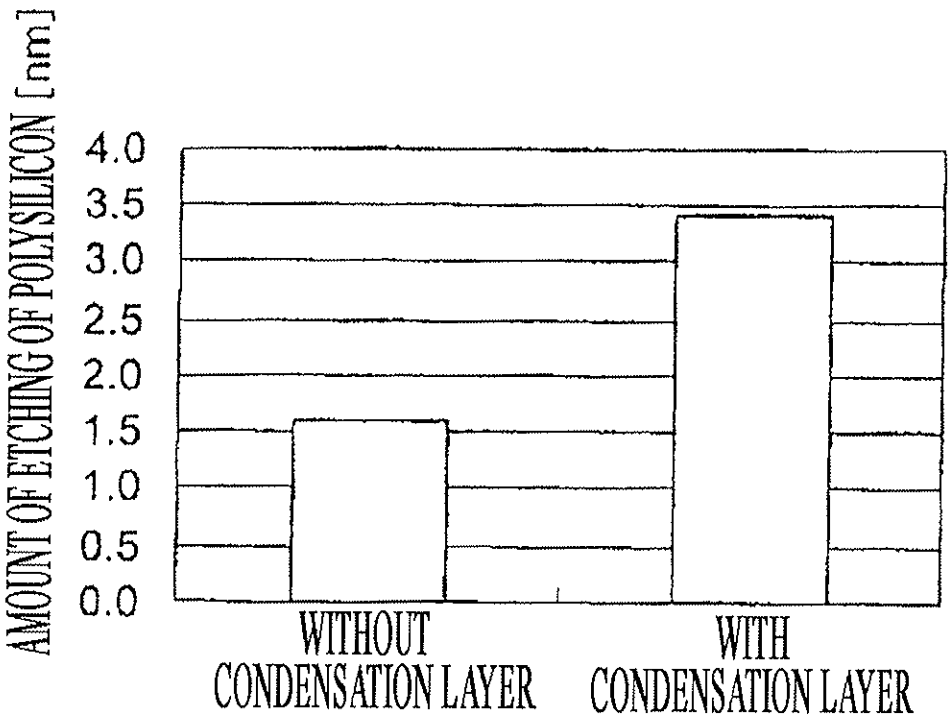

AMOUNT OF ETCHING OF POLYSILICON [nm]
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
WITHOUT CONDENSATION LAYER
WITH CONDENSATION LAYER

FIG. 9

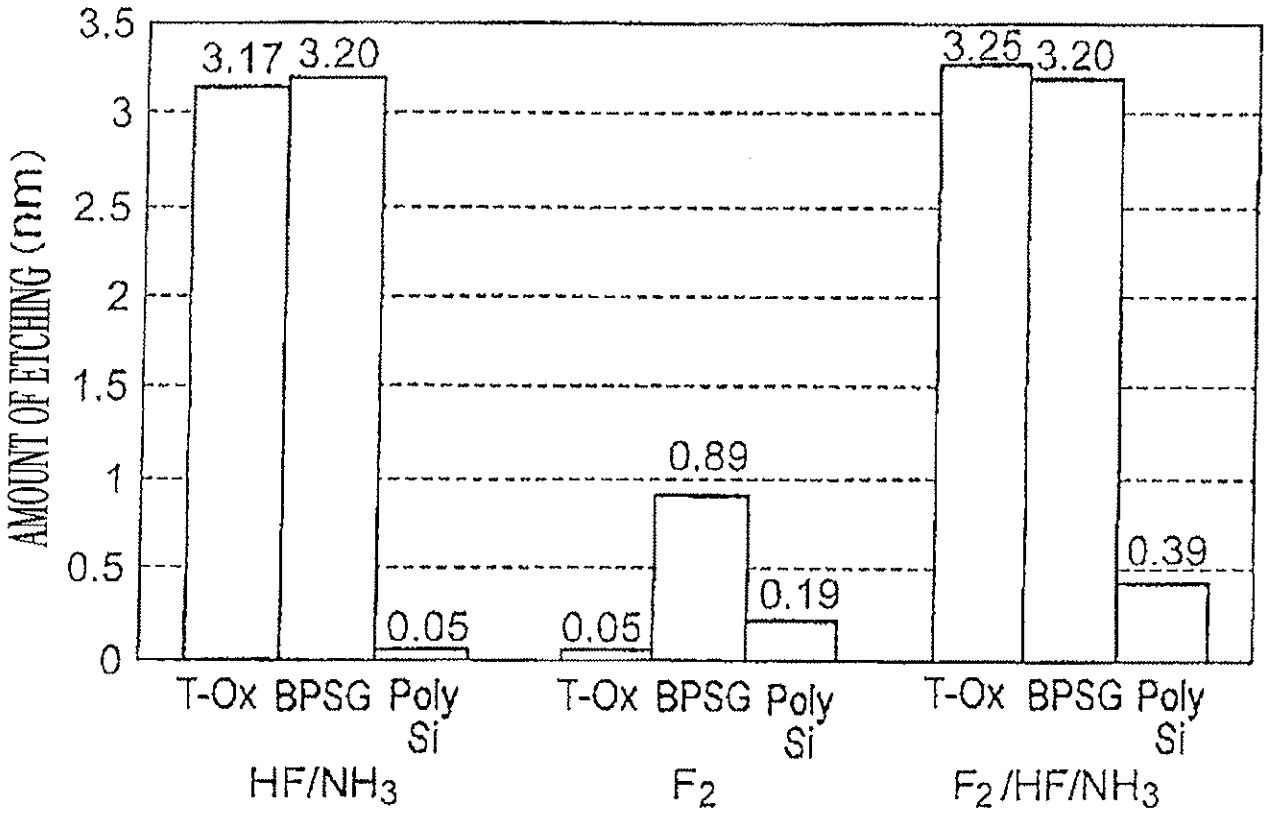

AMOUNT OF ETCHING (nm)
3.5
3
2.5
2
1.5
1
0.5
0
3.17
3.20
0.05
0.05
0.89
0.19
3.25
3.20
0.39
T-Ox
BPSG
Poly Si
HF/NH3
F2
F2/HF/NH3

FIG. 10

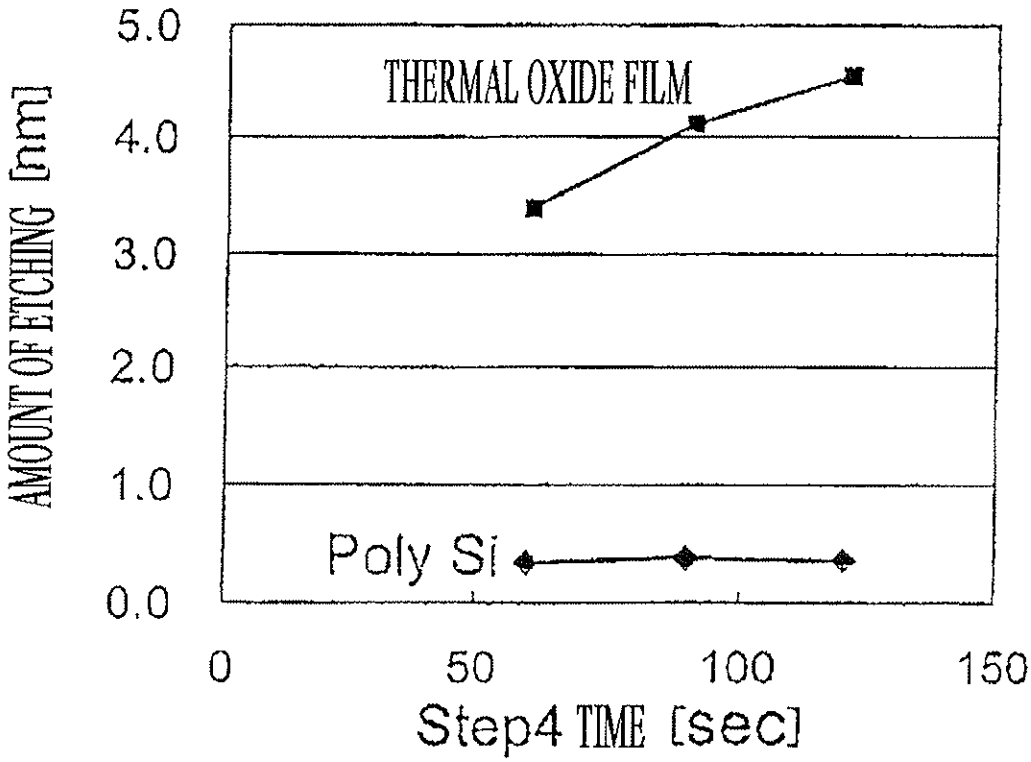

5.0
4.0
3.0
2.0
1.0
0.0
AMOUNT OF ETCHING [nm]
THERMAL OXIDE FILM
Poly Si
0
50
100
150
Step4 TIME [sec]

FIG. 11

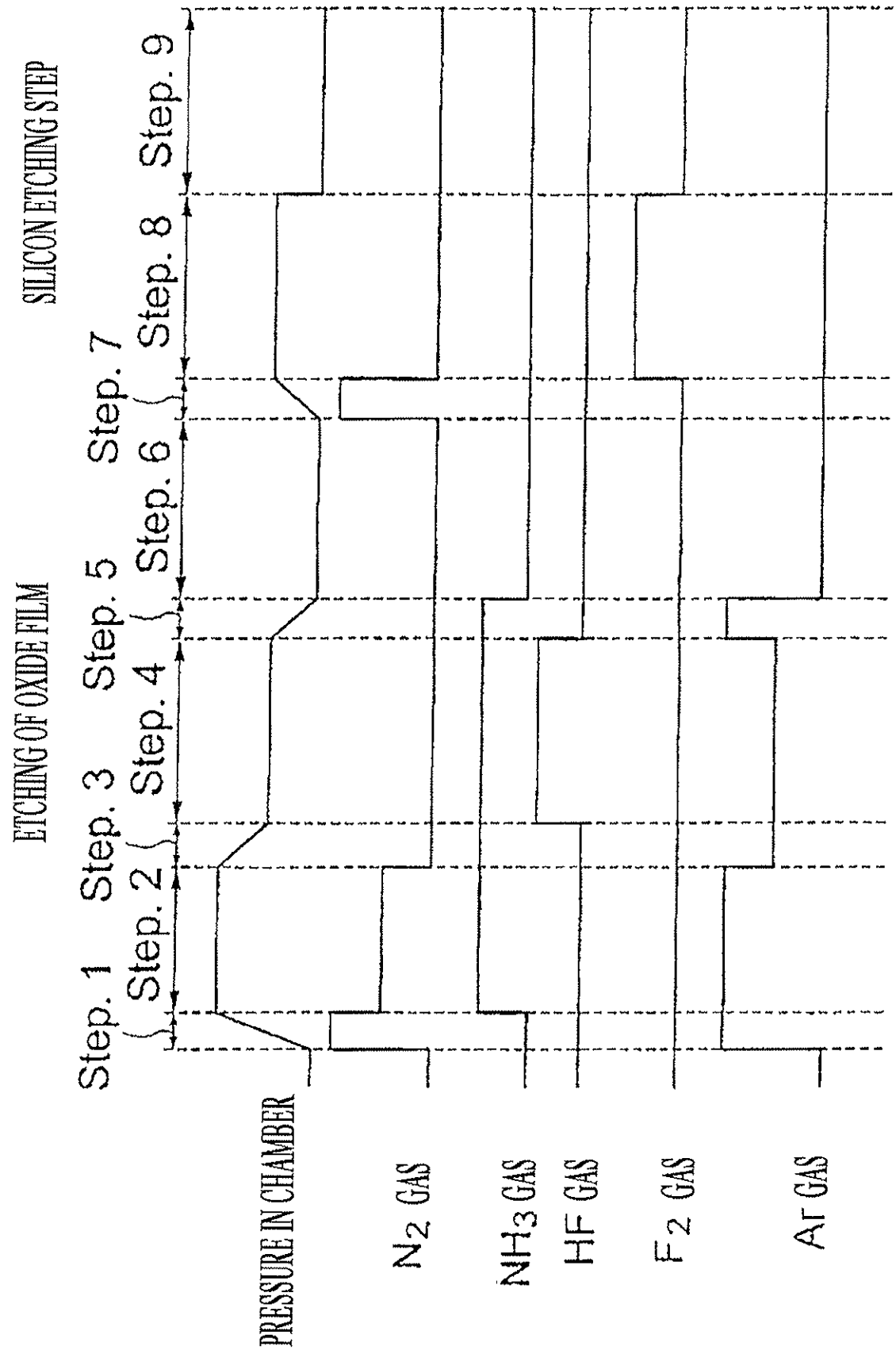

ETCHING OF OXIDE FILM
SILICON ETCHING STEP
Step. 1
Step. 2
Step. 3
Step. 4
Step. 5
Step. 6
Step. 7
Step. 8
Step. 9
PRESSURE IN CHAMBER
N_2 GAS
NH_3 GAS
HF GAS
F_2 GAS
Ar GAS

FIG. 12

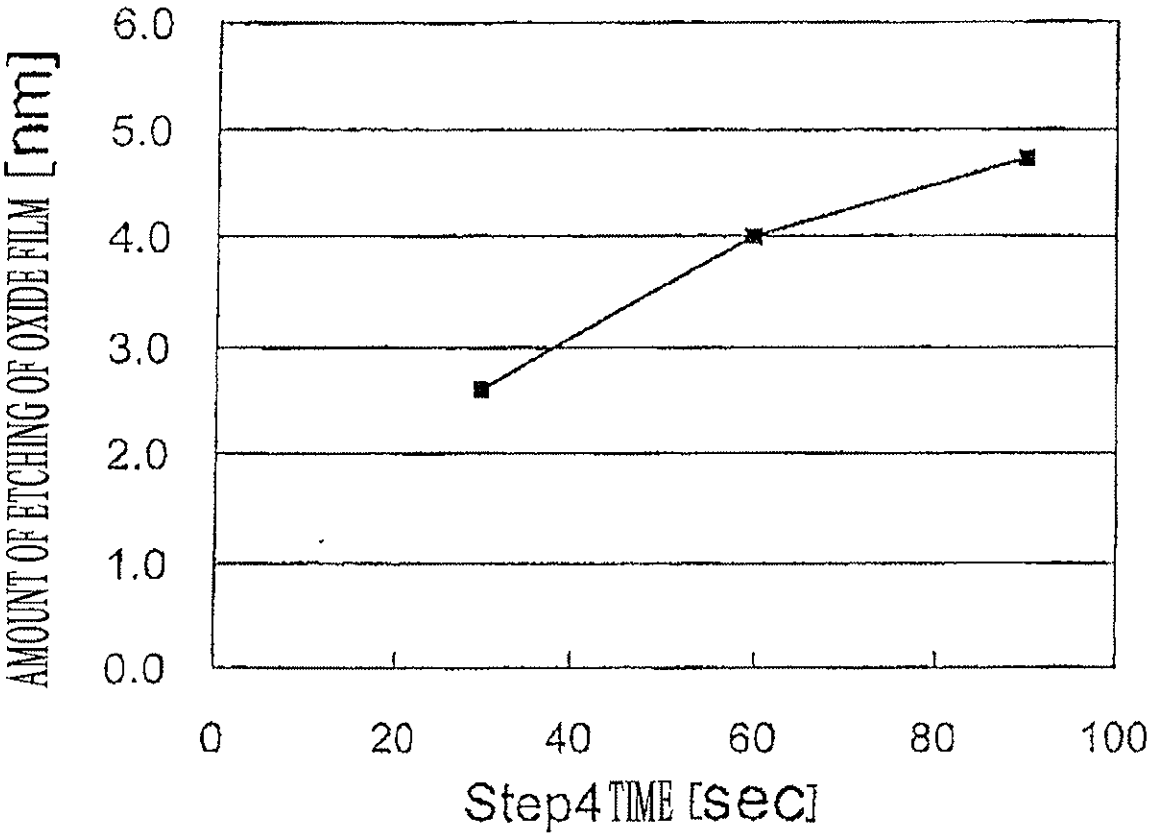

AMOUNT OF ETCHING OF OXIDE FILM [nm]
6.0
5.0
4.0
3.0
2.0
1.0
0.0
0
20
40
60
80
100
Step4 TIME [sec]

FIG. 13

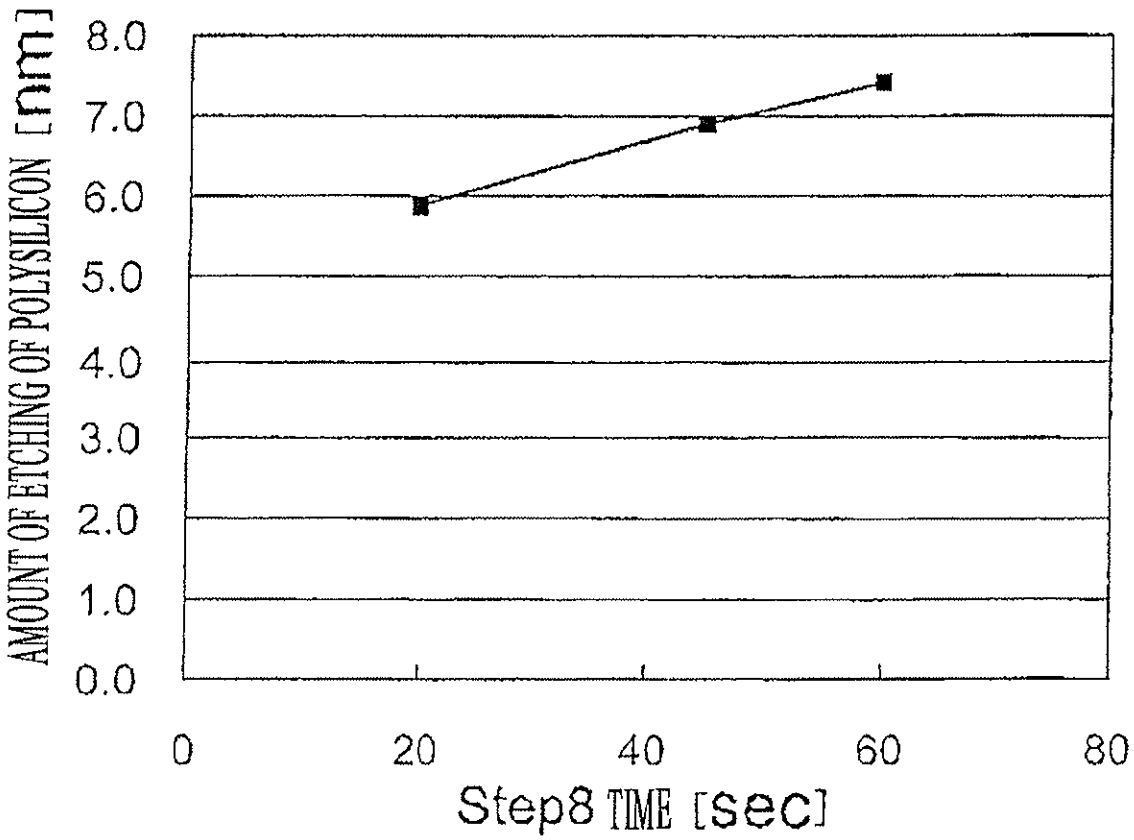

AMOUNT OF ETCHING OF POLYSILICON [nm]
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
0
20
40
60
80
Step8 TIME [sec]

FIG. 14

