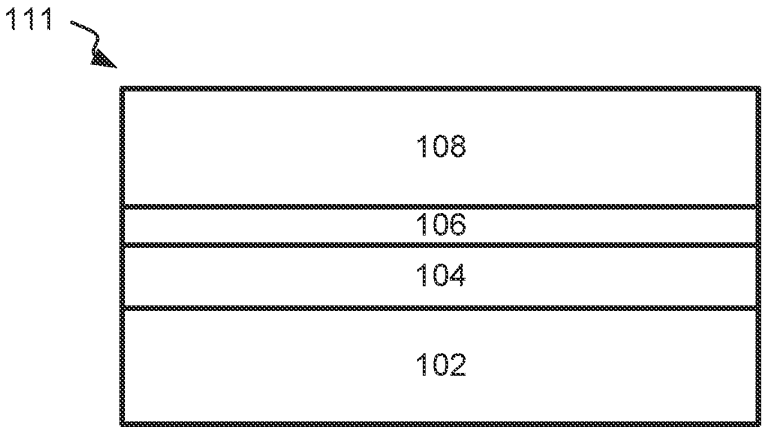


FIG. 1A

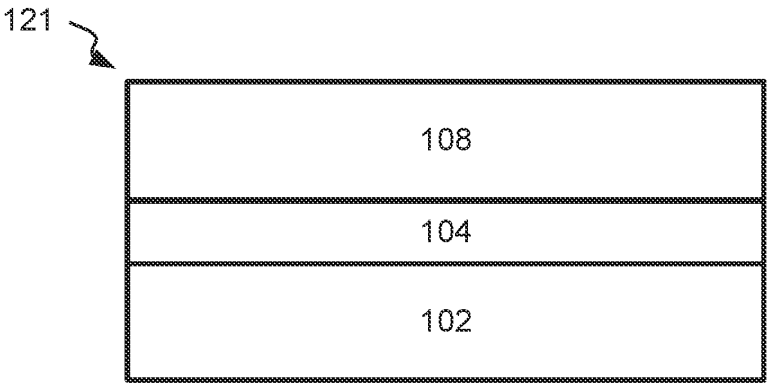


FIG. 1B

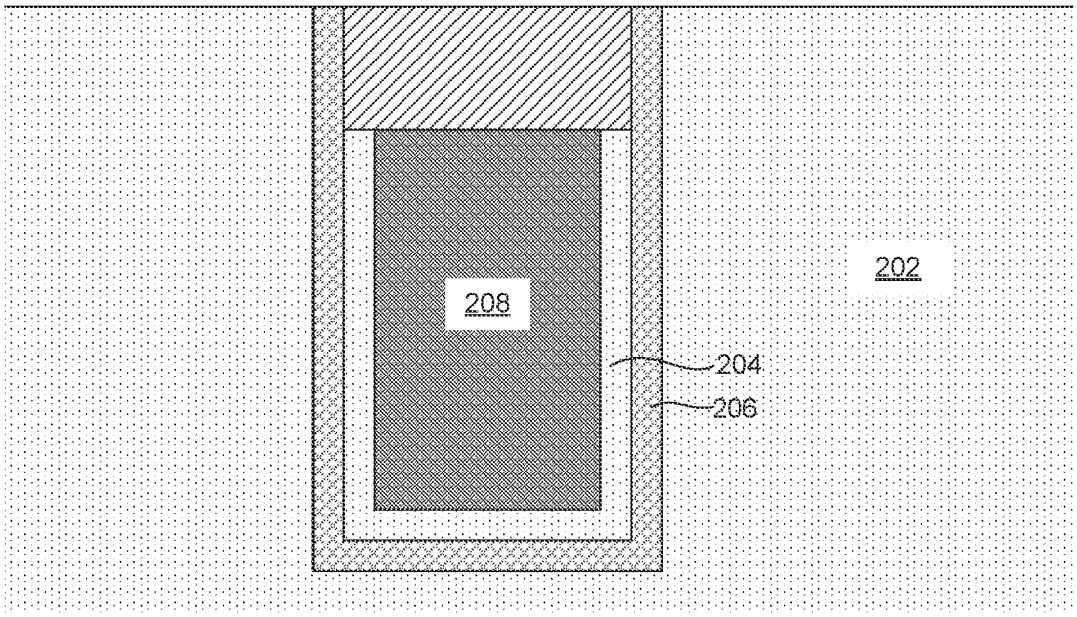


FIG. 2A

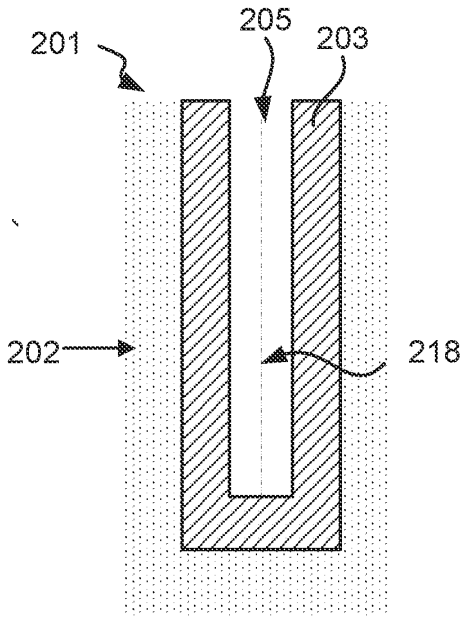


FIG. 2B

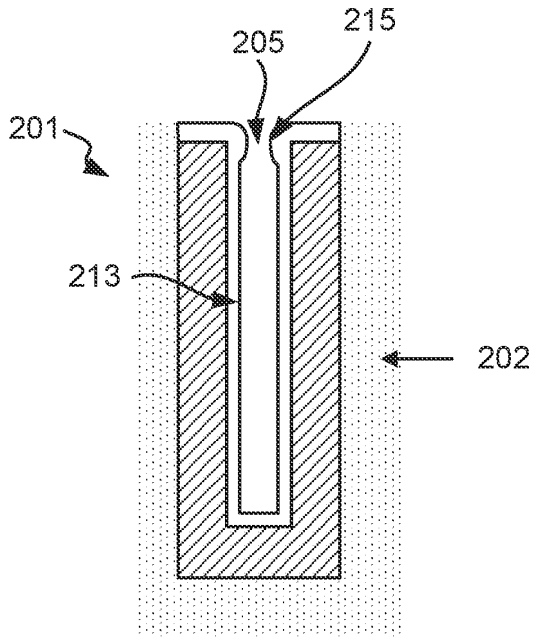


FIG. 2C

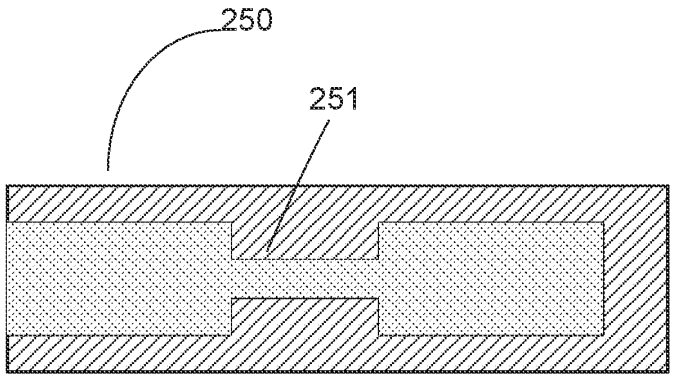


FIG. 2E

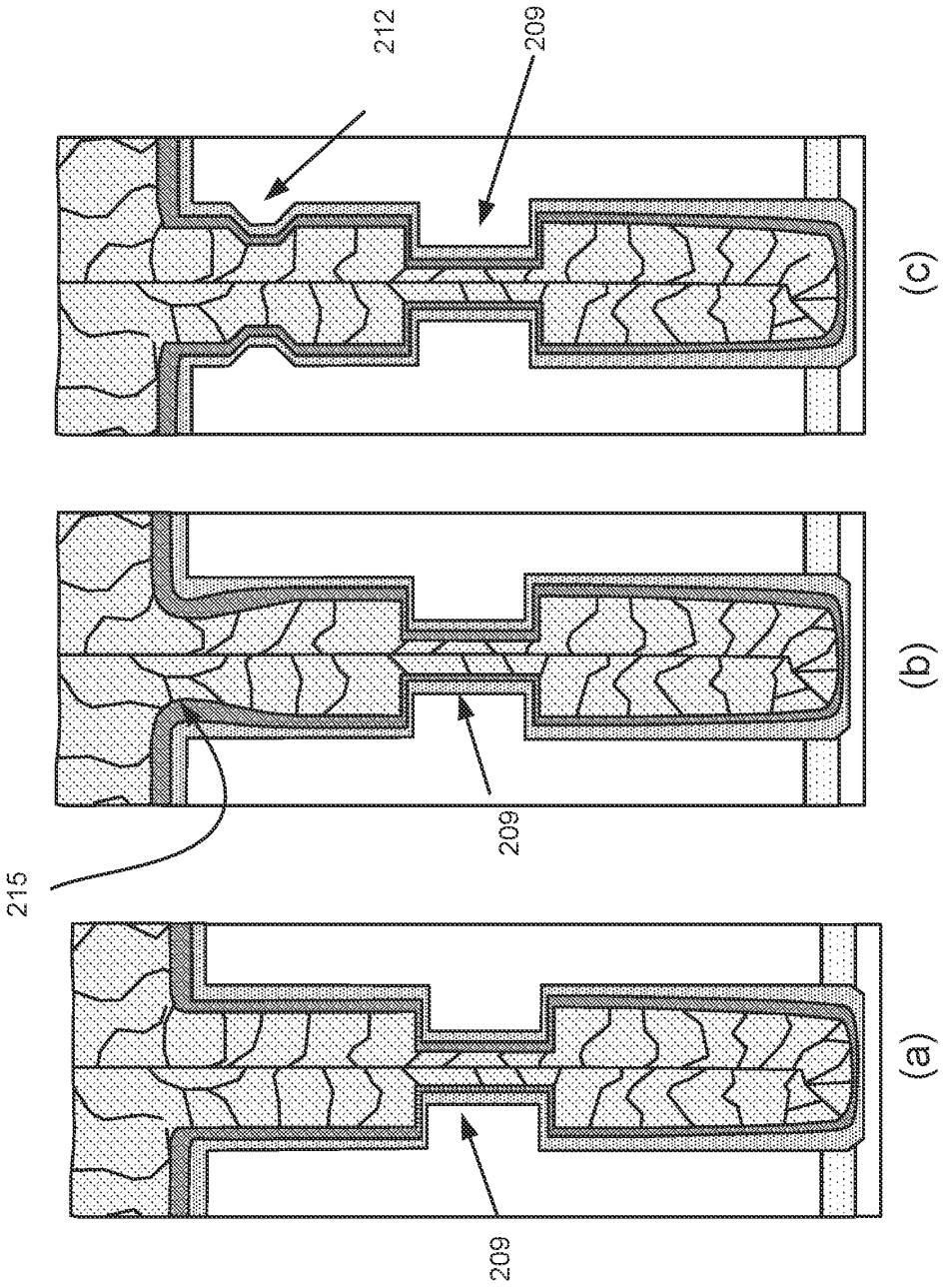


FIG. 2D

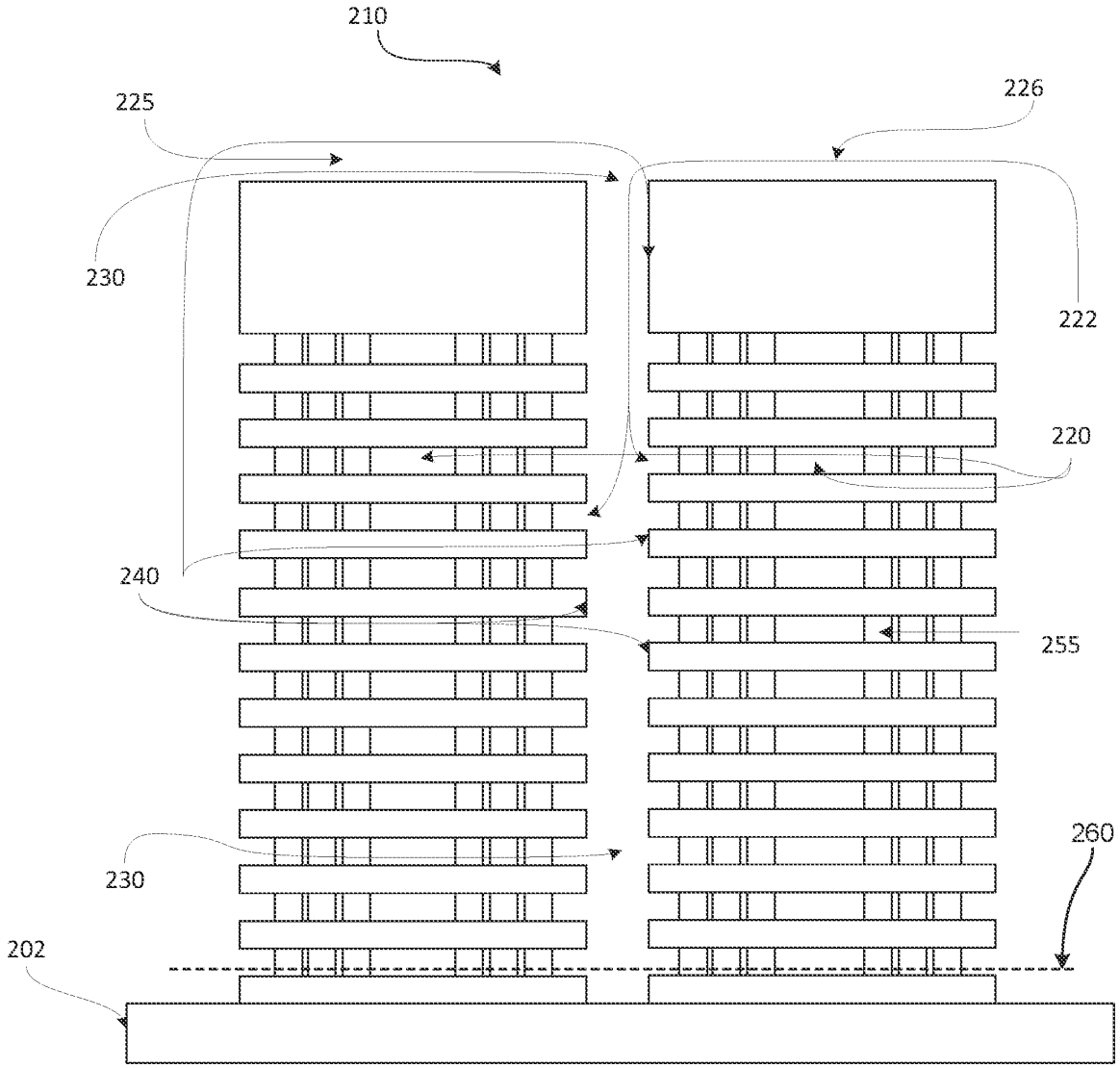


FIG. 2F

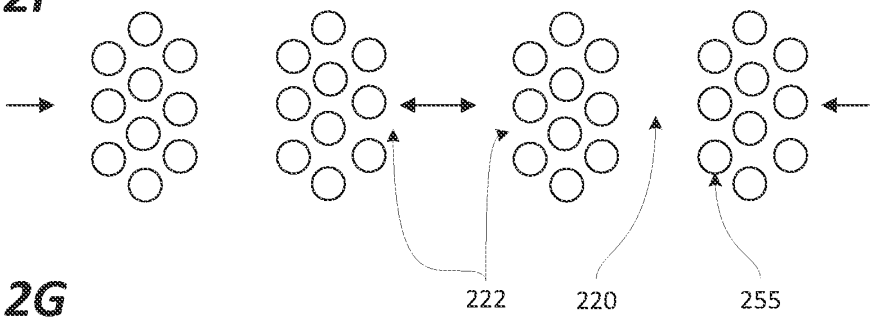


FIG. 2G

FIG. 2H

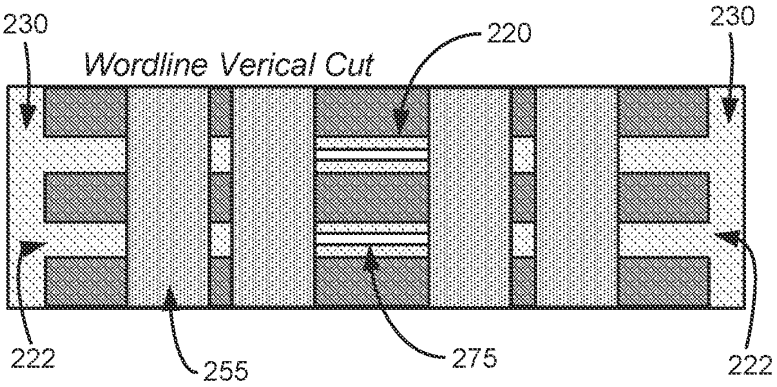


FIG. 2I

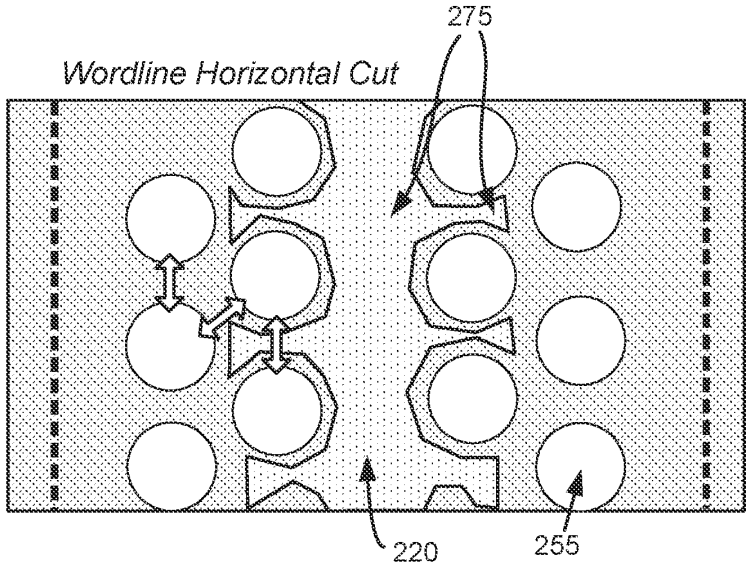
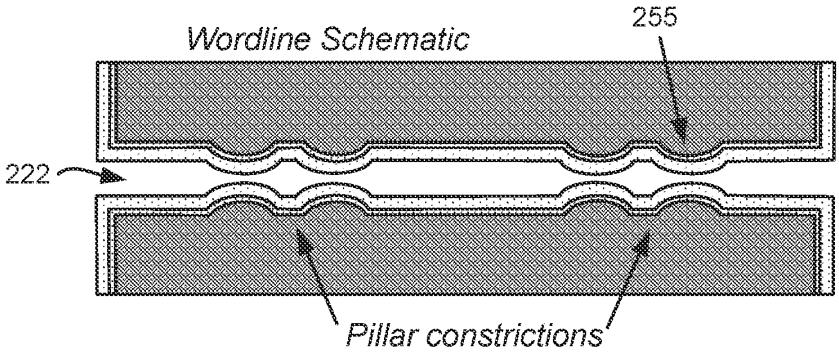


FIG. 2J



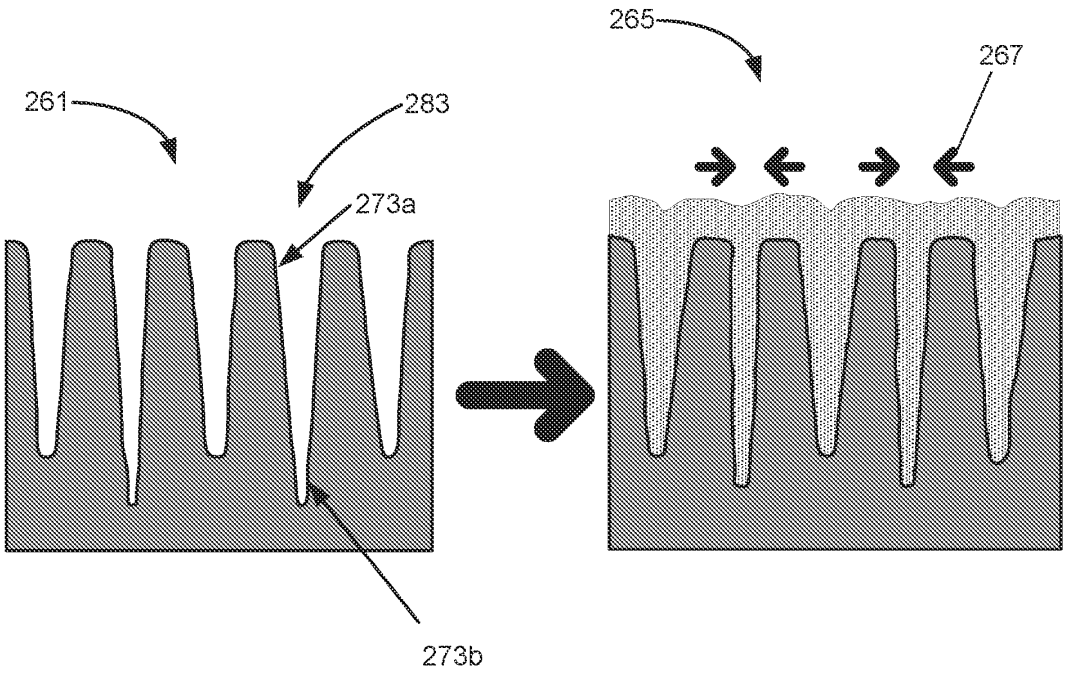


FIG. 2K

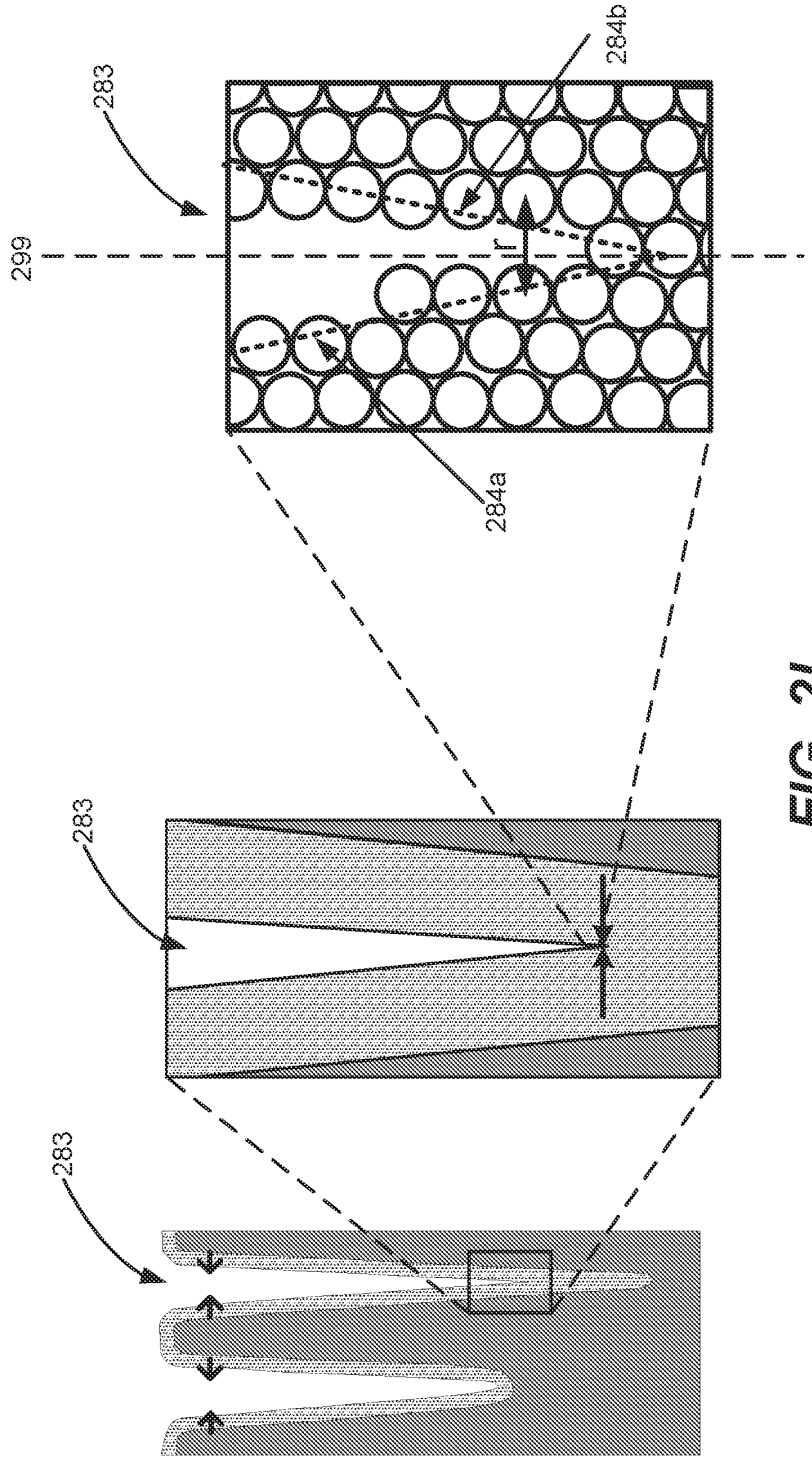


FIG. 2L

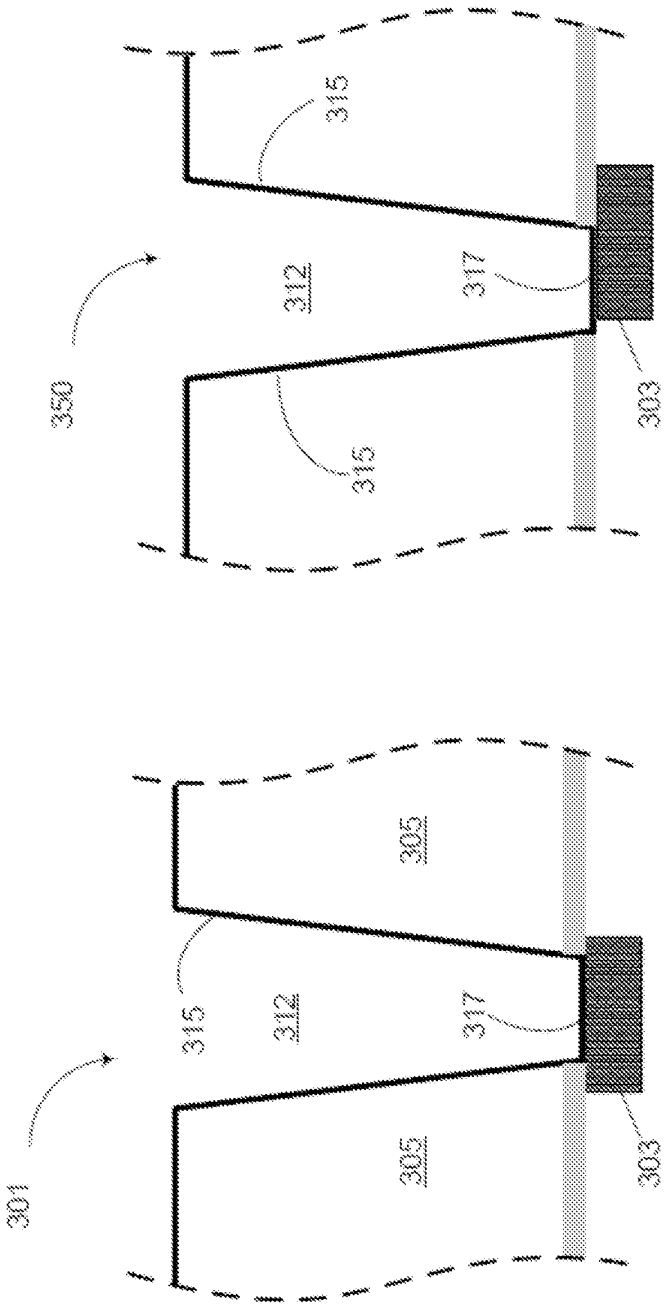


FIG. 3

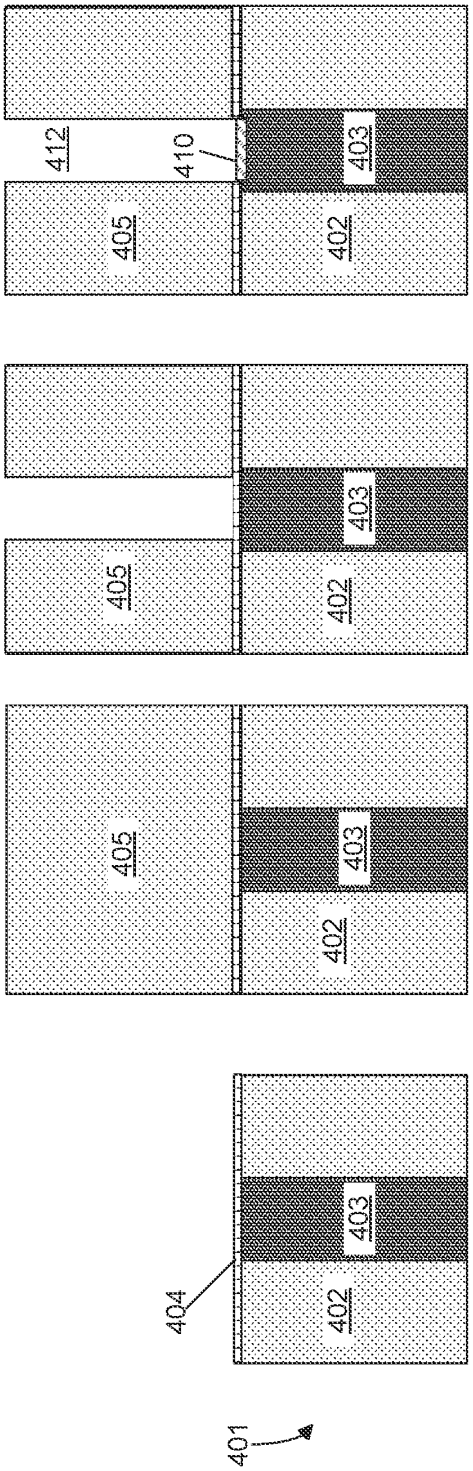


FIG. 4

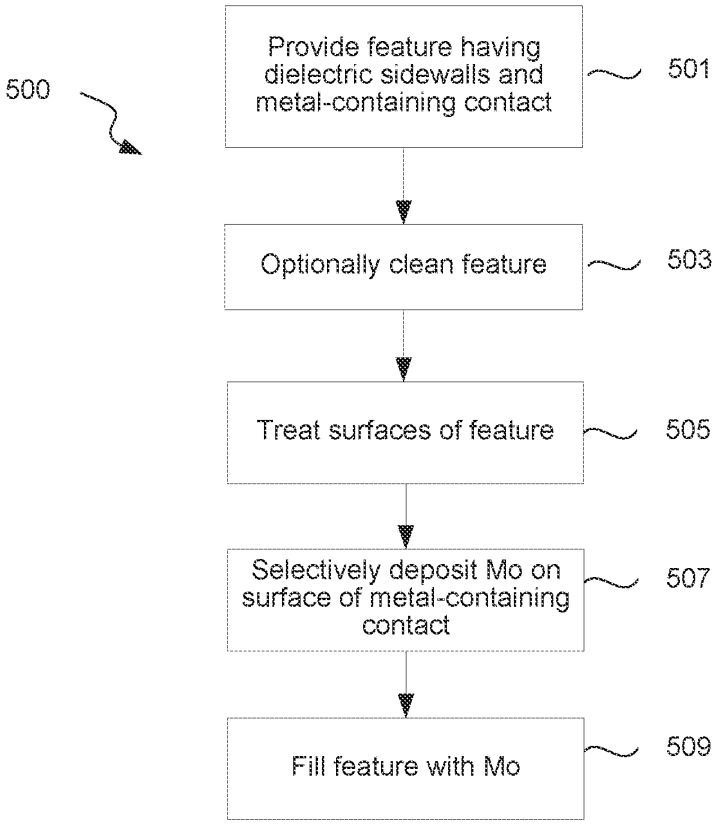

500
Provide feature having dielectric sidewalls and metal-containing contact
501
Optionally clean feature
503
Treat surfaces of feature
505
Selectively deposit Mo on surface of metal-containing contact
507
Fill feature with Mo
509

FIG. 5

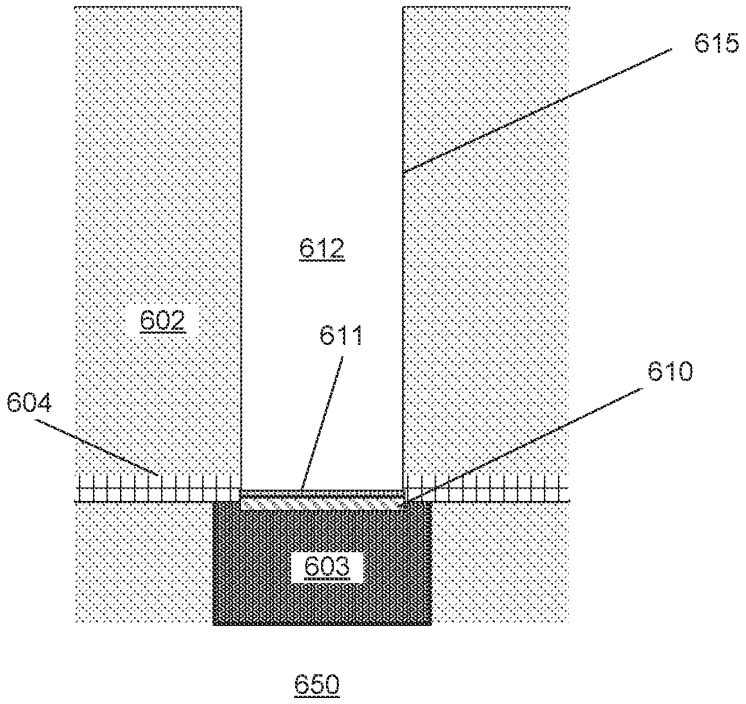
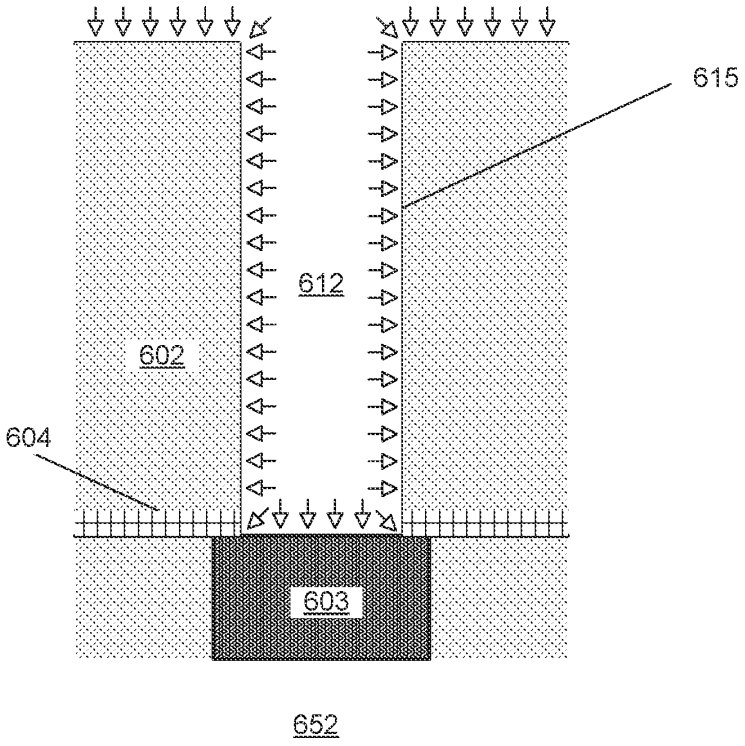


FIG. 6A



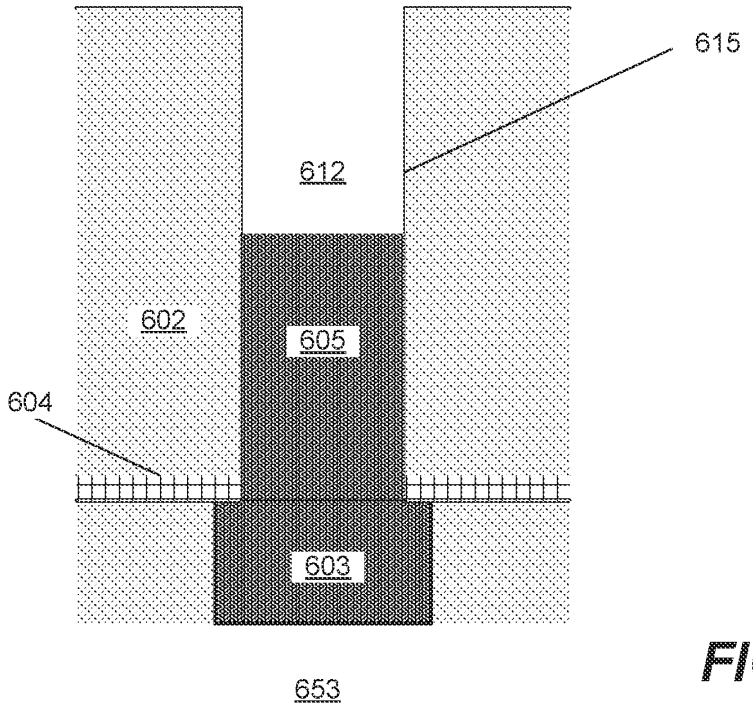
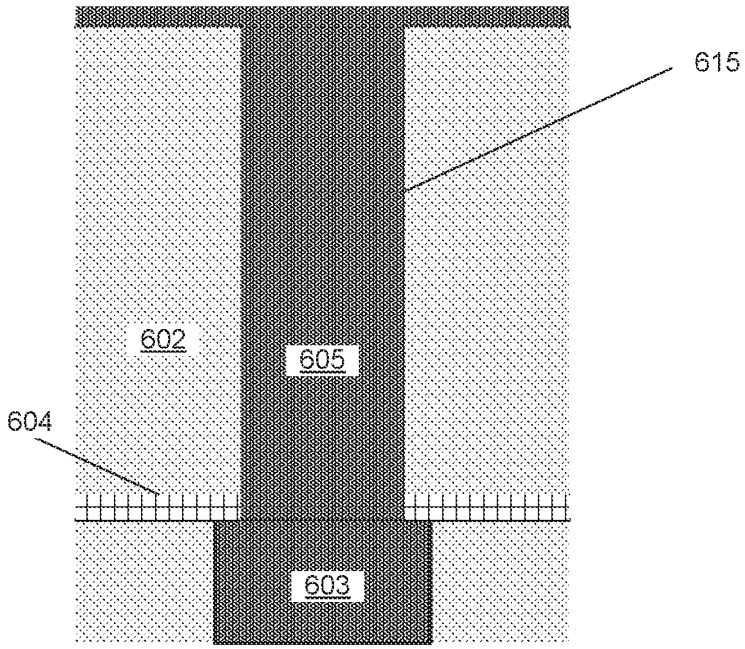
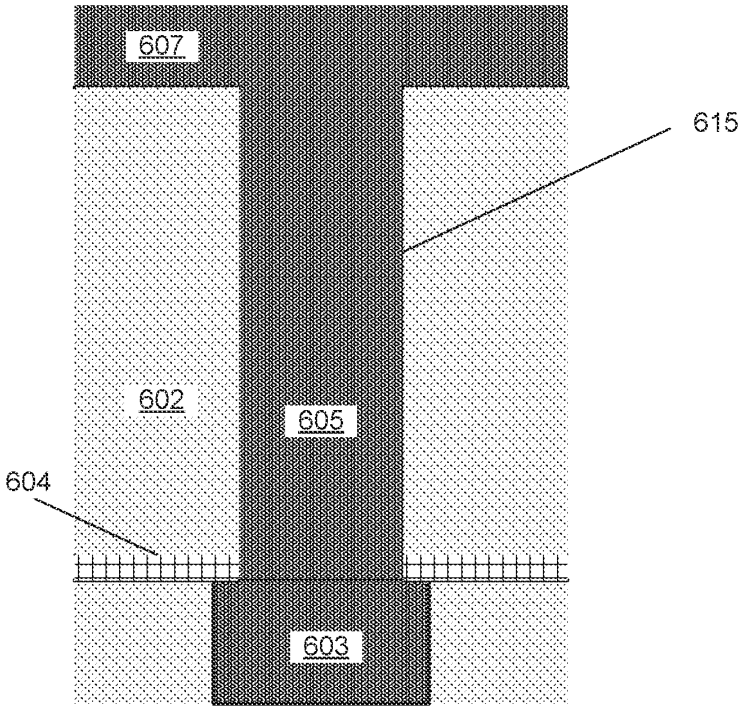


FIG. 6B



654



655

FIG. 6C

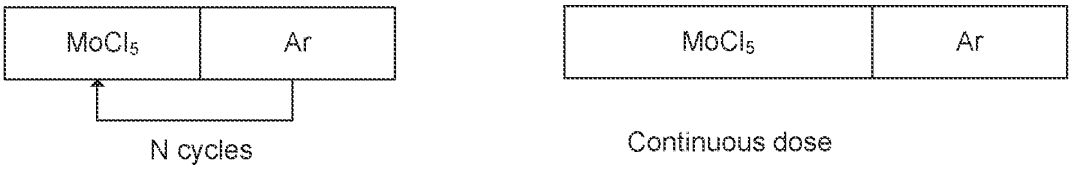

MoCl5
Ar
N cycles
MoCl5
Ar
Continuous dose

FIG. 7

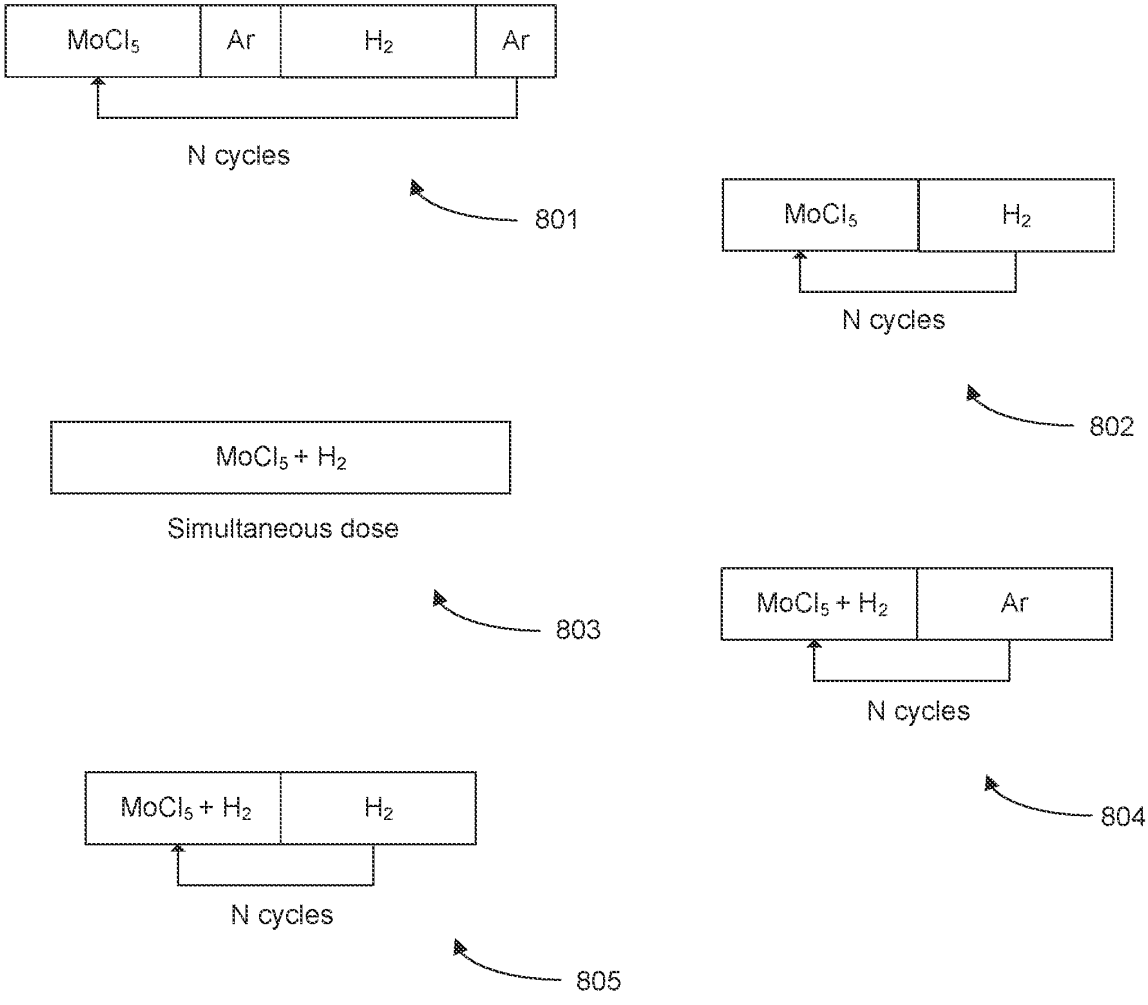

MoCl5
Ar
H2
Ar
N cycles
801
MoCl5
H2
N cycles
802
MoCl5 + H2
Simultaneous dose
803
MoCl5 + H2
Ar
N cycles
804
MoCl5 + H2
H2
N cycles
805

FIG. 8

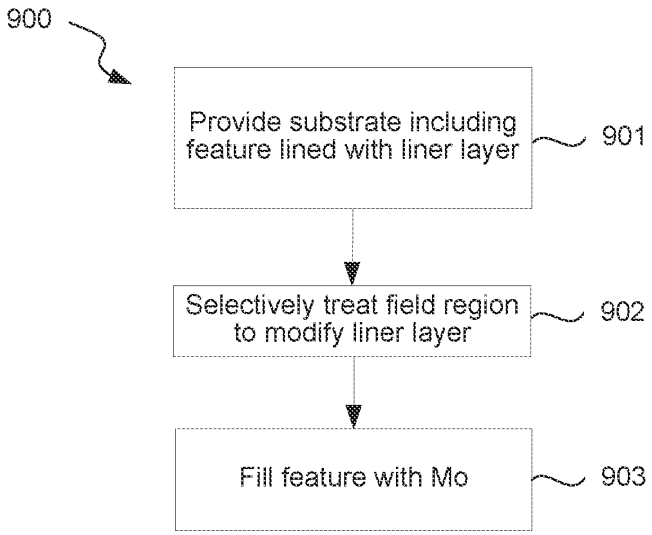

900
Provide substrate including feature lined with liner layer
901
Selectively treat field region to modify liner layer
902
Fill feature with Mo
903

FIG. 9

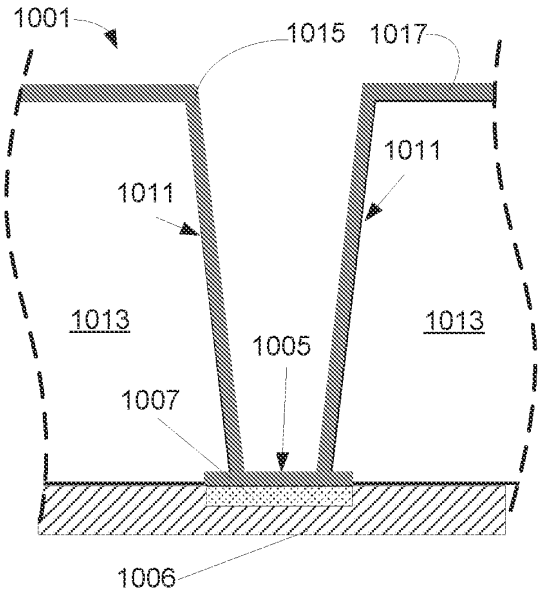


FIG. 10A

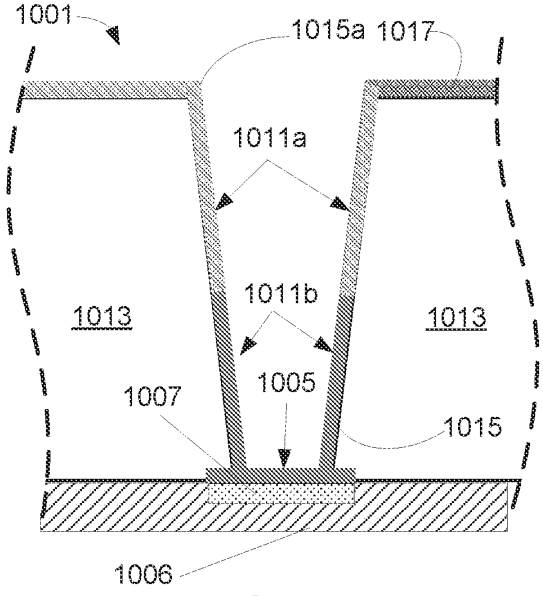


FIG. 10B

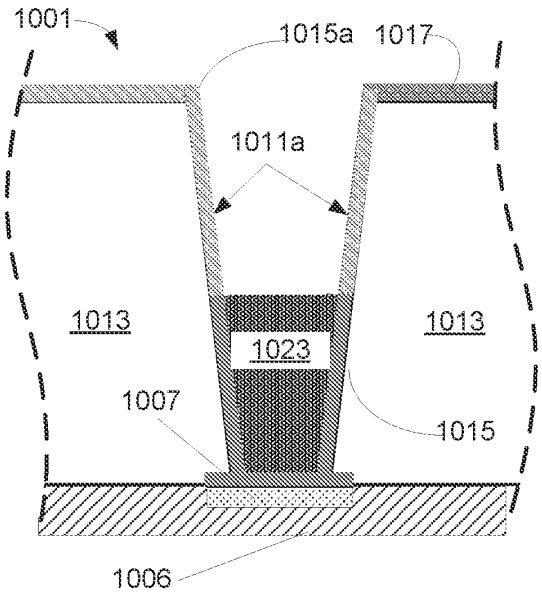


FIG. 10C

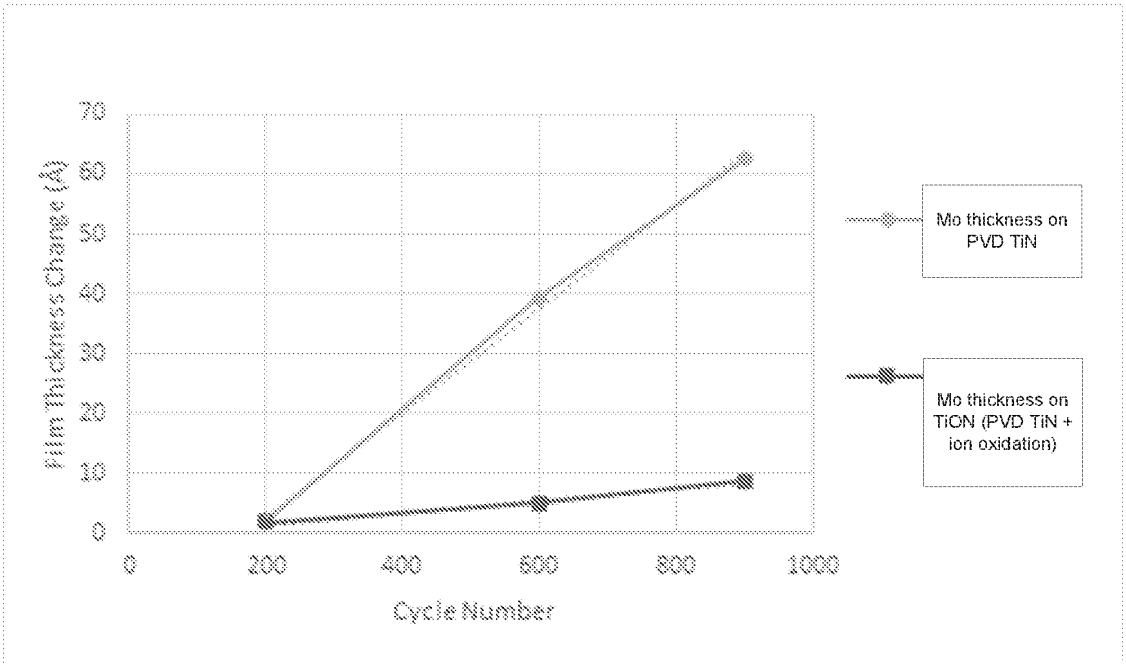

70
60
50
40
30
20
10
0
Film Thickness Change (Å)
0
200
400
600
800
1000
Cycle Number
Mo thickness on PVD TiN
Mo thickness on TiON (PVD TiN + ion oxidation)

FIG. 11

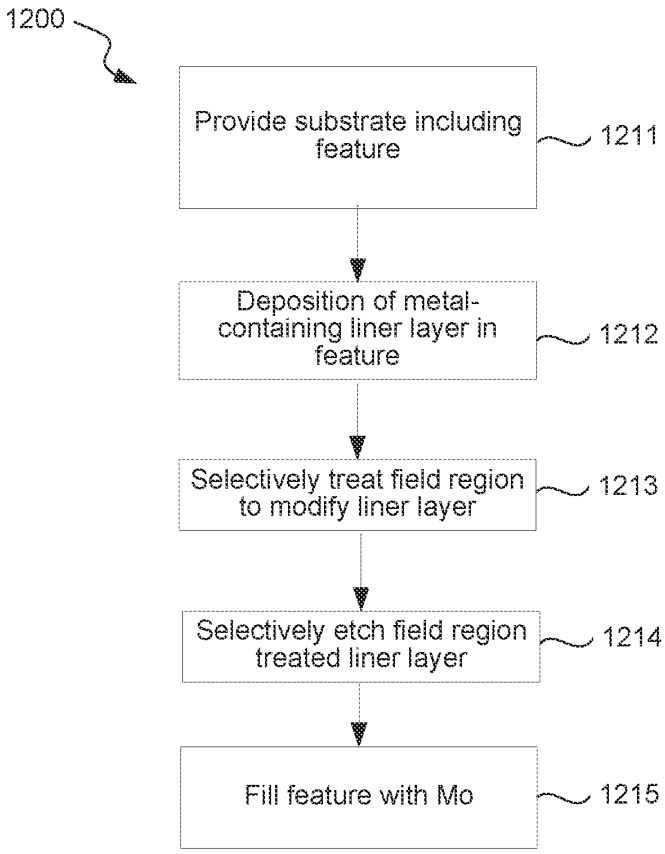

1200
Provide substrate including feature
1211
Deposition of metal-containing liner layer in feature
1212
Selectively treat field region to modify liner layer
1213
Selectively etch field region treated liner layer
1214
Fill feature with Mo
1215

FIG. 12

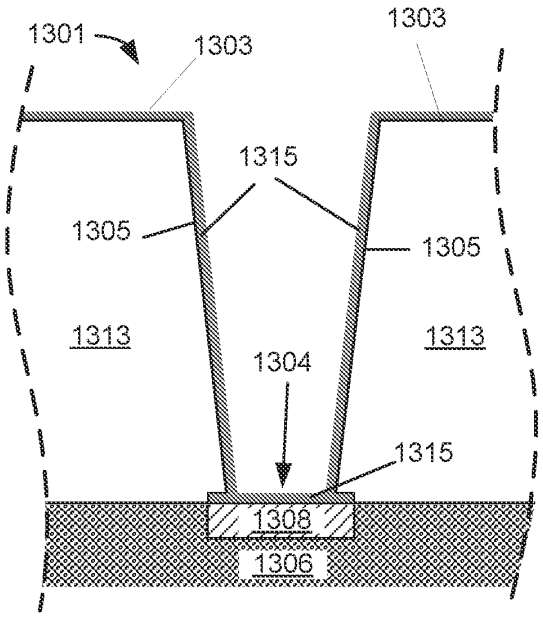


FIG. 13A

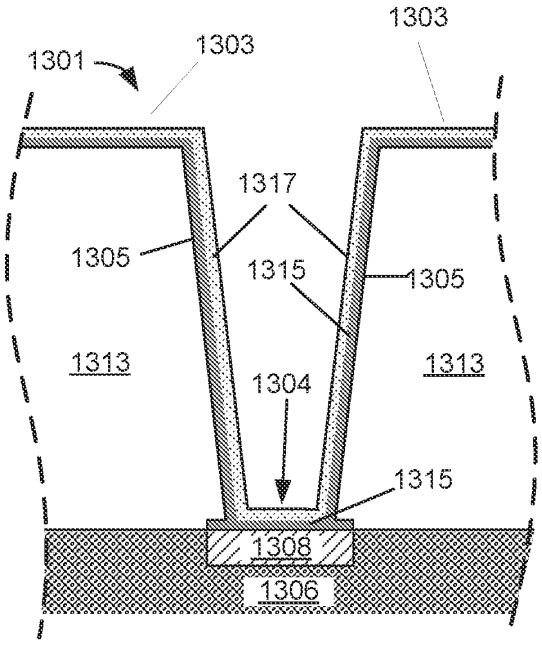


FIG. 13B

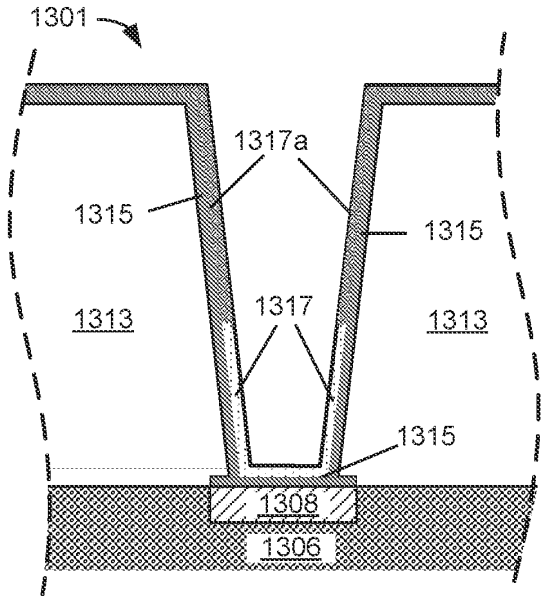


FIG. 13C

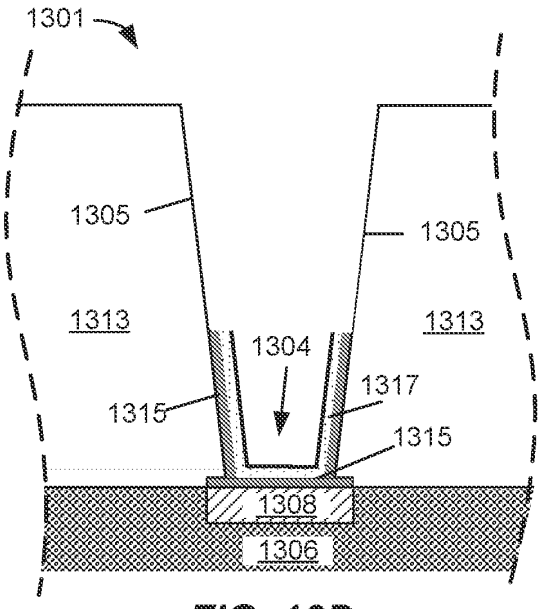


FIG. 13D

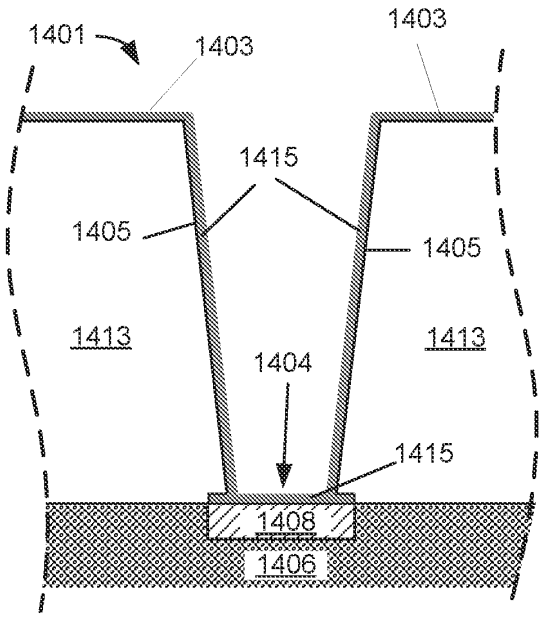


FIG. 14A

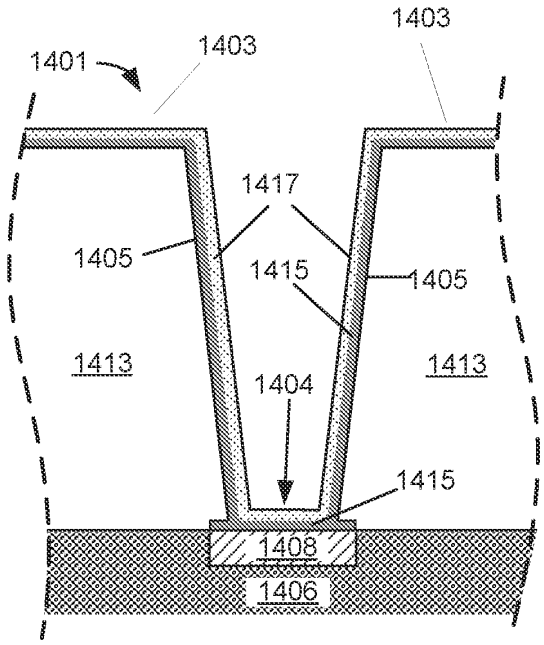


FIG. 14B

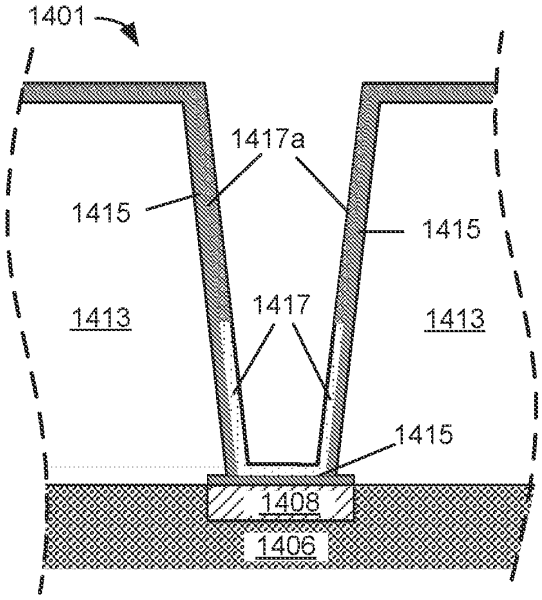


FIG. 14C

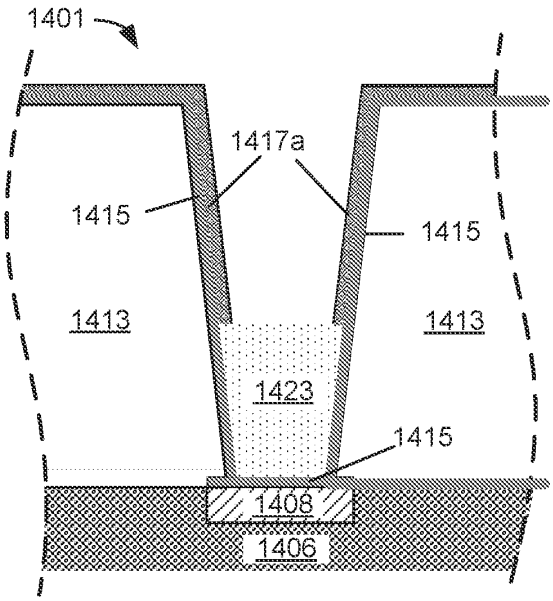


FIG. 14D

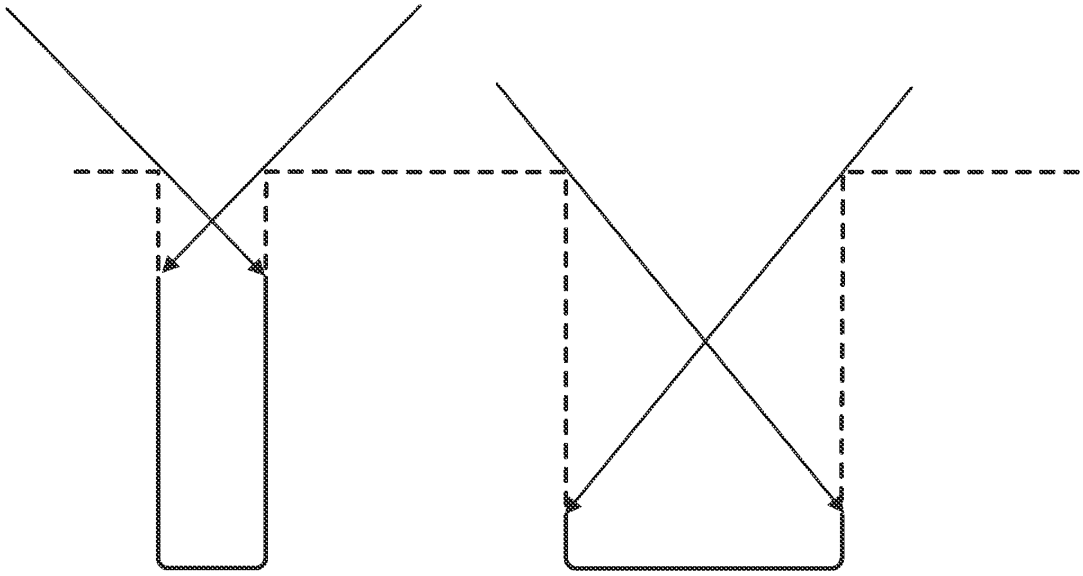


FIG. 15

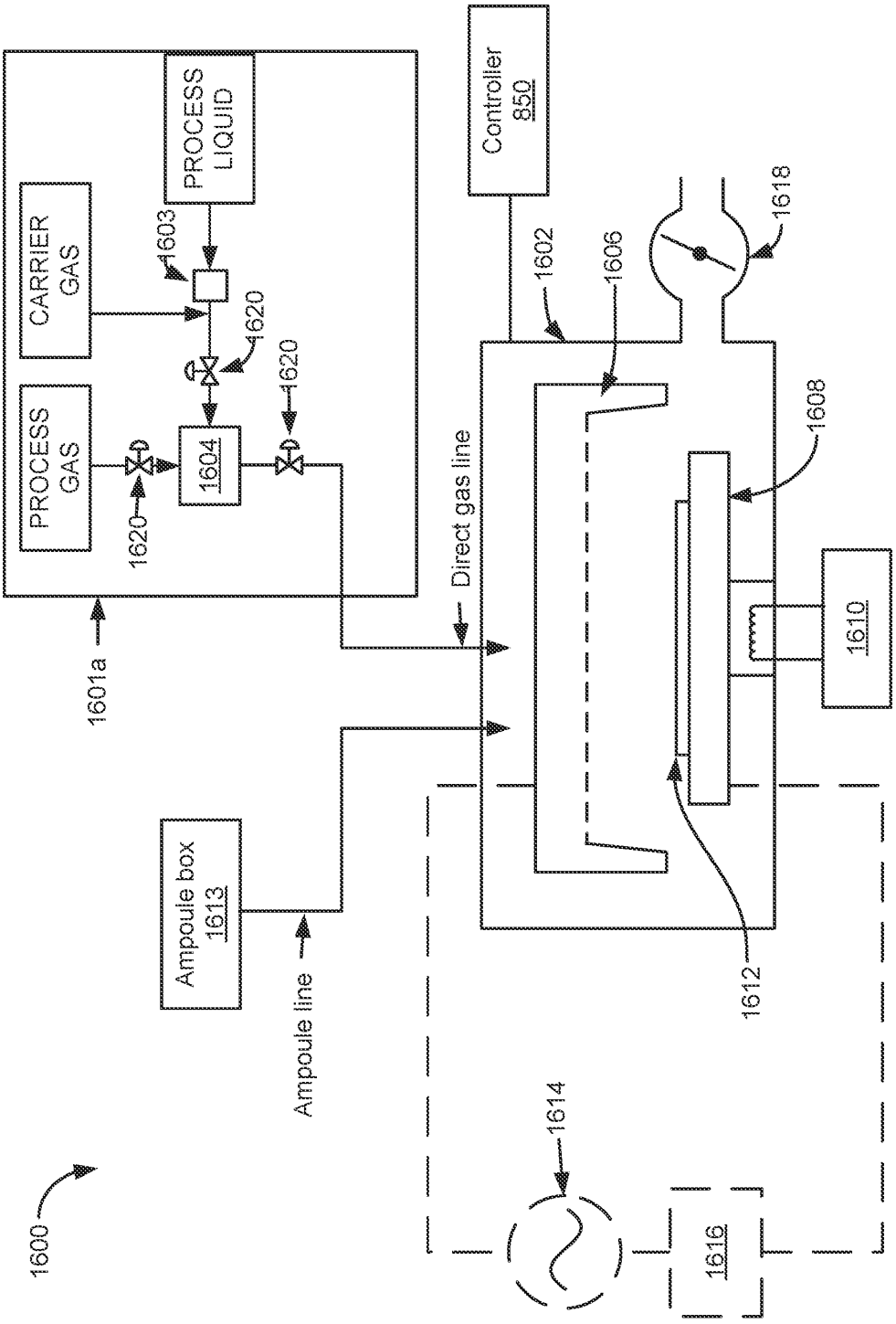

1600
1601a
PROCESS GAS
CARRIER GAS
PROCESS LIQUID
1603
1620
1620
1620
1604
Direct gas line
Controller 850
1602
1606
1618
1608
1610
Ampoule box 1613
Ampoule line
1612
1614
1616

FIG. 16

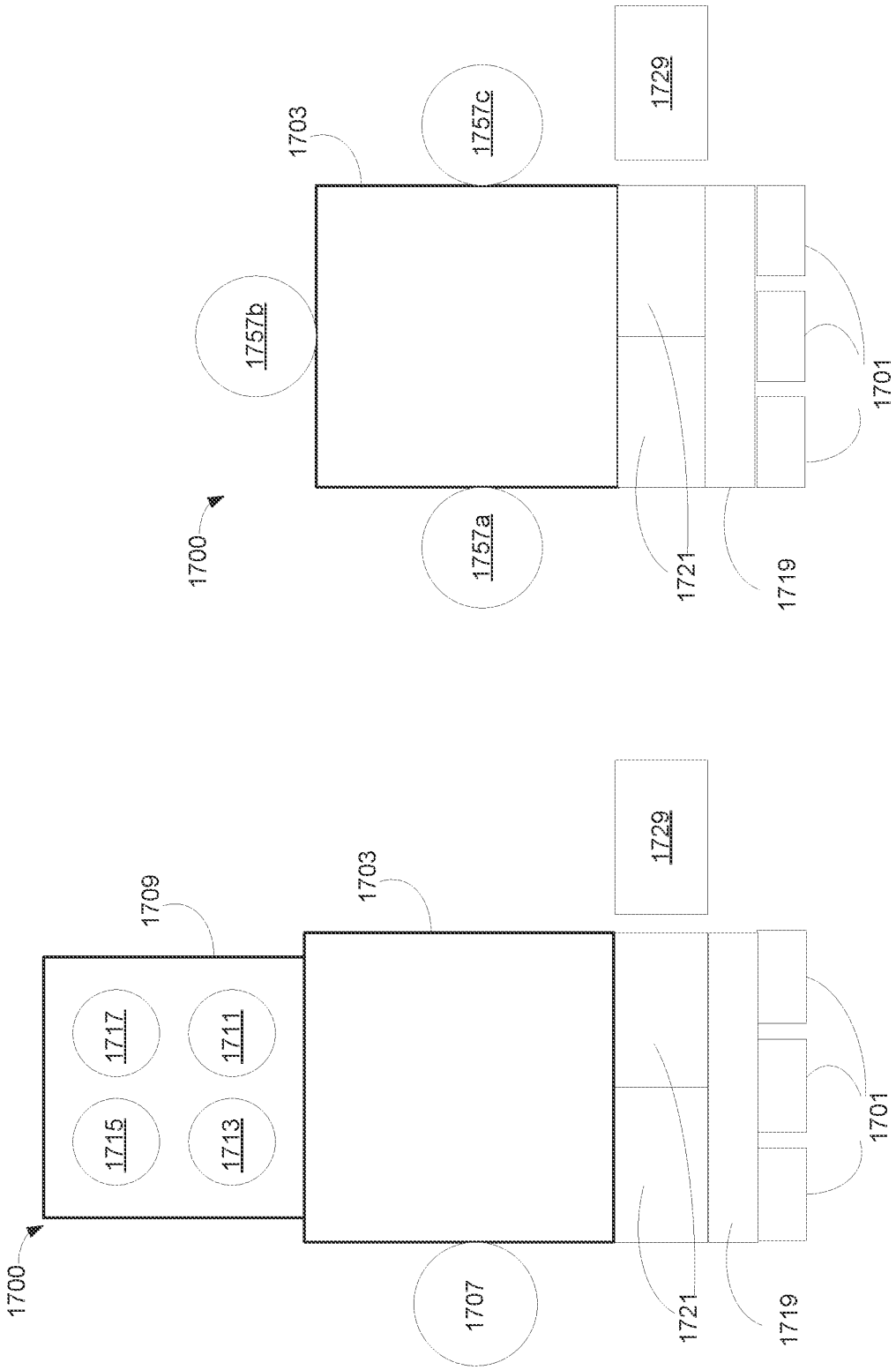


FIG. 17A

FIG. 17B

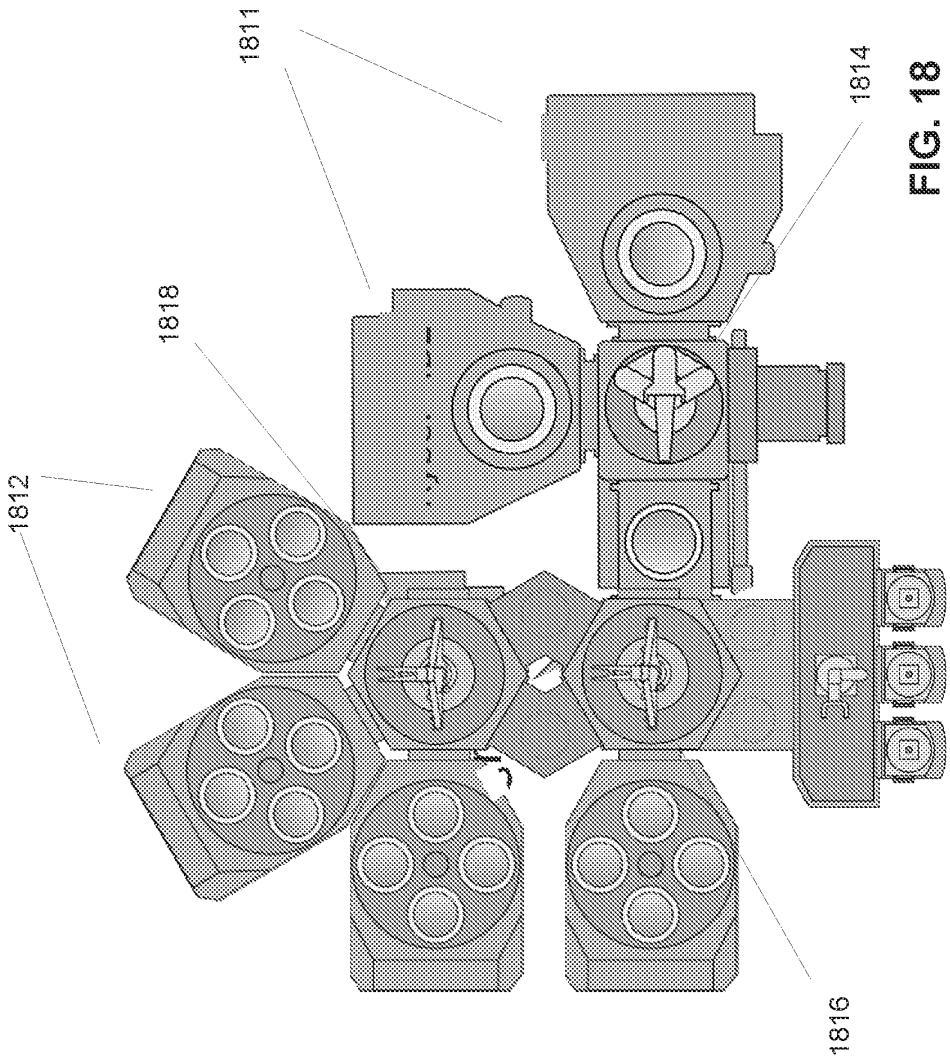


FIG. 18

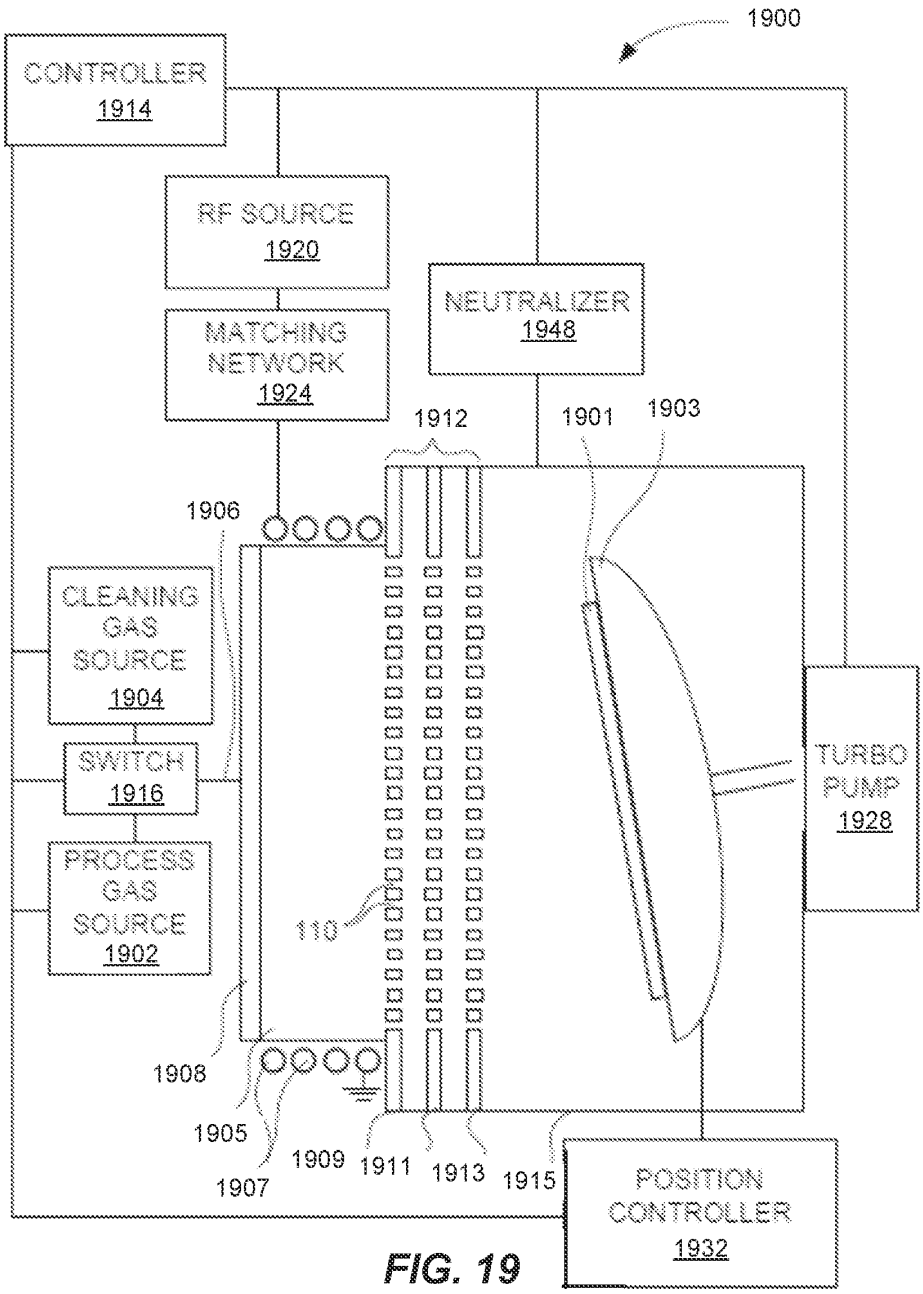

1900
CONTROLLER
1914
RF SOURCE
1920
MATCHING NETWORK
1924
NEUTRALIZER
1948
1912
1901
1903
1906
CLEANING GAS SOURCE
1904
SWITCH
1916
PROCESS GAS SOURCE
1902
TURBO PUMP
1928
110
1908
1905
1907
1909
1911
1913
1915
POSITION CONTROLLER
1932

FIG. 19