FIG. 1

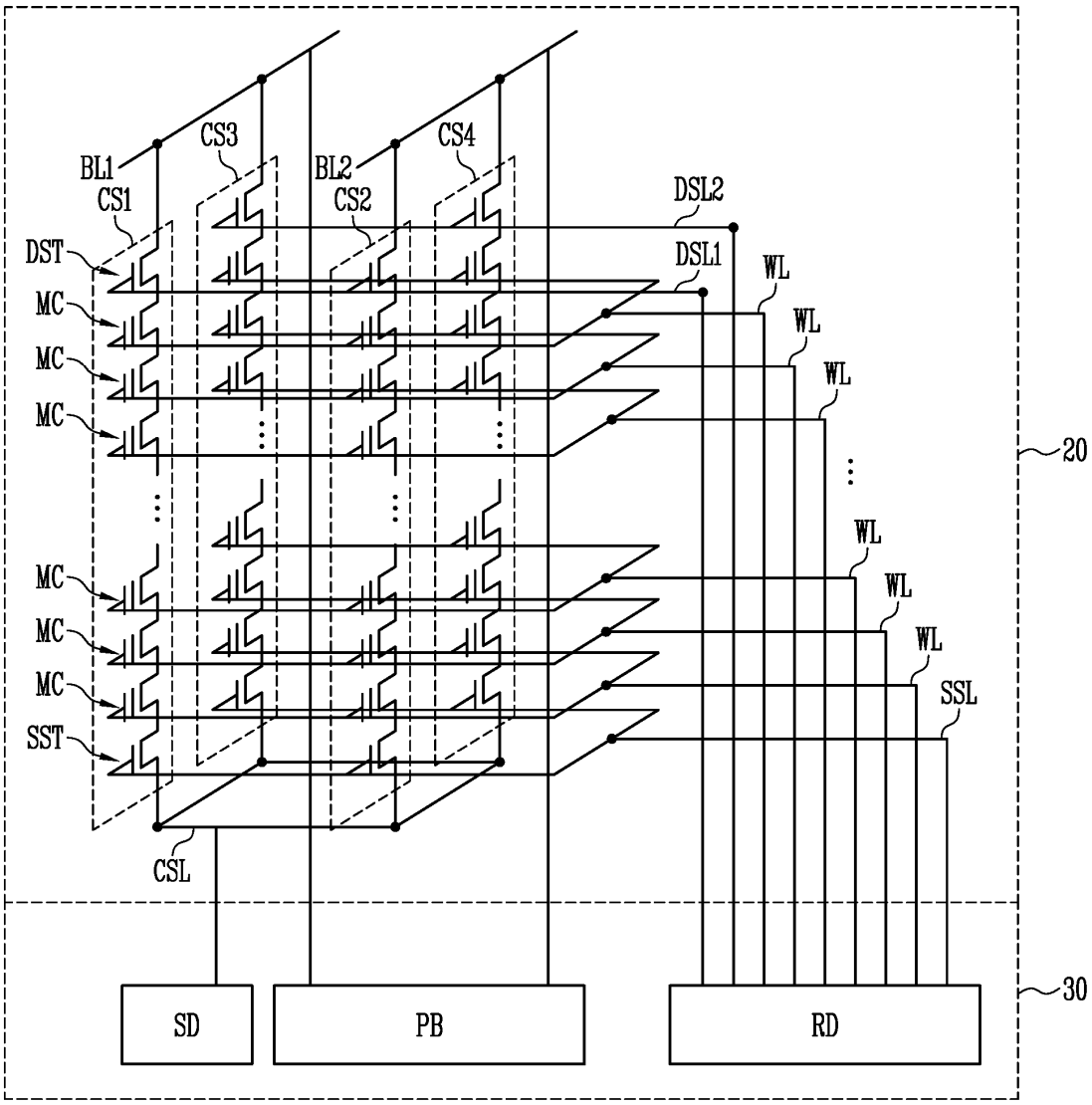

BL1
CS1
CS3
BL2
CS2
CS4
DSL2
DSL1
DST
MC
MC
MC
WL
WL
WL
WL
WL
WL
SSL
MC
MC
MC
SST
CSL
20
SD
PB
RD
30

FIG. 2

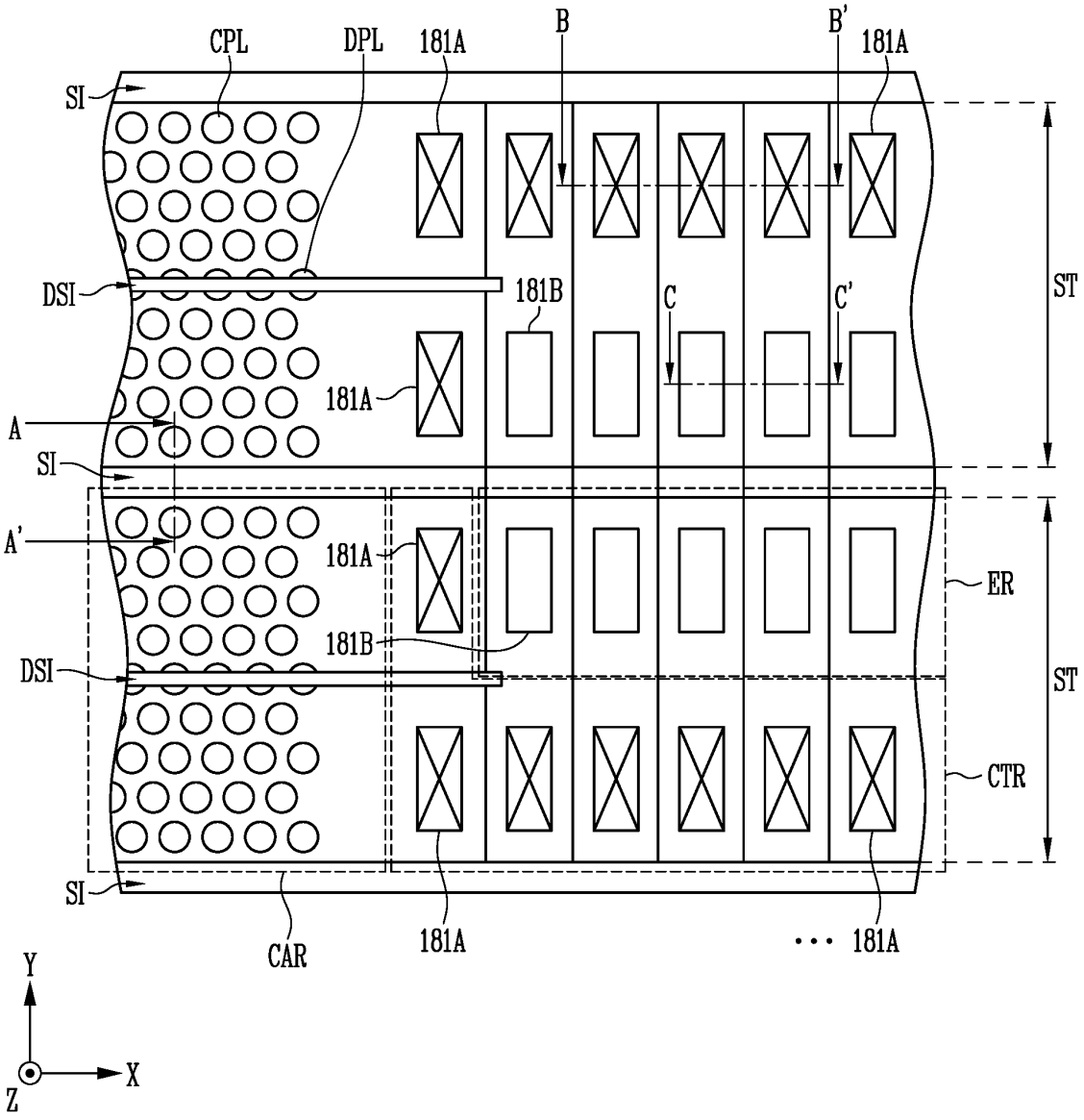

CPL
DPL
181A
B
B'
181A
SI
DSI
181B
C
C'
ST
181A
A
SI
A'
181A
ER
181B
DSI
ST
CTR
SI
CAR
181A
181A
Y
X
Z

FIG. 3A

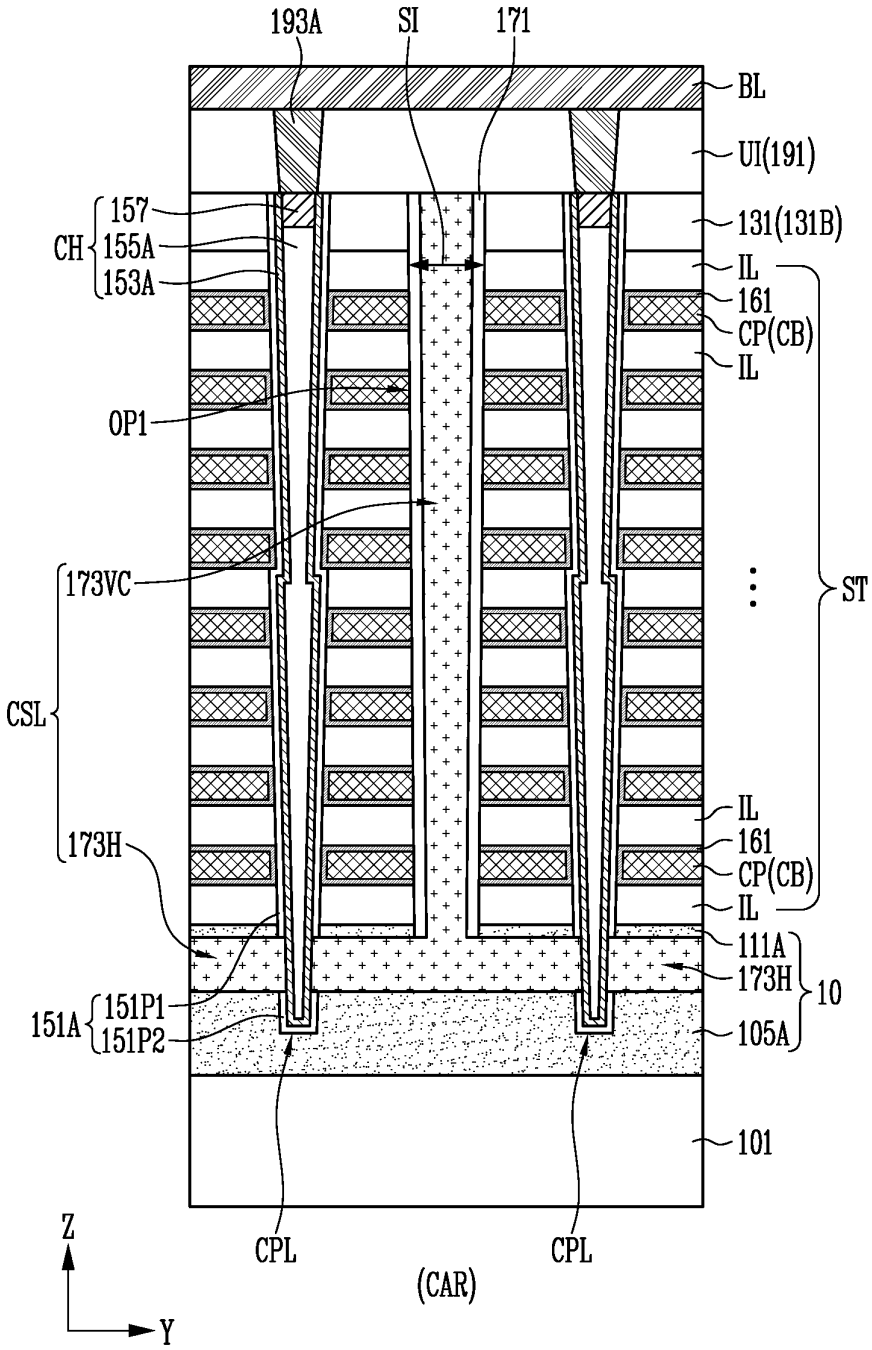

193A
SI
171
BL
UI(191)
131(131B)
157
CH
155A
153A
IL
161
CP(CB)
IL
OP1
173VC
ST
CSL
IL
161
CP(CB)
IL
173H
111A
173H
10
151A
151P1
151P2
105A
101
CPL
CPL
(CAR)
Z
Y

FIG. 3B

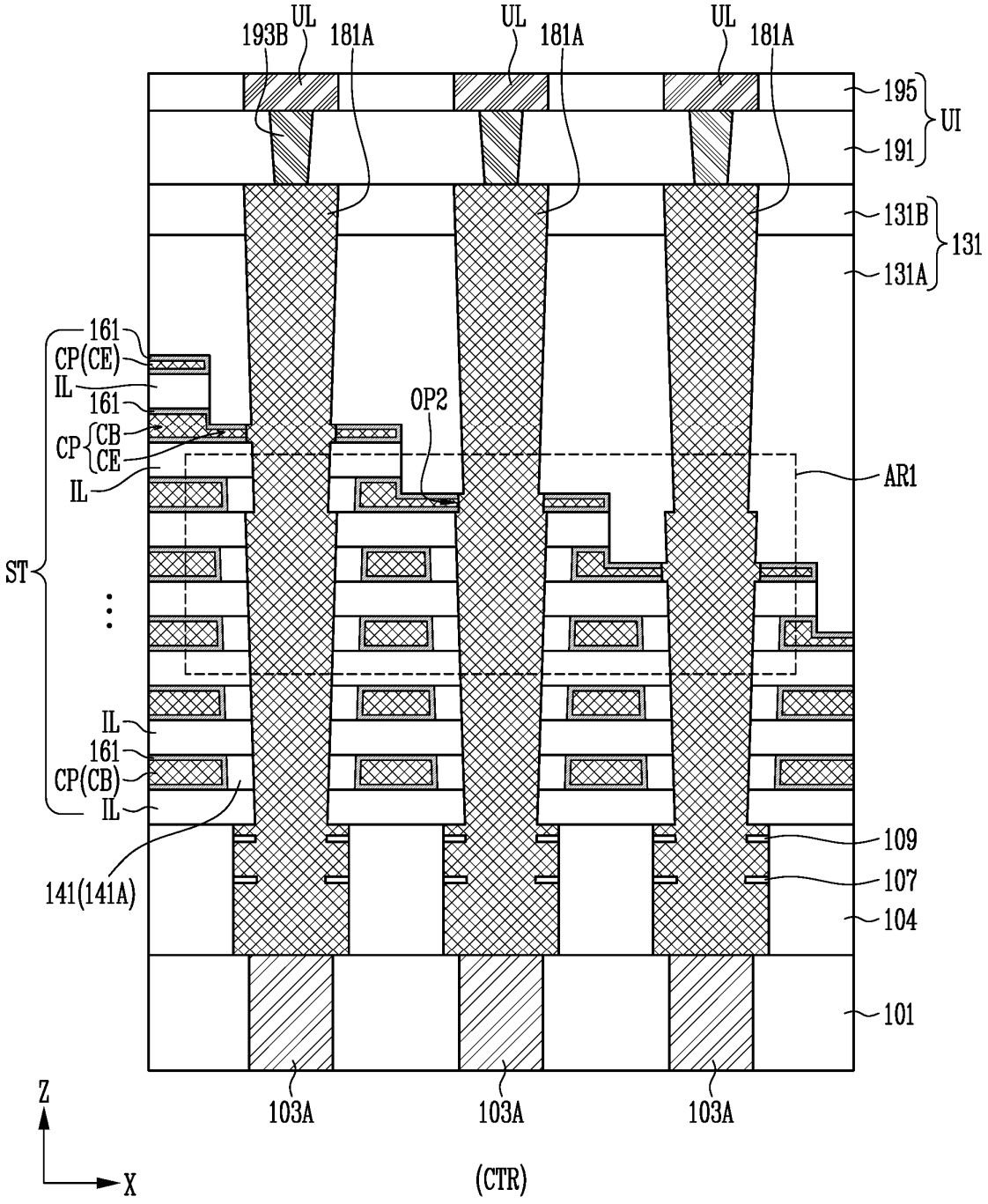

193B
UL
181A
UL
181A
UL
181A
195
191
UI
131B
131A
131
161
CP(CE)
IL
161
CP
CB
CE
IL
0P2
AR1
ST
IL
161
CP(CB)
IL
141(141A)
109
107
104
101
103A
103A
103A
Z
X
(CTR)

FIG. 3C

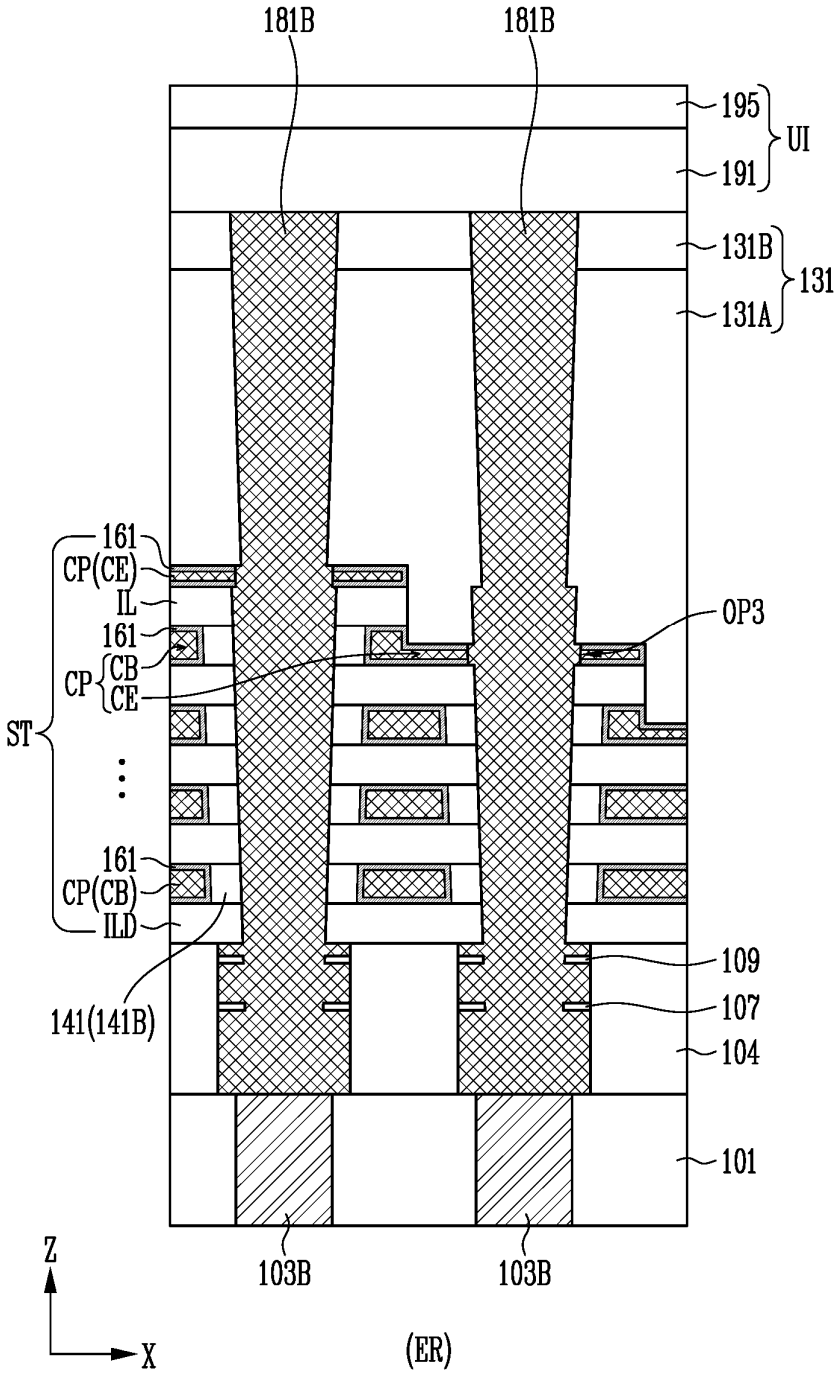

181B
181B
195
UI
191
131B
131
131A
161
CP(CE)
IL
161
CP
CB
CE
ST
OP3
161
CP(CB)
ILD
141(141B)
109
107
104
101
103B
103B
Z
X
(ER)

FIG. 4

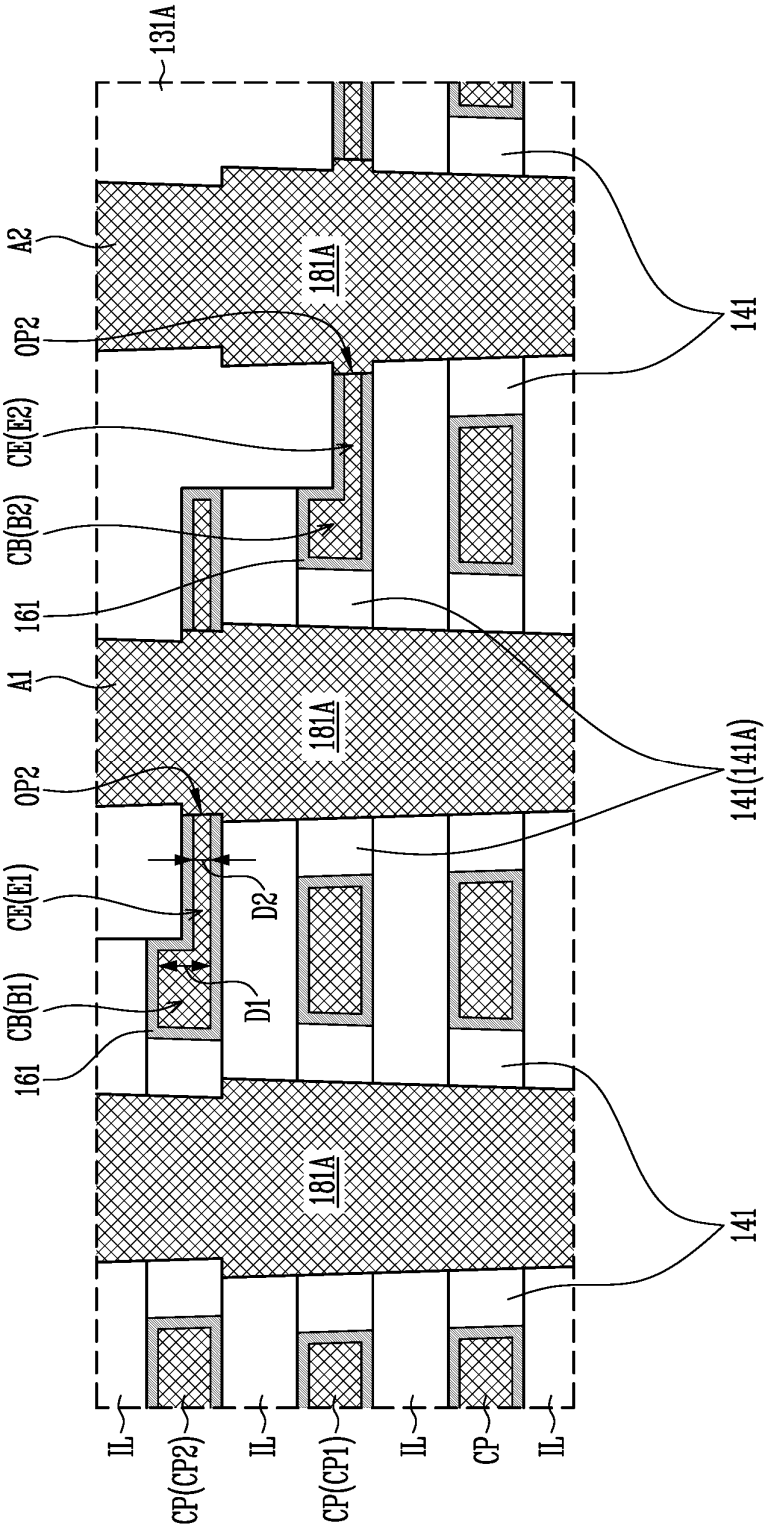

131A
A2
OP2
CE(E2)
CB(B2)
161
A1
OP2
CE(E1)
CB(B1)
161
181A
181A
181A
D2
D1
141
141(141A)
141
IL
CP(CP2)
IL
CP(CP1)
IL
CP
IL

FIG. 5

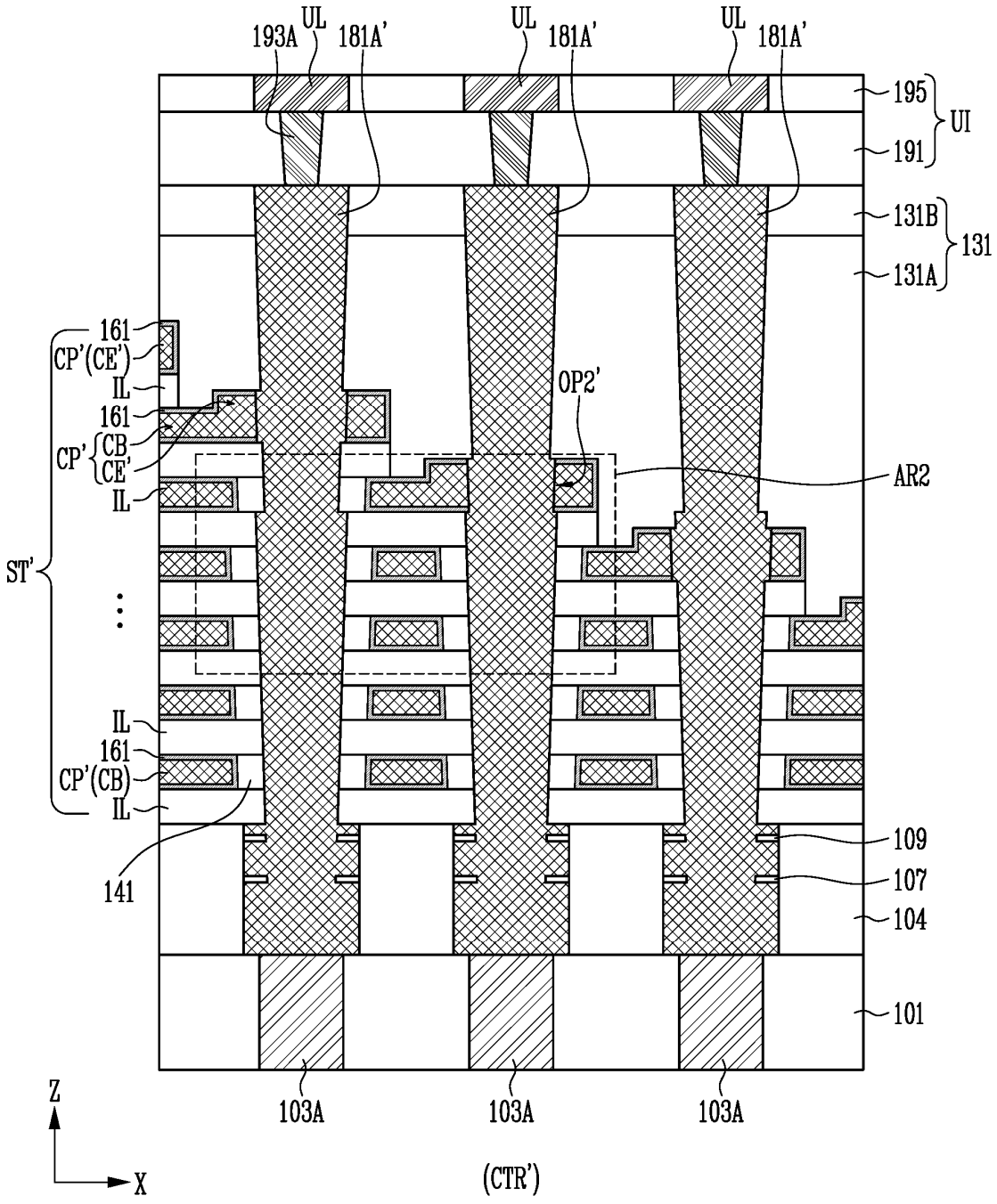

193A
UL
181A'
UL
181A'
UL
181A'
195
191
UI
131B
131A
131
161
CP'(CE')
IL
161
CP'
CB
CE'
IL
ST'
OP2'
AR2
IL
161
CP'(CB)
IL
141
109
107
104
101
103A
103A
103A
Z
X
(CTR')

FIG. 6

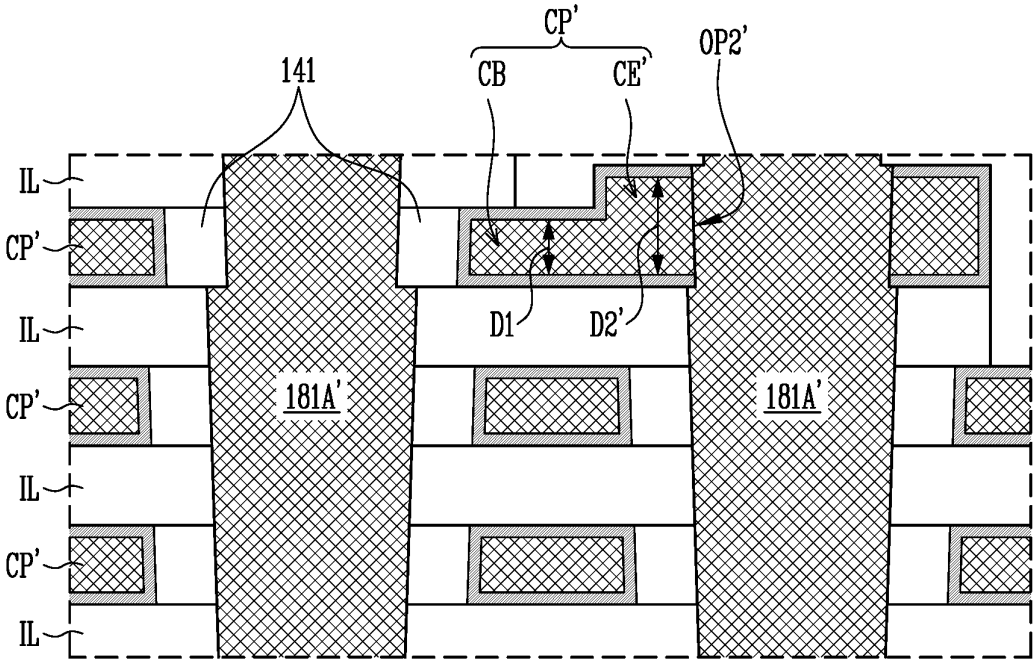


FIG. 7A

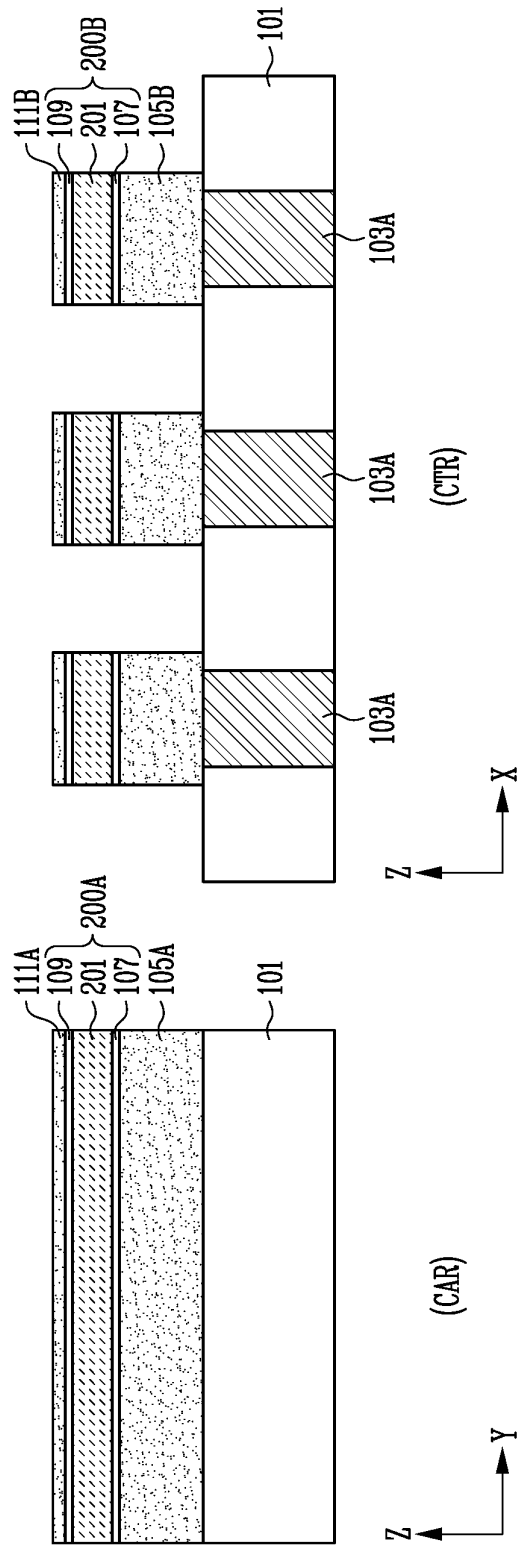

111B
109
201
107
105B
200B
101
103A
103A
103A
(CTR)
Z
X
111A
109
201
107
105A
200A
101
(CAR)
Z
Y

FIG. 7B

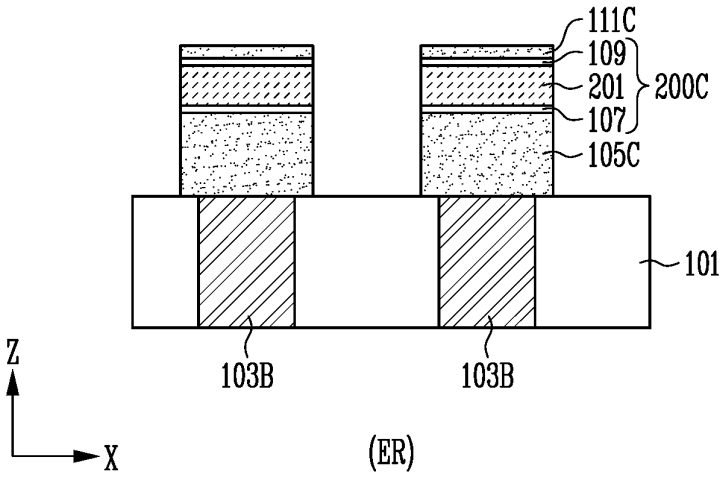


FIG. 8A

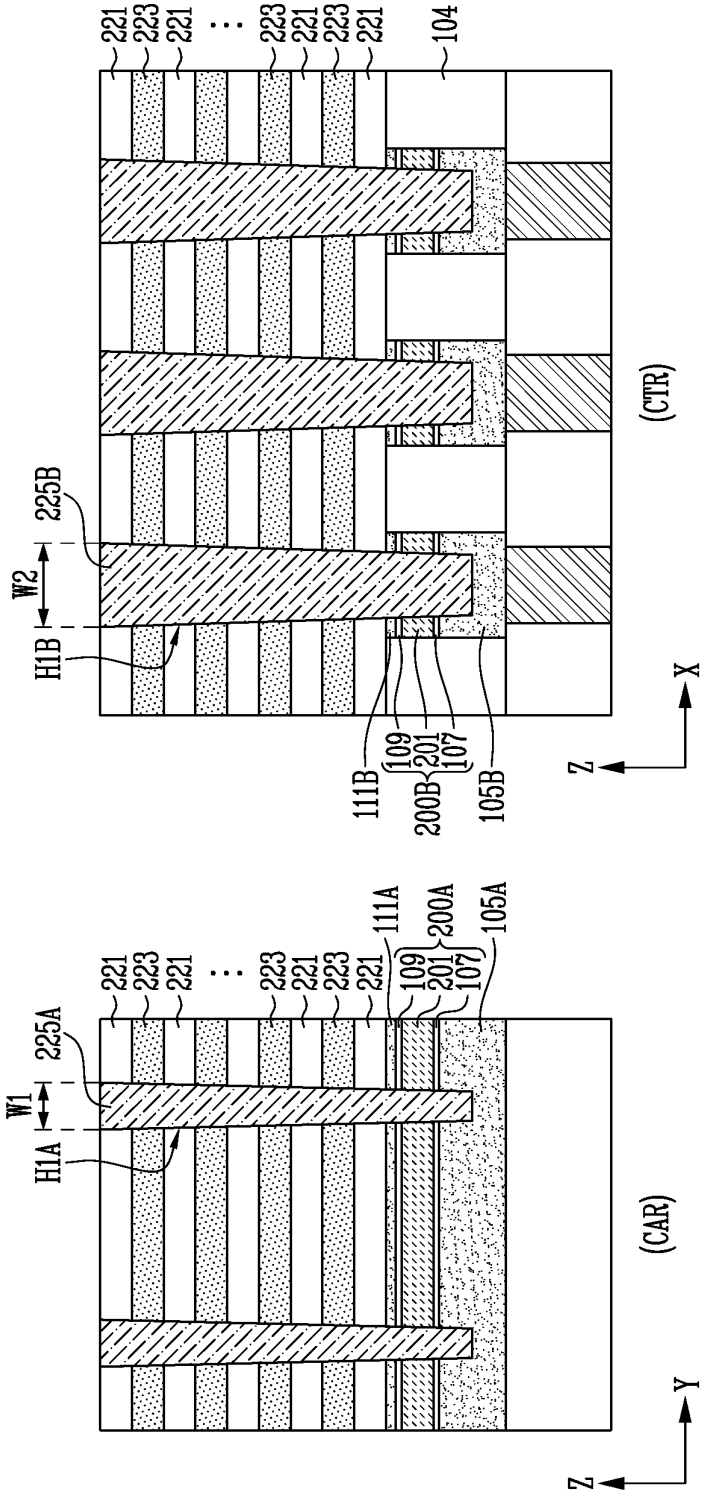

221
223
221
223
221
223
221
104
225B
W2
H1B
(CTR)
111B
109
200B
201
107
105B
Z
X
111A
200A
105A
225A
W1
H1A
(CAR)
Z
Y

FIG. 8B

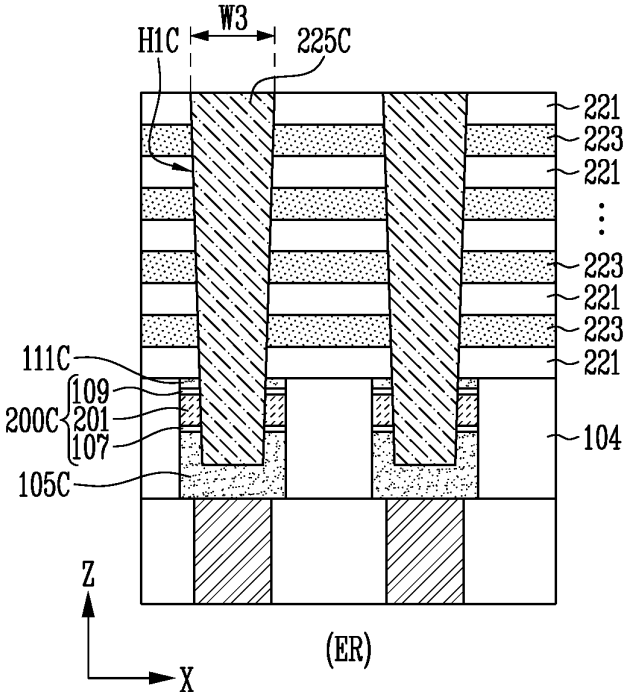

W3
H1C
225C
221
223
221
223
221
223
221
111C
109
200C
201
107
104
105C
Z
X
(ER)

FIG. 9A

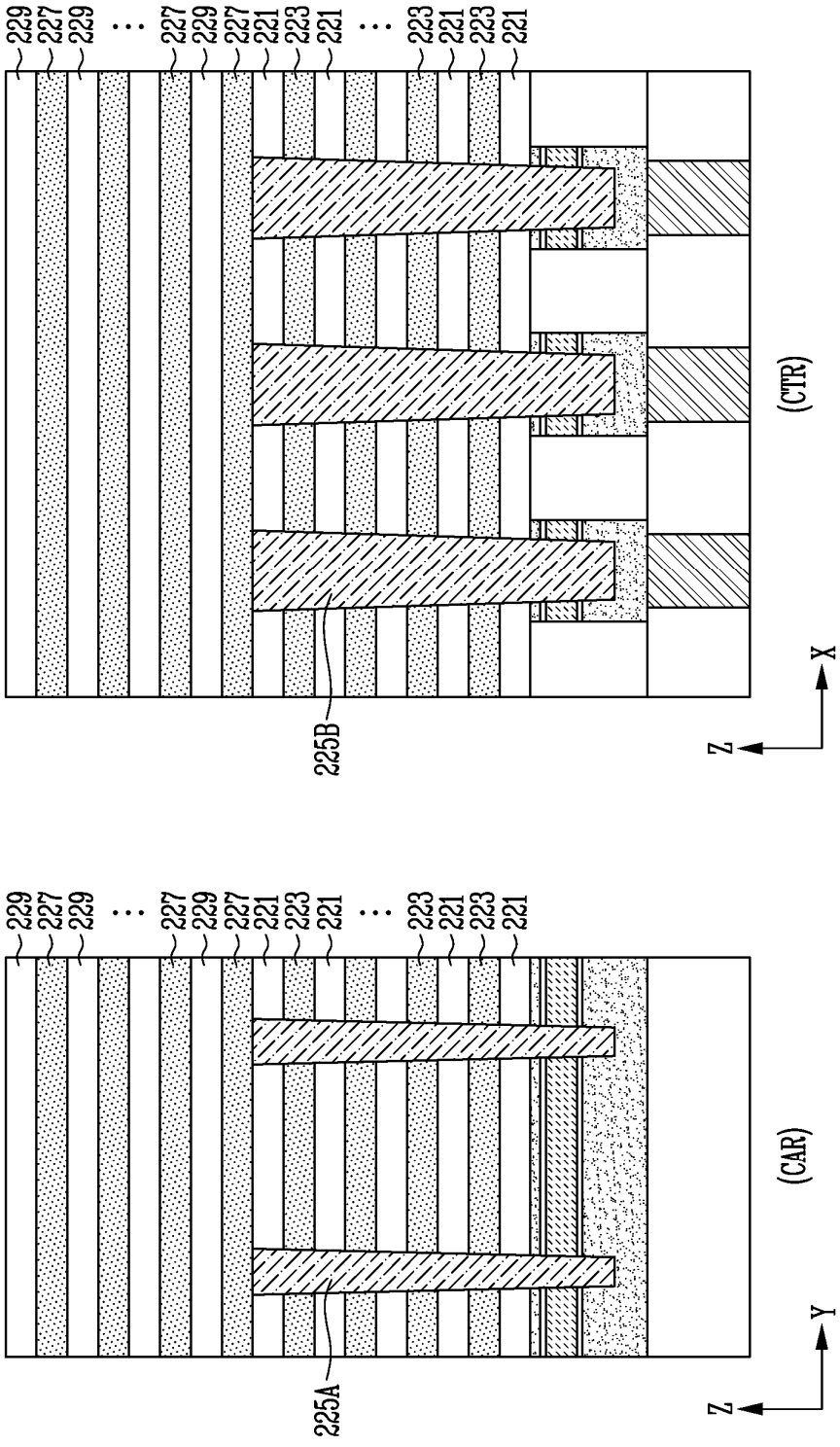

229
227
229
227
229
227
221
223
221
223
221
223
221
225B
(CTR)
X
Z
225A
(CAR)
Y
Z

FIG. 9B

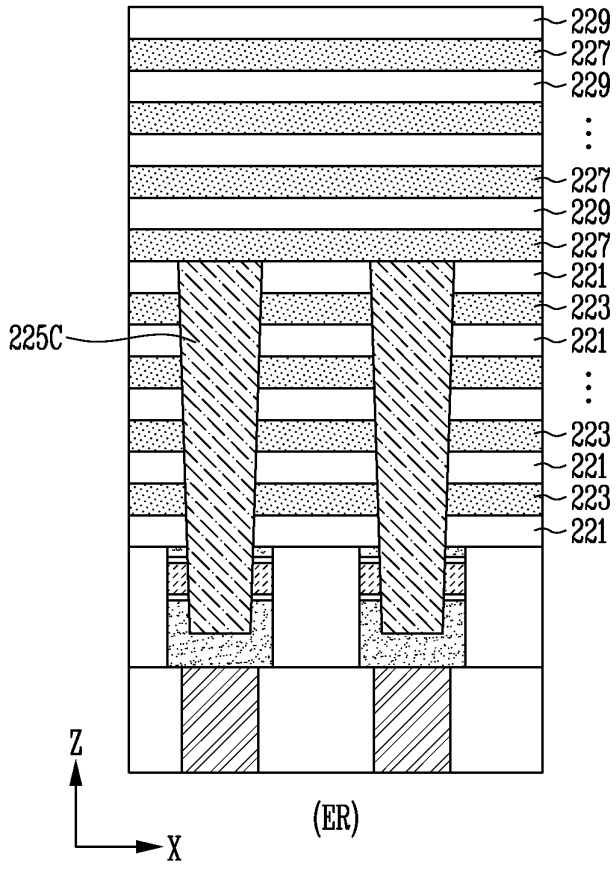


FIG. 10A

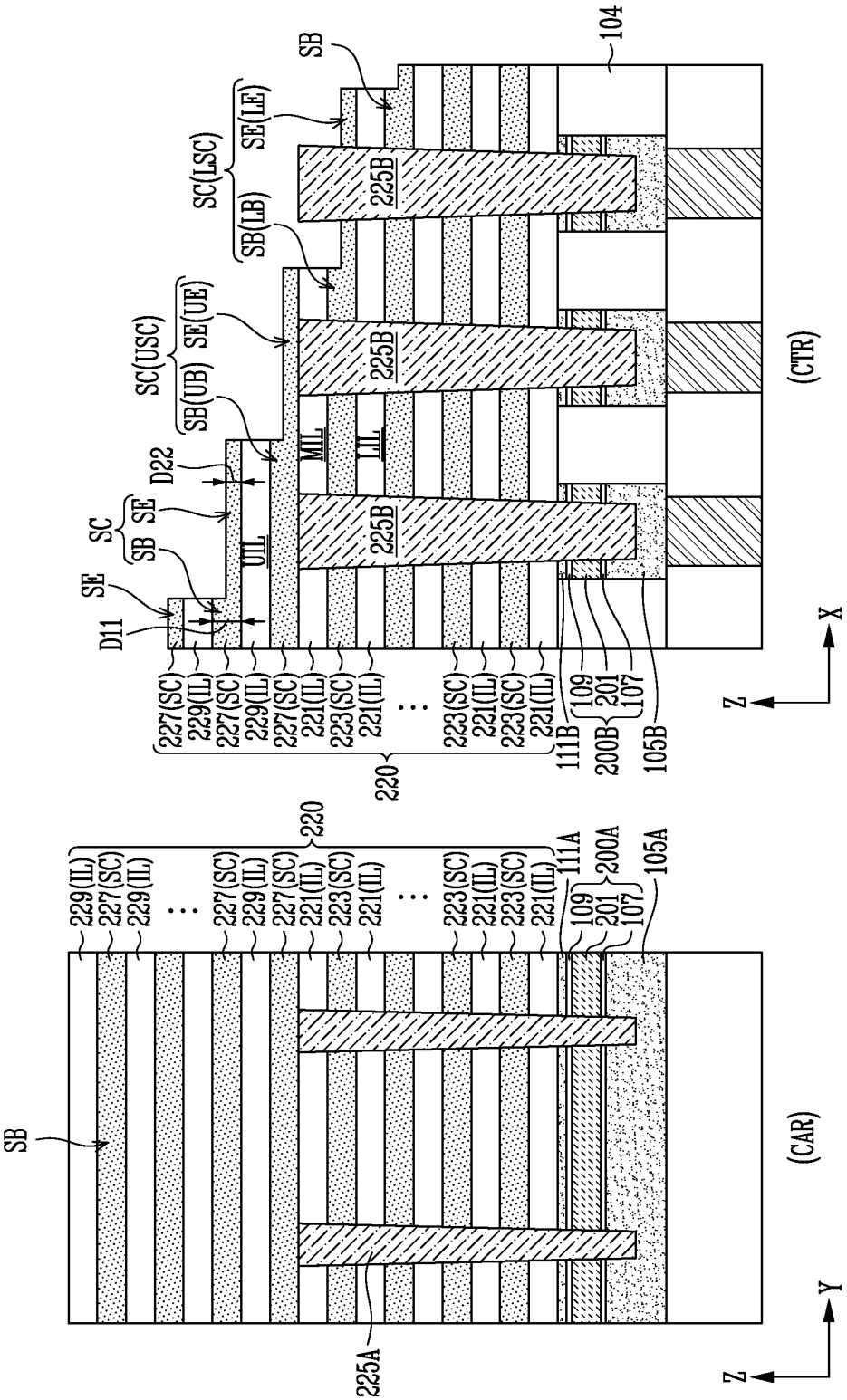

SB
104
SC(LSC)
SB(LB)
SE(LE)
225B
SC(USC)
SB(UB)
SE(UE)
D22
MIL
LIL
SC
SE
SB
UIL
SE
D11
227(SC)
229(IL)
227(SC)
229(IL)
227(SC)
221(IL)
223(SC)
221(IL)
223(SC)
221(IL)
223(SC)
221(IL)
111B
109
201
107
105B
200B
220
(CTR)
Z
X
229(IL)
227(SC)
229(IL)
227(SC)
229(IL)
227(SC)
221(IL)
223(SC)
221(IL)
223(SC)
221(IL)
223(SC)
221(IL)
111A
109
201
107
105A
200A
220
SB
225A
(CAR)
Z
Y

FIG. 10B

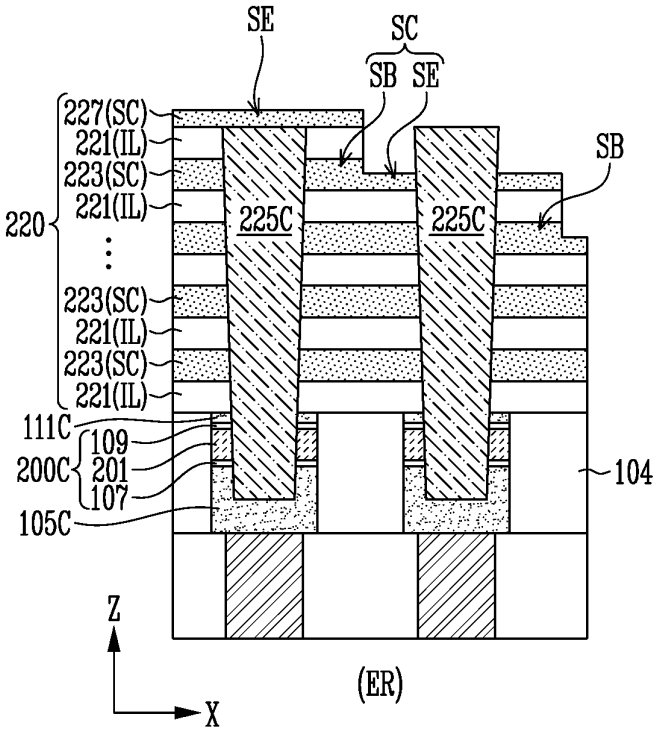

SE
SC
SB SE
SB
227(SC)
221(IL)
223(SC)
221(IL)
220
225C
225C
223(SC)
221(IL)
223(SC)
221(IL)
111C
109
200C
201
107
105C
104
Z
X
(ER)

FIG. 11A

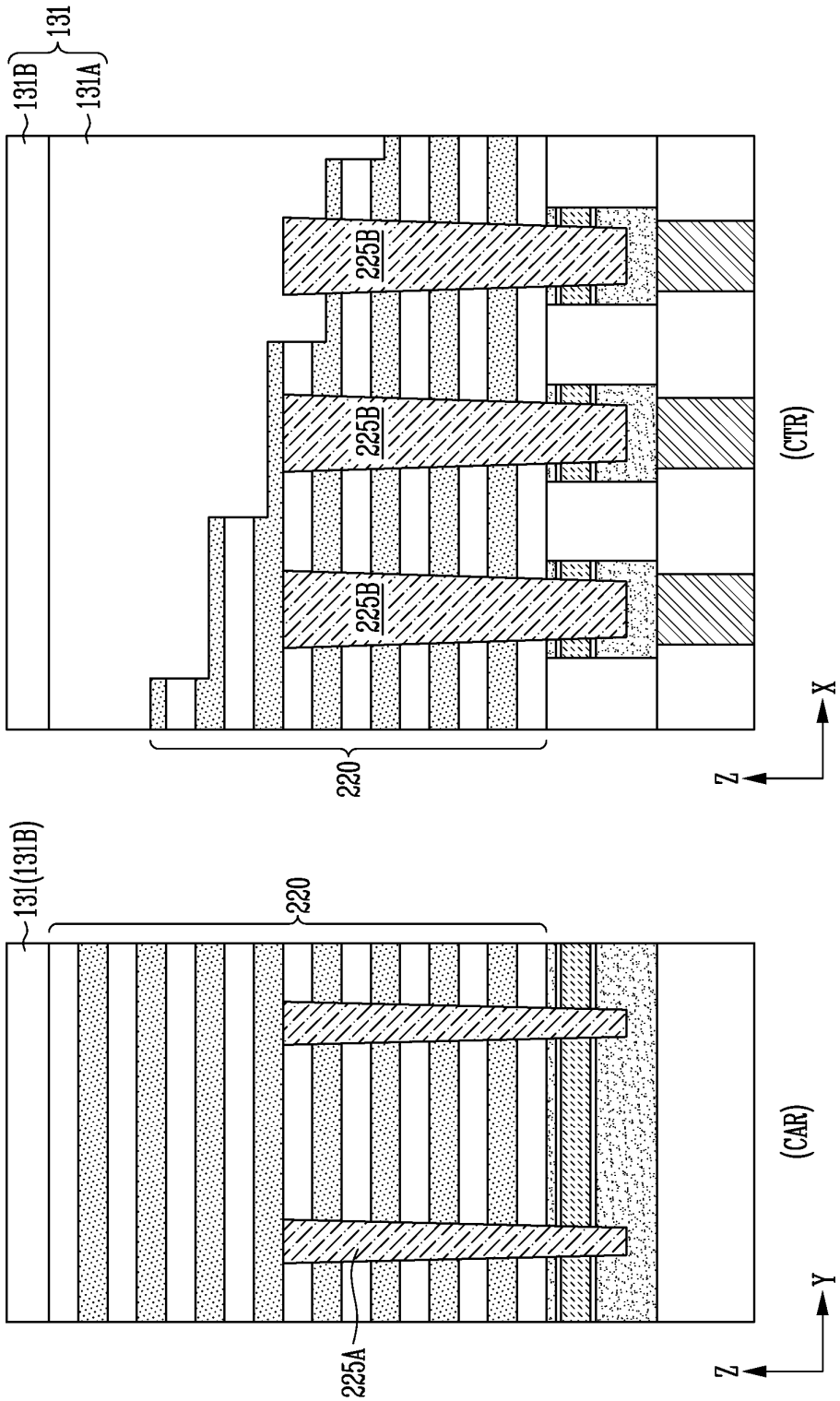

131
131B
131A
225B
225B
225B
(CTR)
220
X
Z
131(131B)
220
(CAR)
225A
Y
Z

FIG. 11B

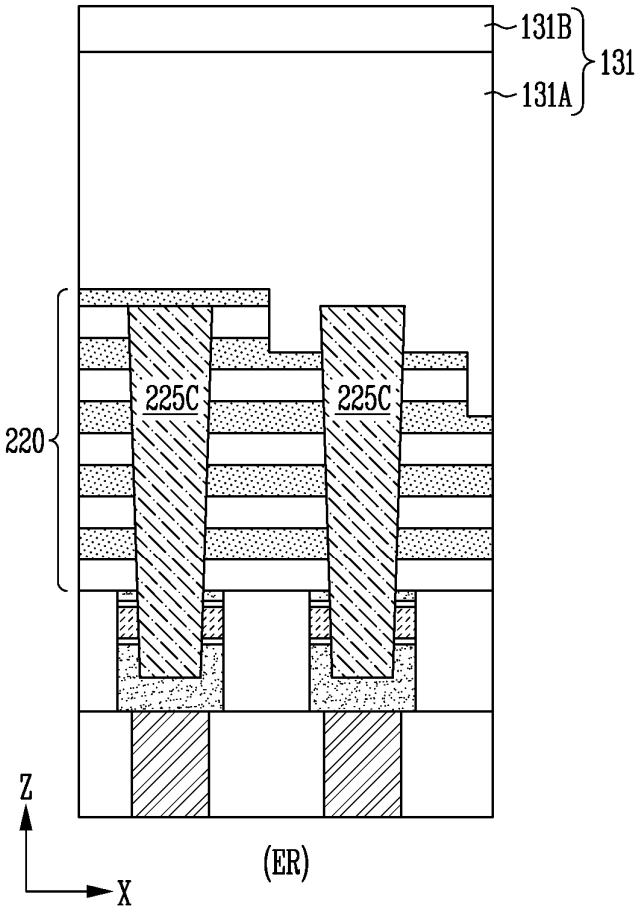


FIG. 12A

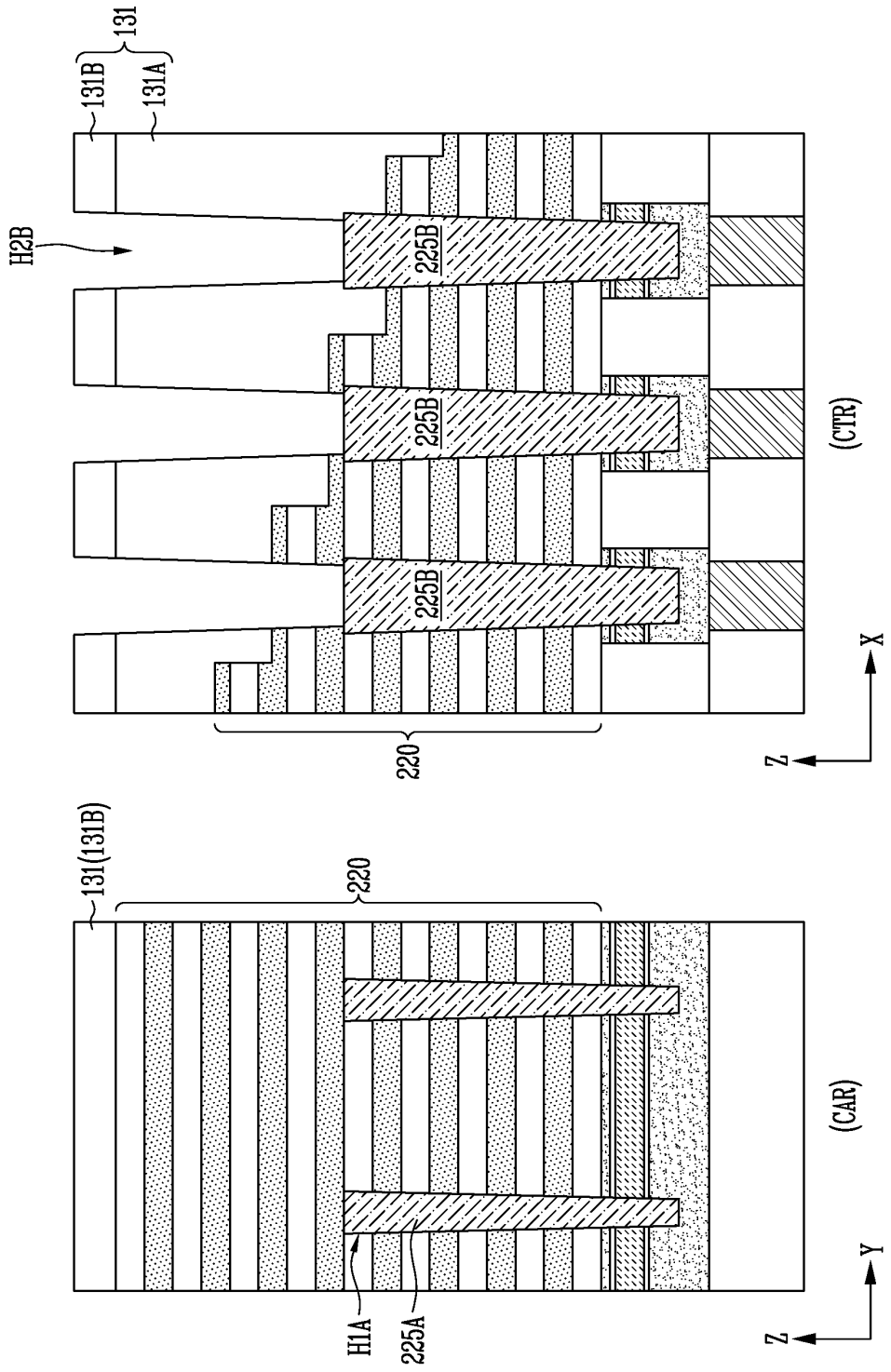

131
131B
131A
H2B
225B
225B
225B
220
(CTR)
X
Z
131(131B)
220
H1A
225A
(CAR)
Y
Z

FIG. 12B

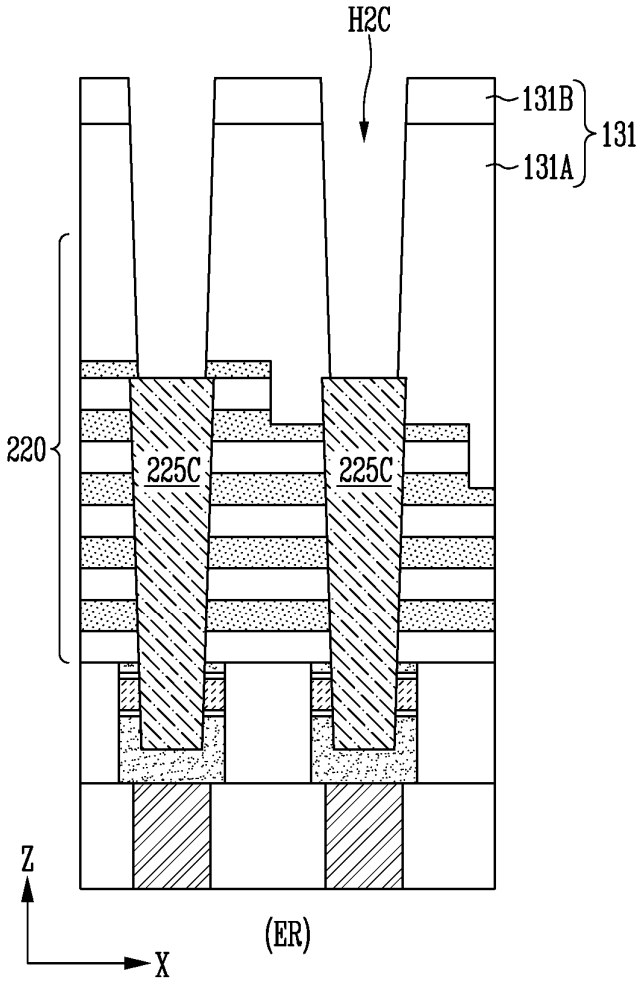


FIG. 13A

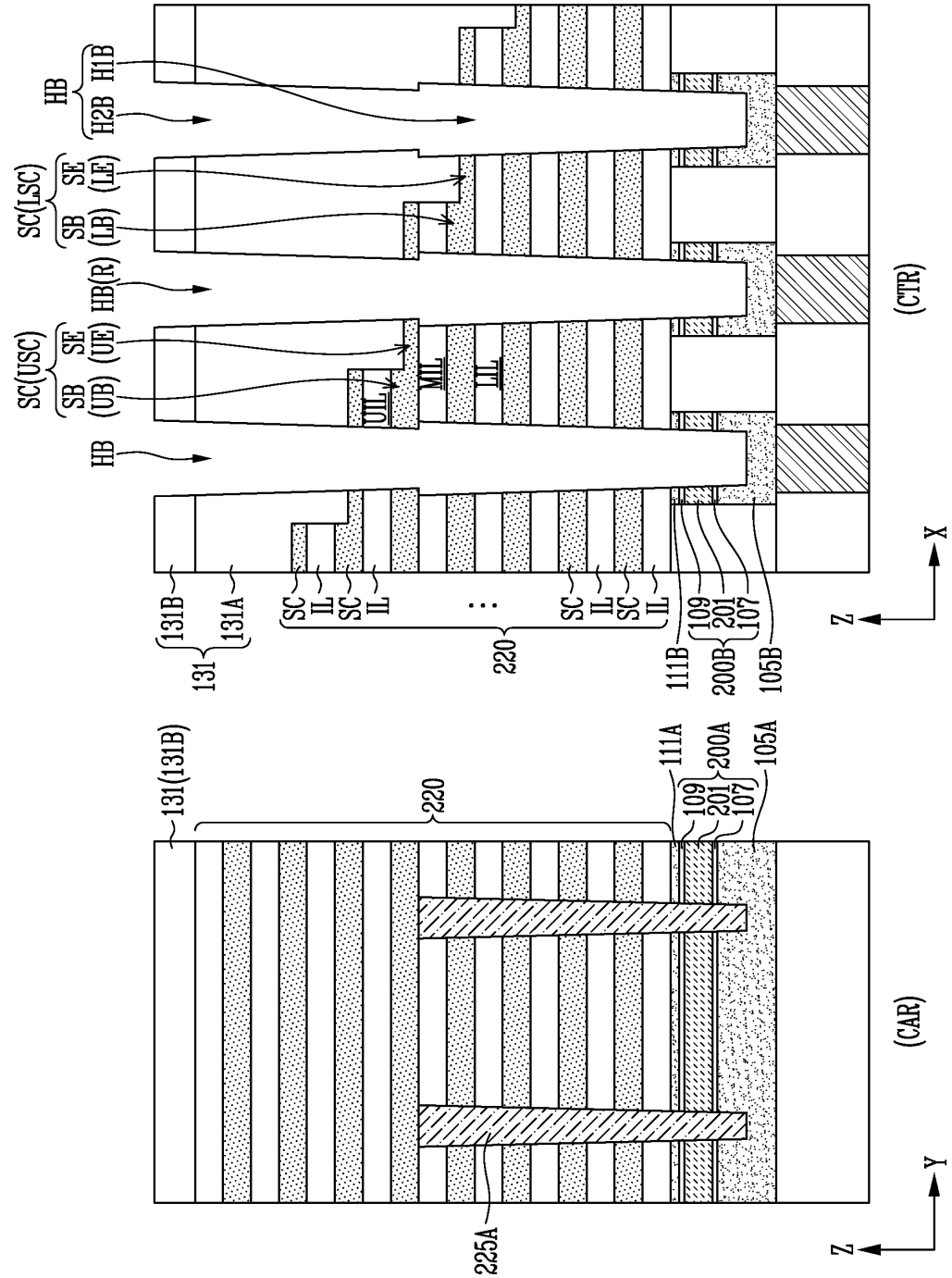

HB
H1B
H2B
SC(LSC)
SE
(LE)
SB
(LB)
HB(R)
SC(USC)
SE
(UE)
SB
(UB)
HB
UIL
MIL
LIL
131B
131A
131
SC
IL
220
111B
109
201
200B
107
105B
(CTR)
Z
X
131(131B)
111A
200A
105A
225A
(CAR)
Y

FIG. 13B

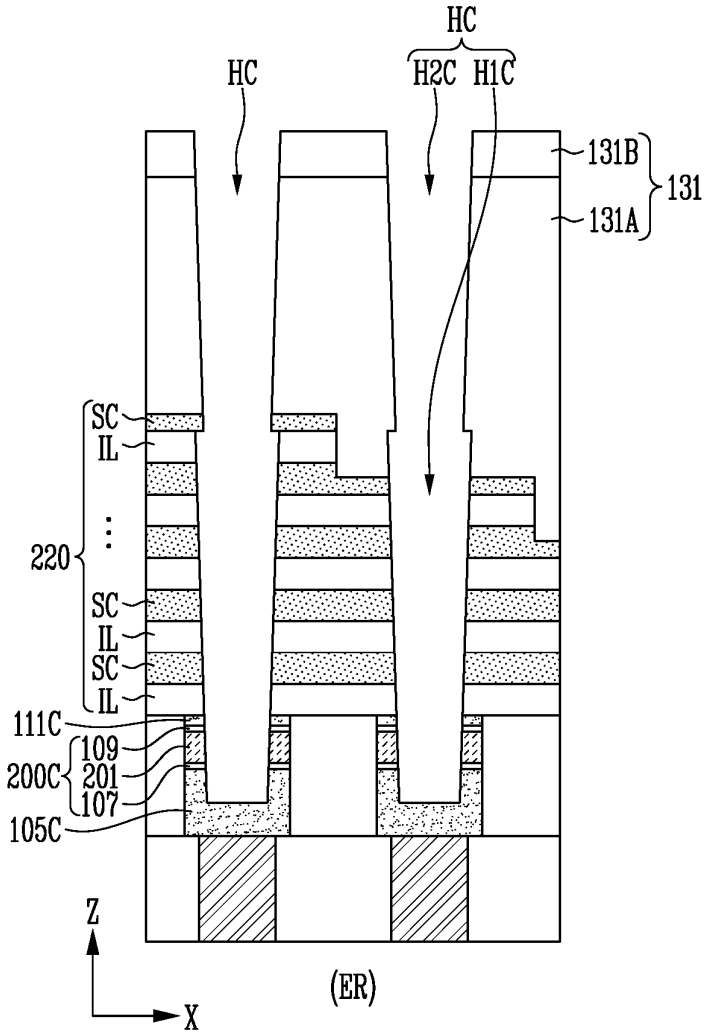

HC
HC
H2C
H1C
131B
131
131A
SC
IL
220
SC
IL
SC
IL
111C
109
200C
201
107
105C
Z
X
(ER)

FIG. 14A

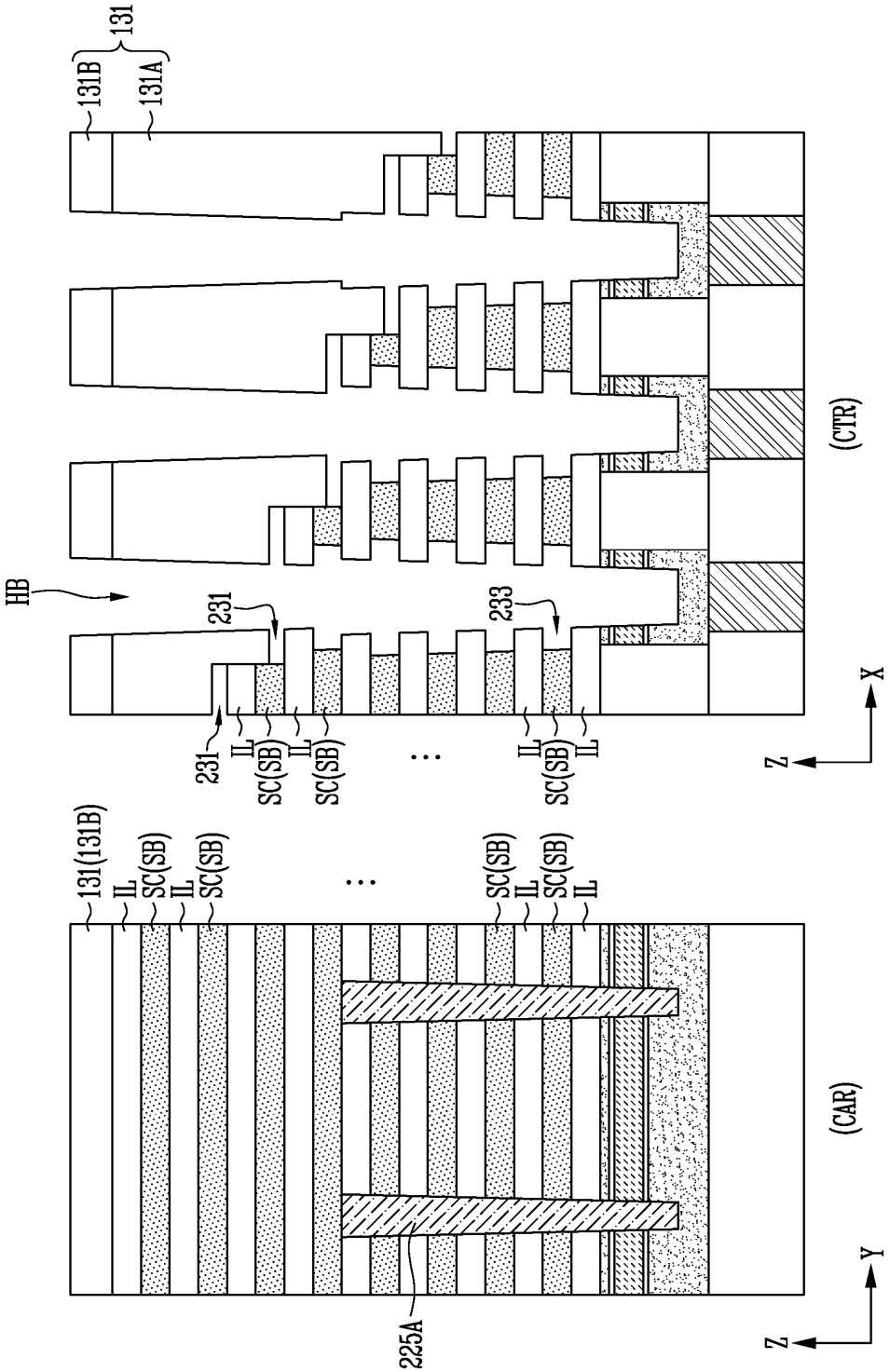

131
131B
131A
HB
231
233
231
IL
SC(SB)
IL
SC(SB)
IL
SC(SB)
IL
SC(SB)
(CTR)
Z
X
131(131B)
IL
SC(SB)
IL
SC(SB)
SC(SB)
IL
SC(SB)
IL
(CAR)
225A
Z
Y

FIG. 14B

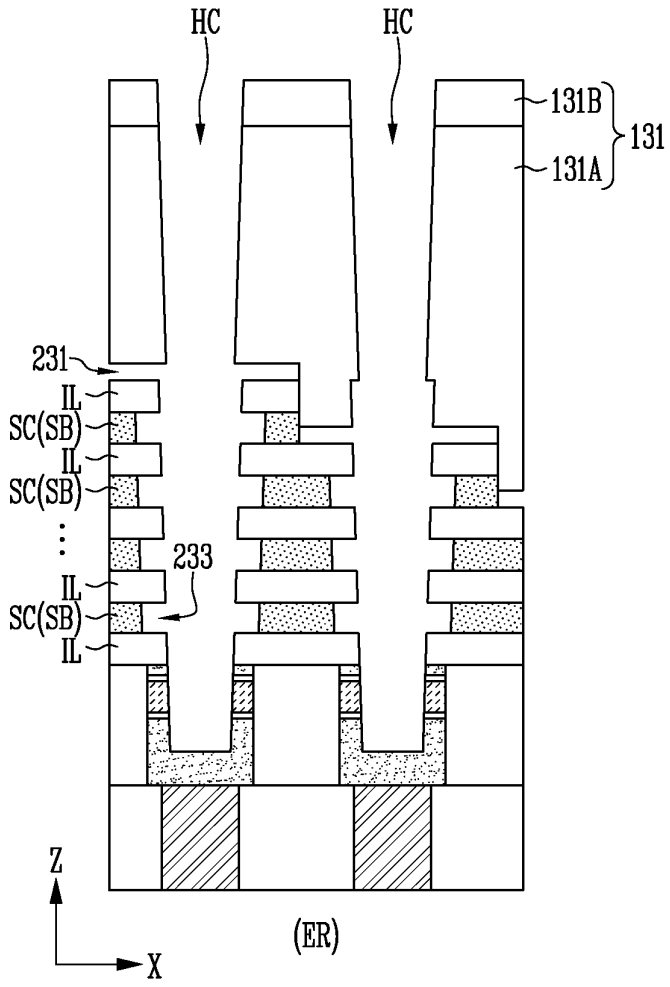


FIG. 15A

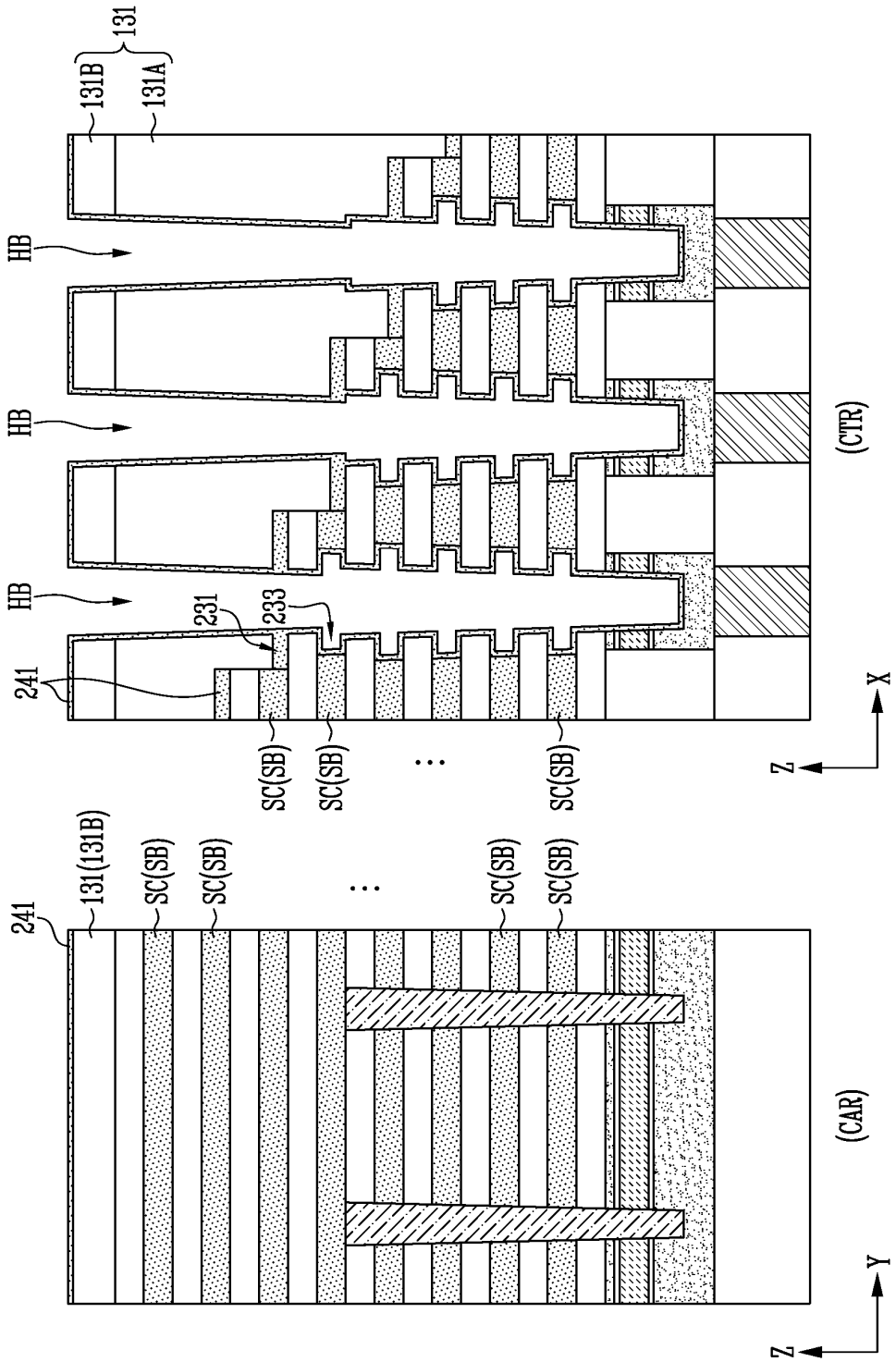

131
131B
131A
HB
HB
HB
231
233
241
SC(SB)
SC(SB)
SC(SB)
(CTR)
X
Z
241
131(131B)
SC(SB)
SC(SB)
SC(SB)
SC(SB)
(CAR)
Y
Z

FIG. 15B

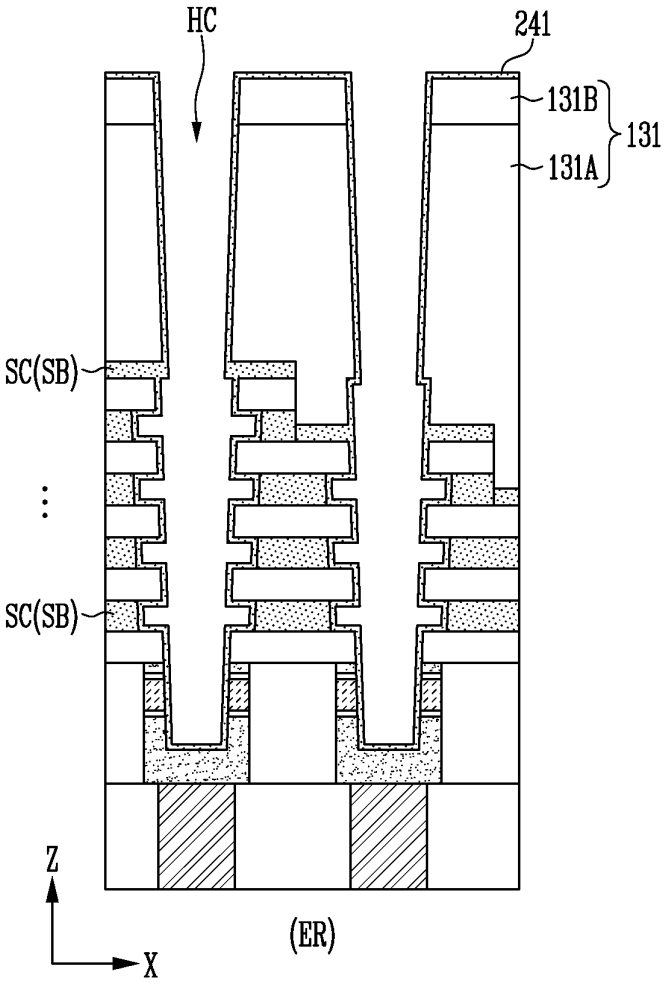


FIG. 16A

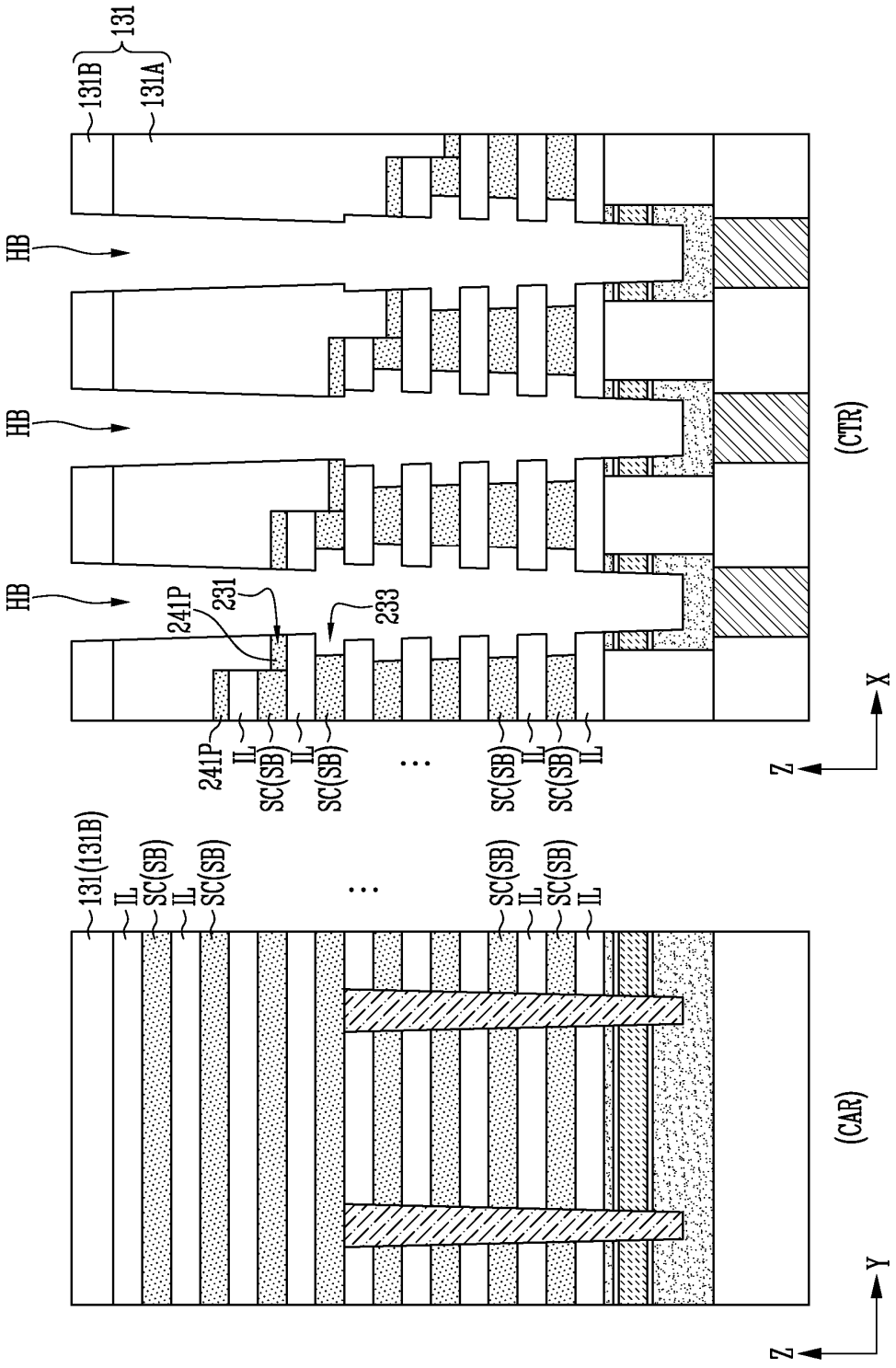

131
131B
131A
HB
HB
HB
241P
231
233
241P
IL
SC(SB)
IL
SC(SB)
SC(SB)
IL
SC(SB)
IL
(CTR)
Z
X
131(131B)
IL
SC(SB)
IL
SC(SB)
SC(SB)
IL
SC(SB)
IL
(CAR)
Z
Y

FIG. 16B

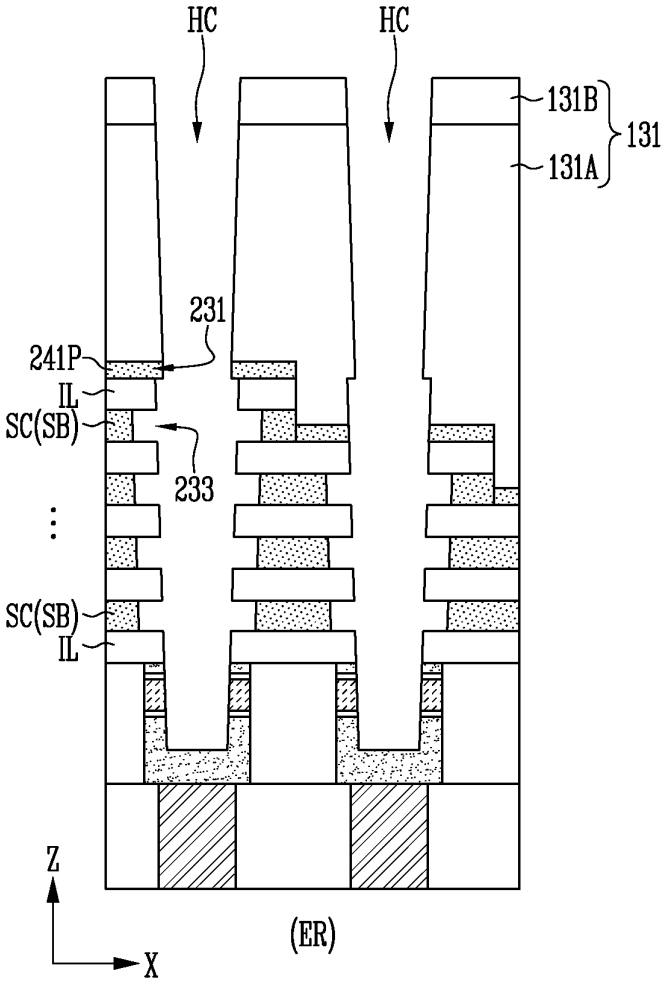


FIG. 17A

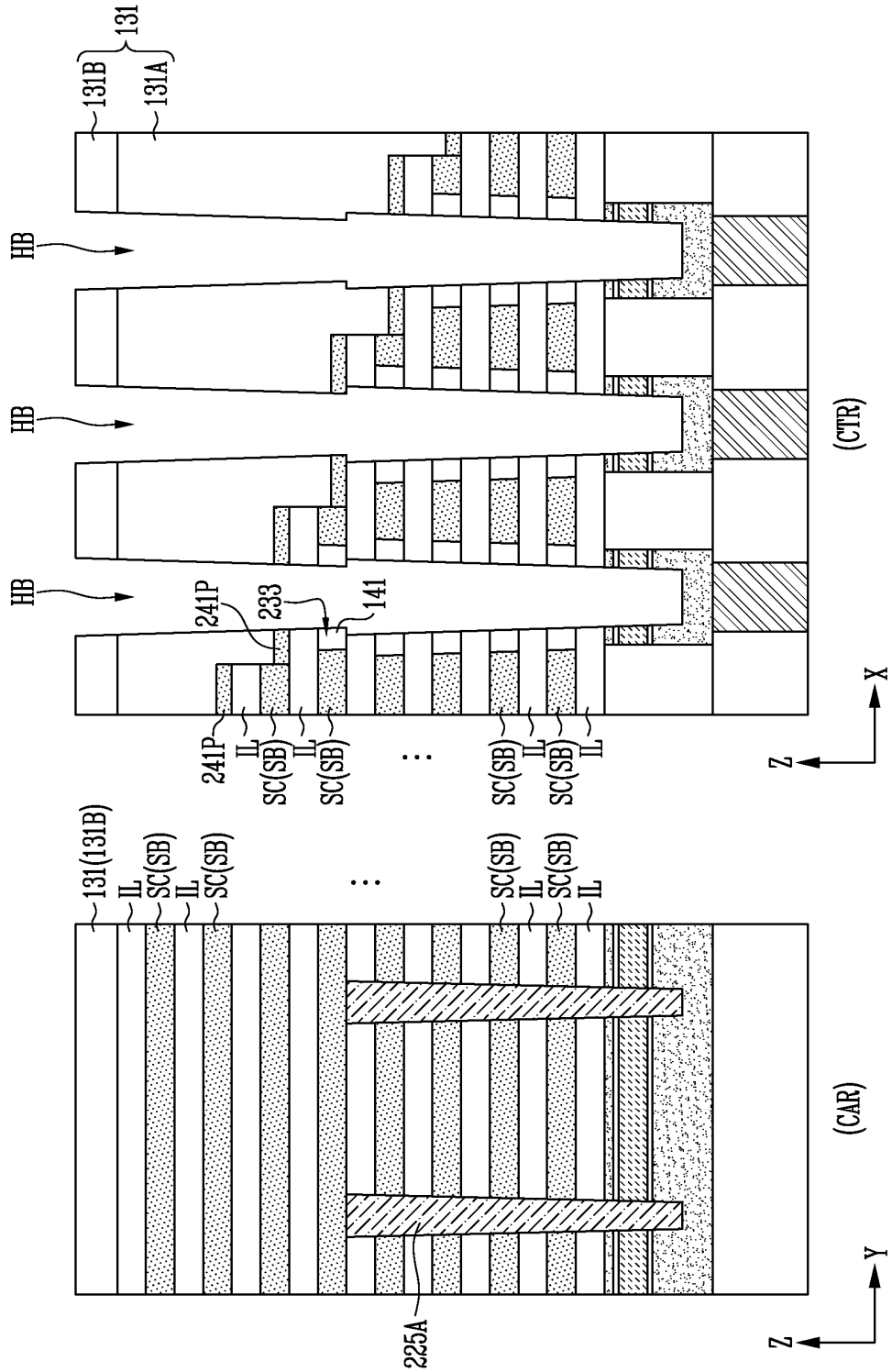

131
131B
131A
HB
HB
HB
241P
233
141
241P
IL
SC(SB)
IL
SC(SB)
SC(SB)
IL
SC(SB)
IL
(CTR)
X
Z
131(131B)
IL
SC(SB)
IL
SC(SB)
SC(SB)
IL
SC(SB)
IL
225A
(CAR)
Y
Z

FIG. 17B

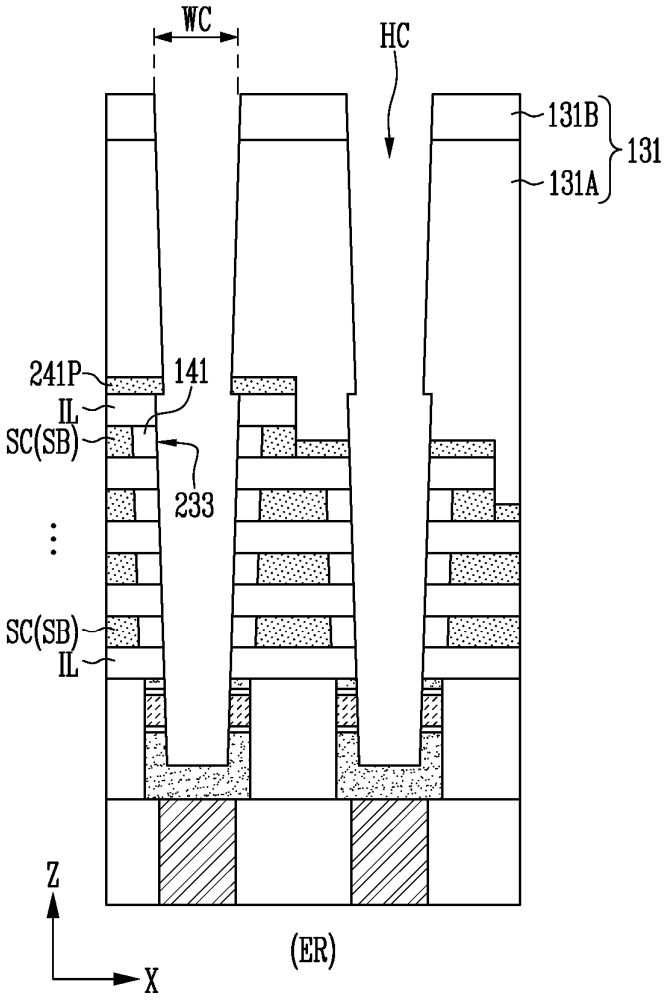


FIG. 18

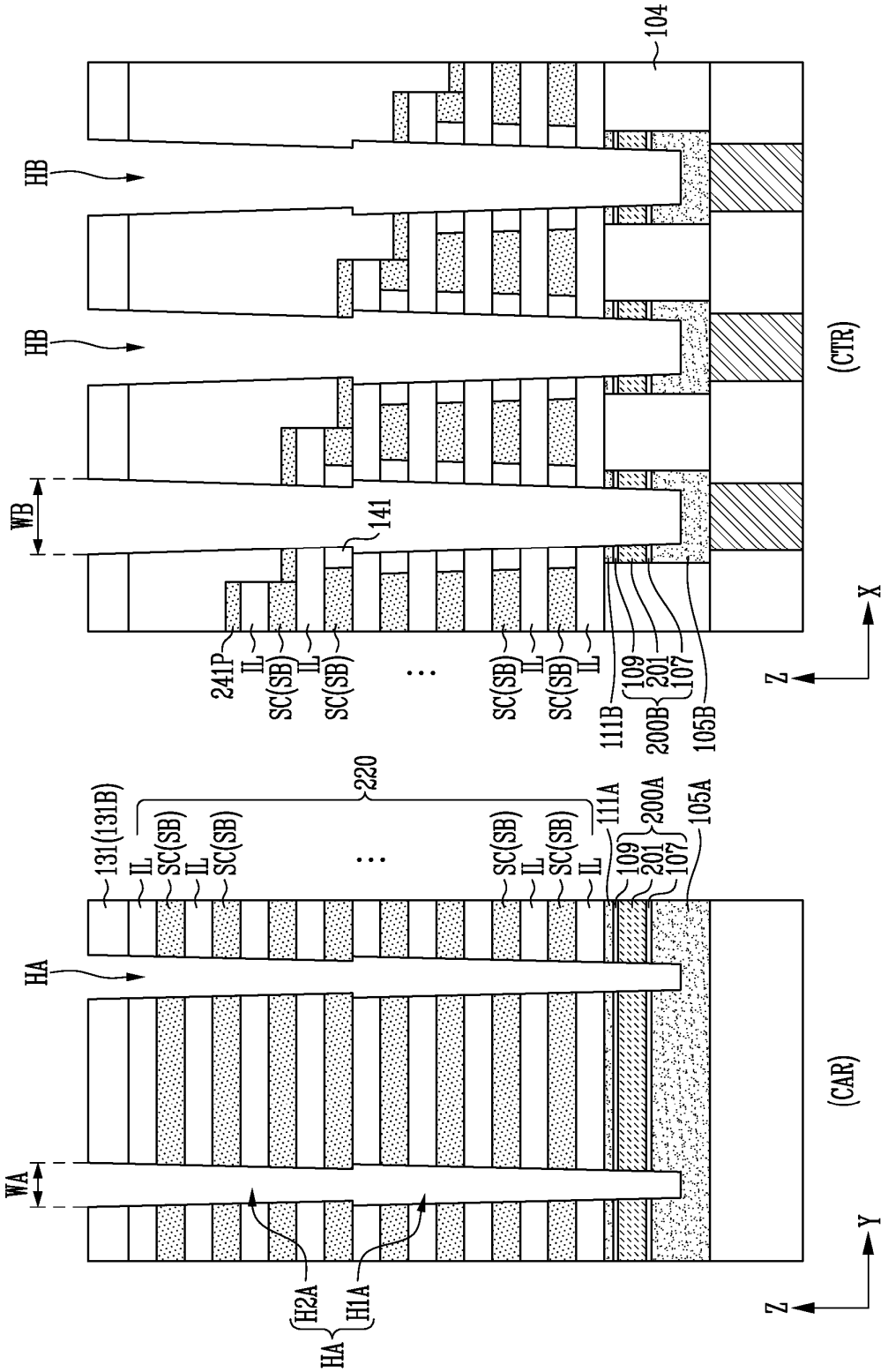

104
HB
HB
WB
141
241P
IL
SC(SB)
IL
SC(SB)
SC(SB)
IL
SC(SB)
IL
111B
109
201
200B
107
105B
(CTR)
X
Z
220
131(131B)
IL
SC(SB)
IL
SC(SB)
SC(SB)
IL
SC(SB)
IL
111A
109
201
200A
107
105A
HA
WA
H2A
H1A
HA
(CAR)
Y
Z

FIG. 19A

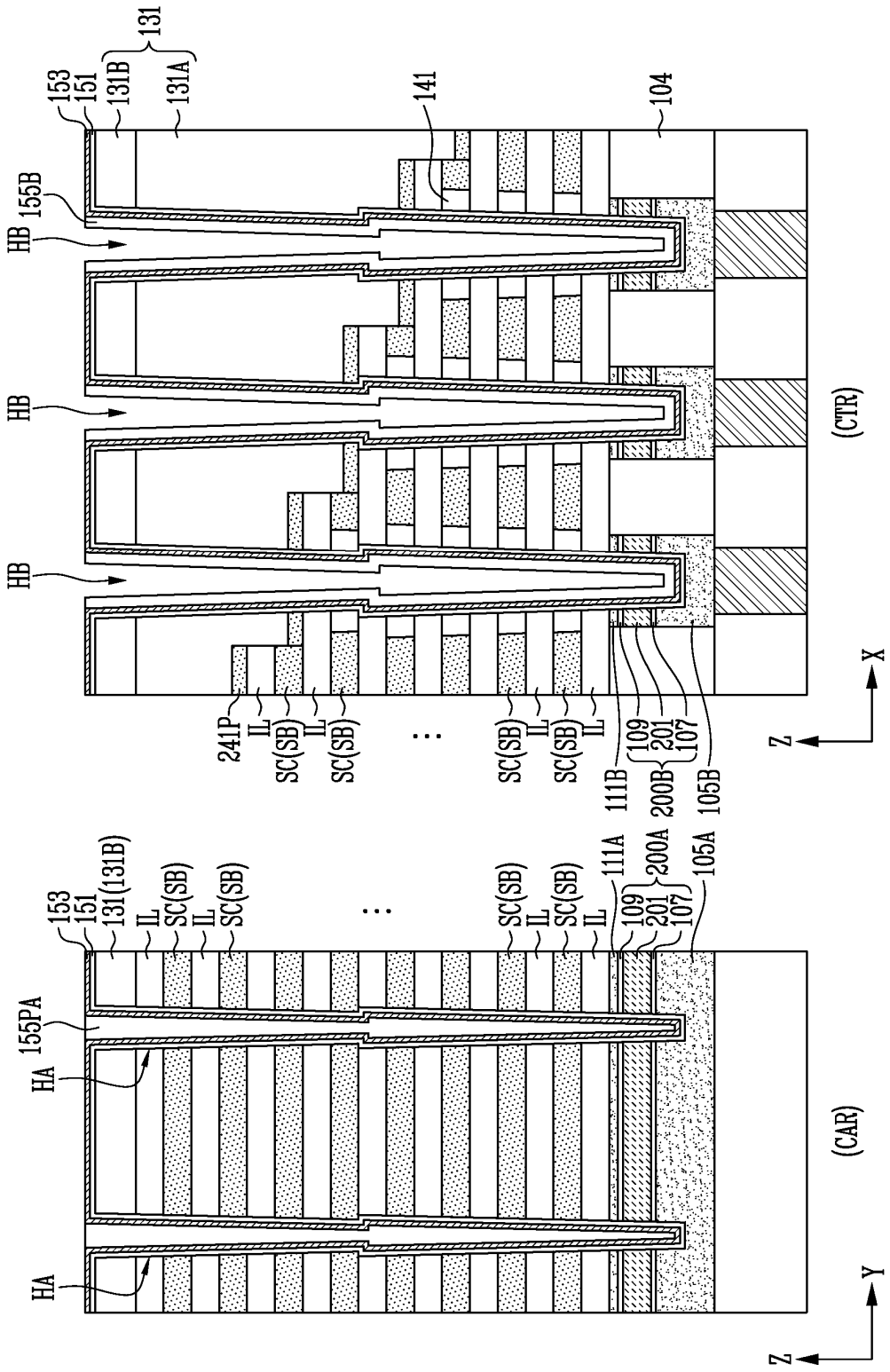

153
151
131(131B)
IL
SC(SB)
IL
SC(SB)
SC(SB)
IL
SC(SB)
111A
109
201
107
200A
105A
155PA
HA
HA
(CAR)
Y
Z
153
151
131B
131A
131
141
104
155B
HB
HB
HB
241P
IL
SC(SB)
IL
SC(SB)
SC(SB)
IL
SC(SB)
111B
109
201
107
200B
105B
(CTR)
X
Z

FIG. 19B

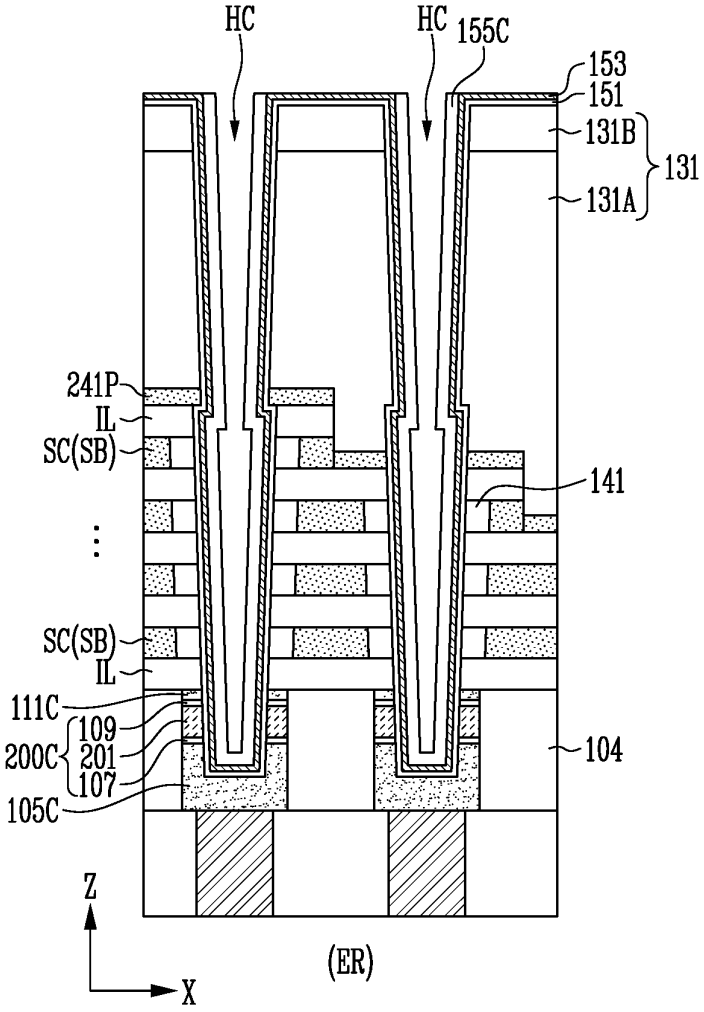

HC
HC
155C
153
151
131B
131
131A
241P
IL
SC(SB)
141
SC(SB)
IL
111C
109
200C
201
107
105C
104
Z
X
(ER)

FIG. 20A

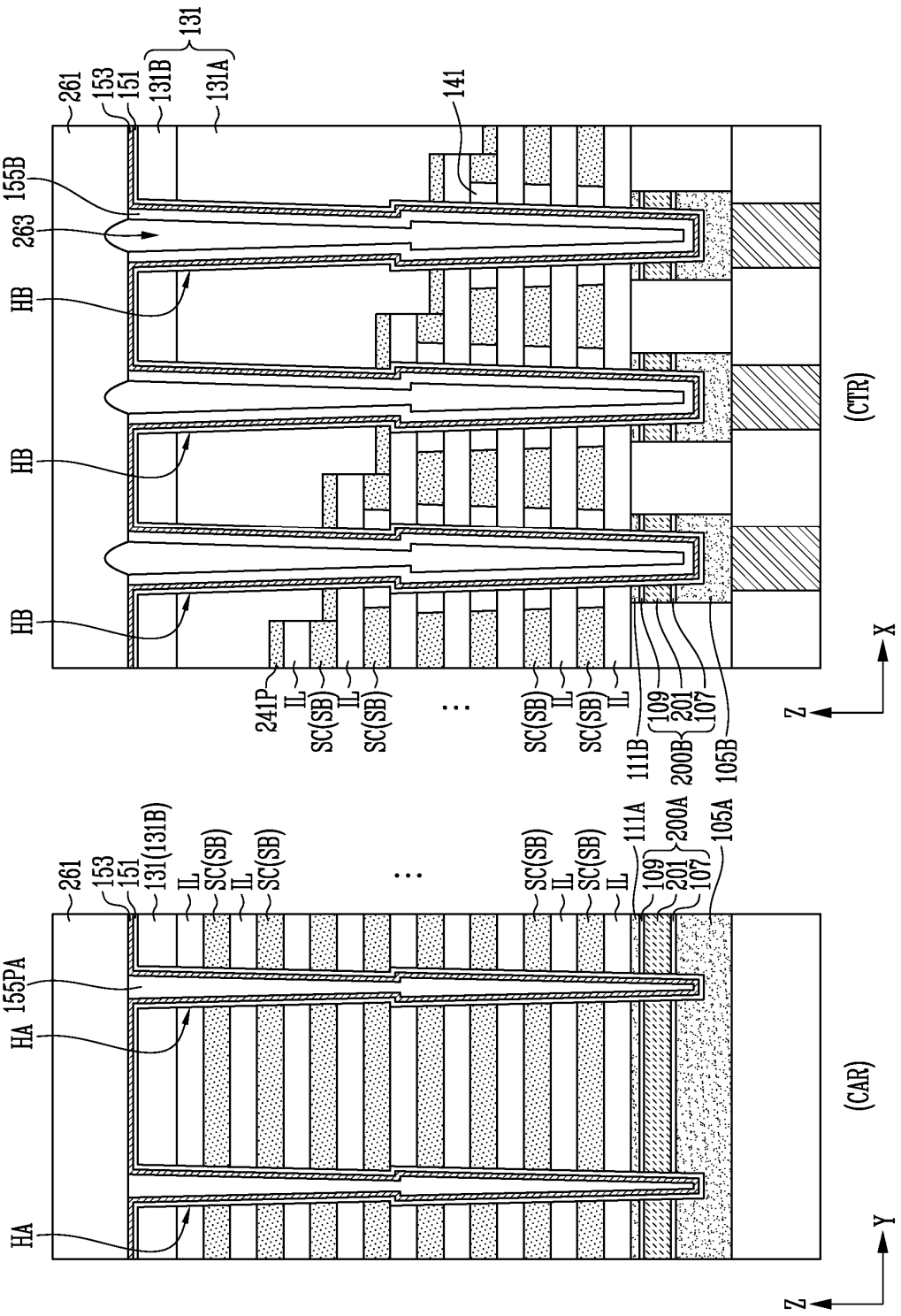

261
153
151
131B
131A
131
141
155B
263
HB
HB
HB
241P
IL
SC(SB)
IL
SC(SB)
SC(SB)
IL
SC(SB)
IL
SC(SB)
IL
111B
109
201
107
200B
105B
(CTR)
Z
X
261
153
151
131(131B)
IL
SC(SB)
IL
SC(SB)
SC(SB)
IL
SC(SB)
IL
SC(SB)
IL
111A
109
201
107
200A
105A
155PA
HA
HA
(CAR)
Z
Y

FIG. 20B

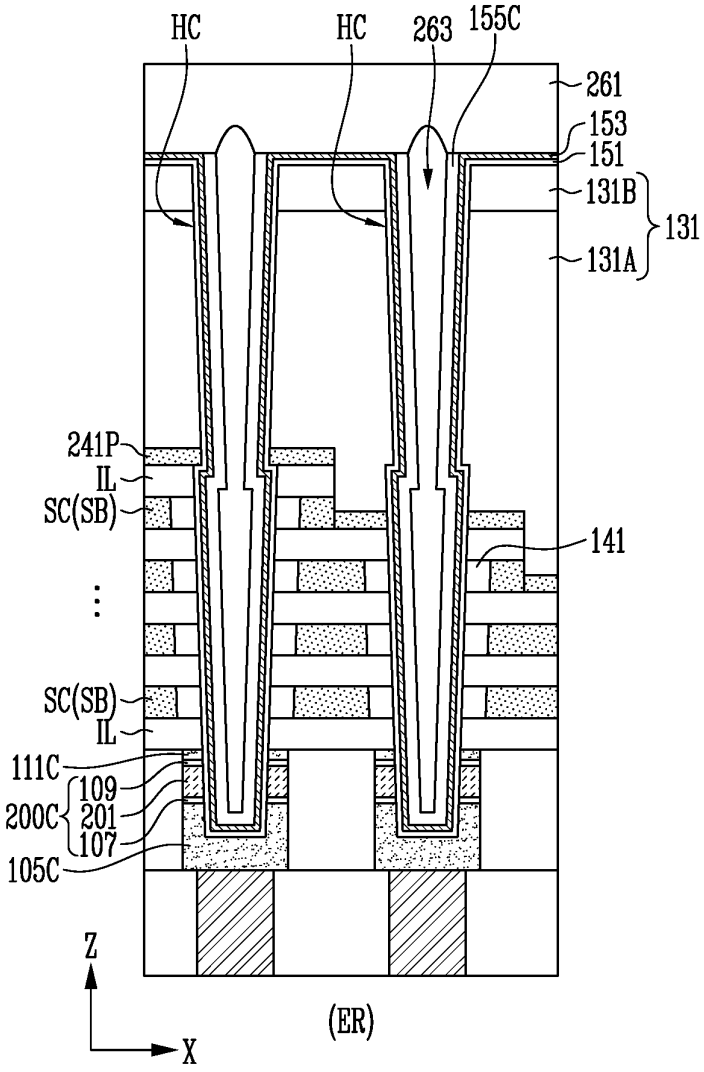

HC
HC
263
155C
261
153
151
131B
131
131A
241P
IL
SC(SB)
141
SC(SB)
IL
111C
109
200C
201
107
105C
Z
X
(ER)

FIG. 21

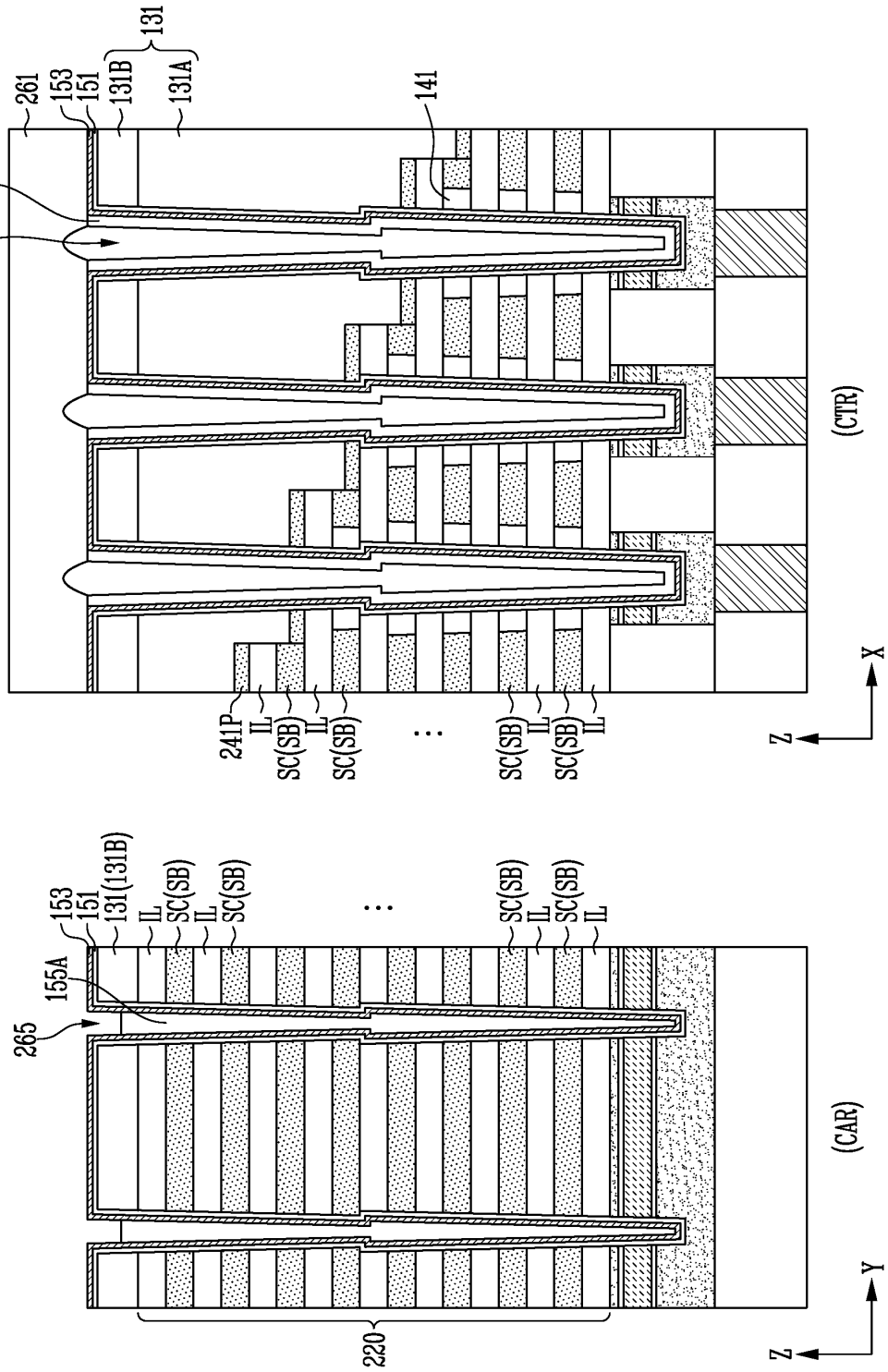

261
153
151
131B
131A
131
141
155B
263
241P
IL
SC(SB)
(CTR)
X
Z
155A
265
131(131B)
220
(CAR)
Y

FIG. 22A

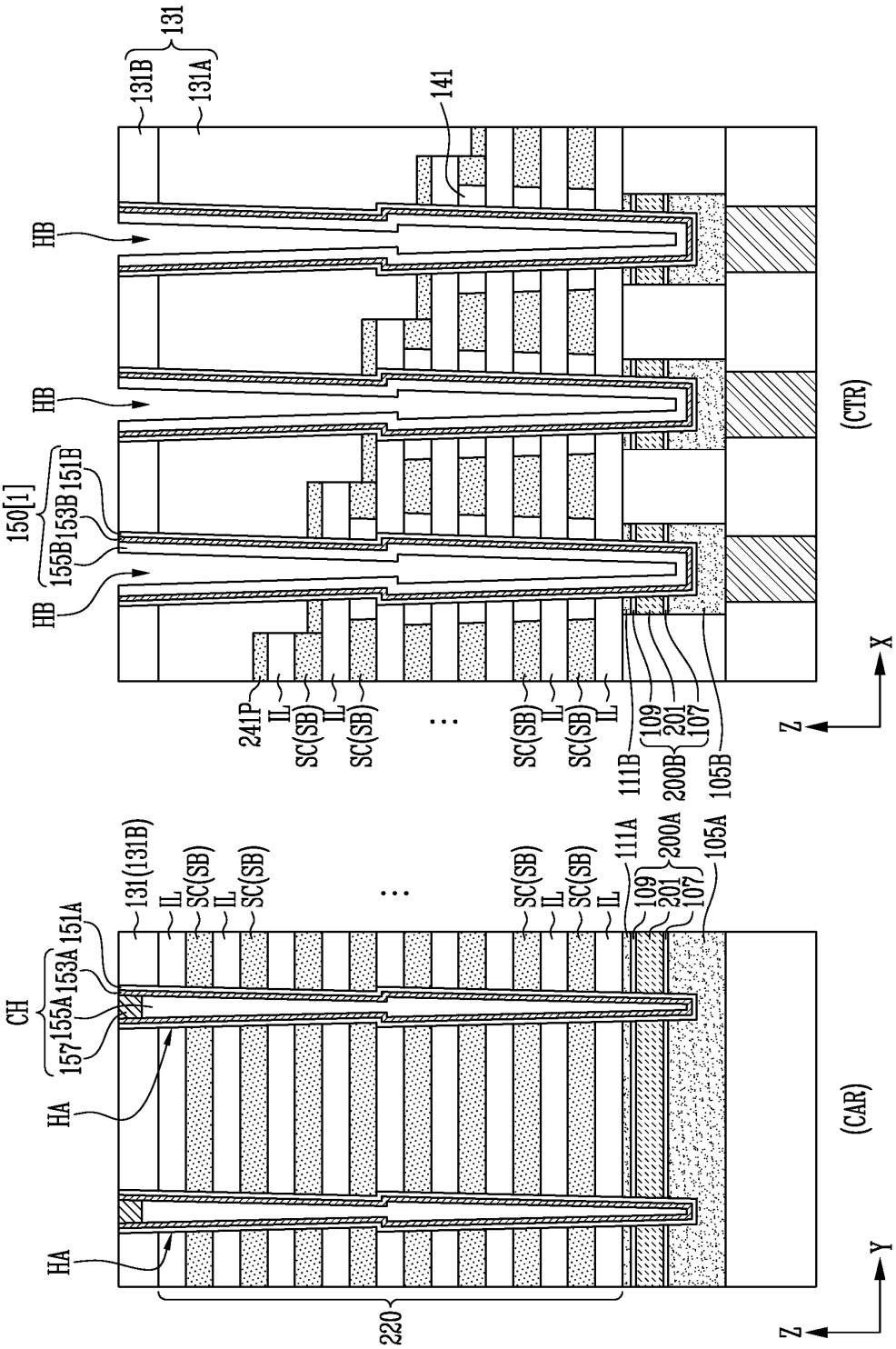

131
131B
131A
141
HB
HB
HB
150[1]
151B
153B
155B
241P
IL
SC(SB)
IL
SC(SB)
SC(SB)
SC(SB)
IL
SC(SB)
IL
111B
109
201
107
200B
105B
(CTR)
Z
X
CH
157
155A
153A
151A
131(131B)
HA
HA
220
111A
200A
105A
(CAR)
Z
Y

FIG. 22B

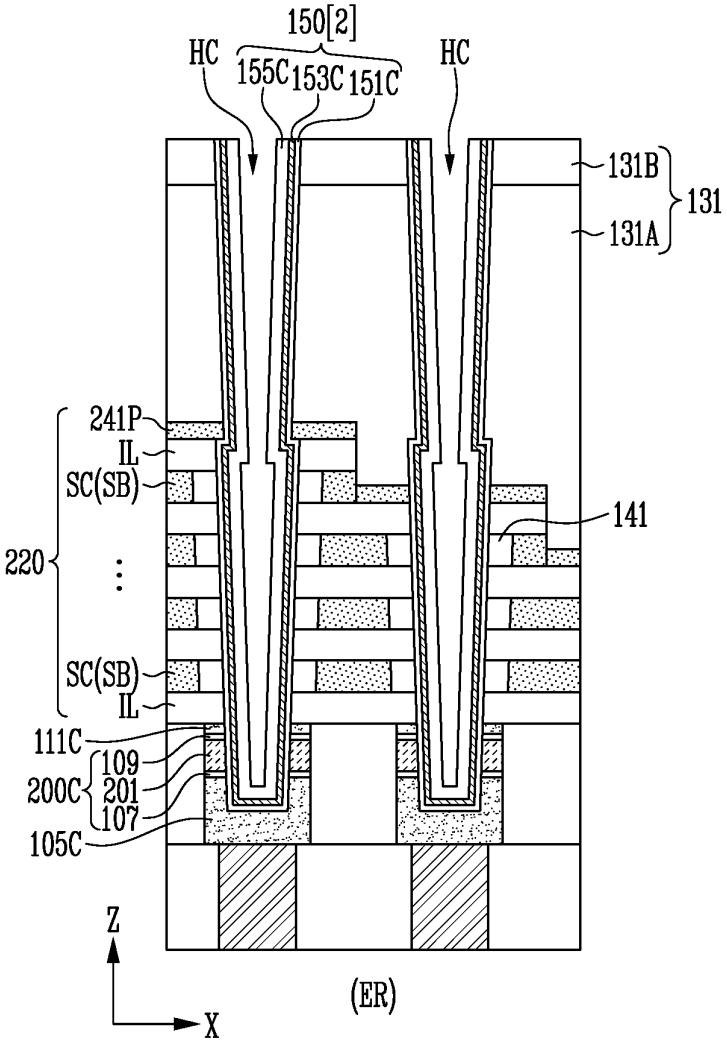

150[2]
HC
155C
153C
151C
HC
131B
131
131A
241P
IL
SC(SB)
141
220
SC(SB)
IL
111C
109
200C
201
107
105C
Z
X
(ER)

FIG. 23A

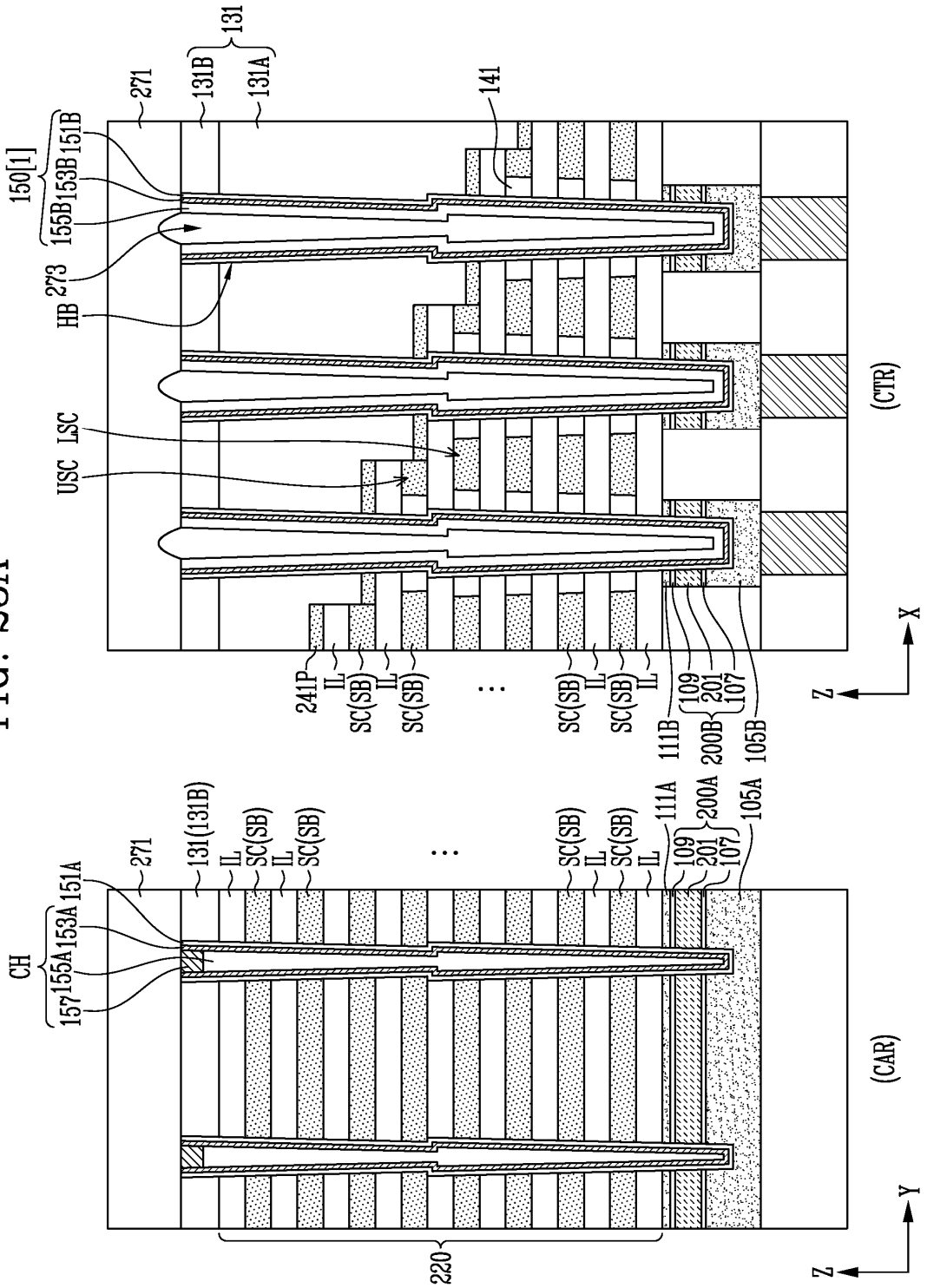

271
131B
131A
131
141
150[1]
151B
153B
155B
273
HB
USC
LSC
241P
IL
SC(SB)
111B
109
201
107
200B
105B
(CTR)
X
Z
CH
157
155A
153A
151A
131(131B)
111A
200A
105A
220
(CAR)
Y

FIG. 23B

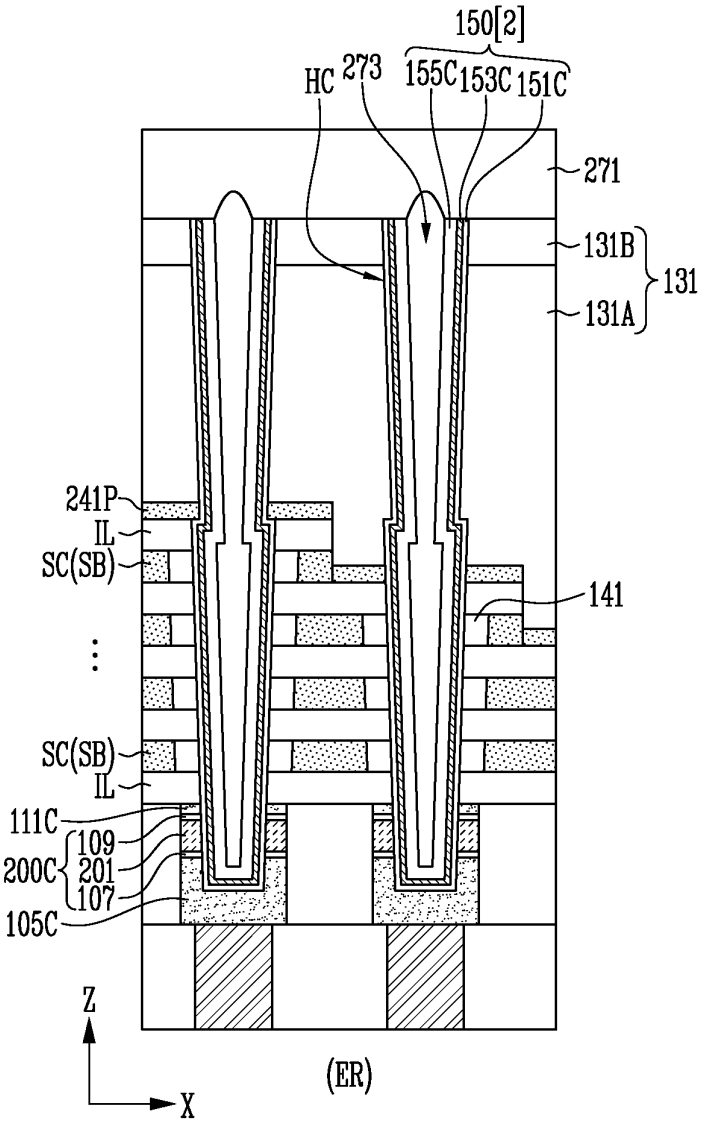

150[2]
HC
273
155C
153C
151C
271
131B
131
131A
241P
IL
SC(SB)
141
SC(SB)
IL
111C
109
200C
201
107
105C
Z
X
(ER)

FIG. 24A

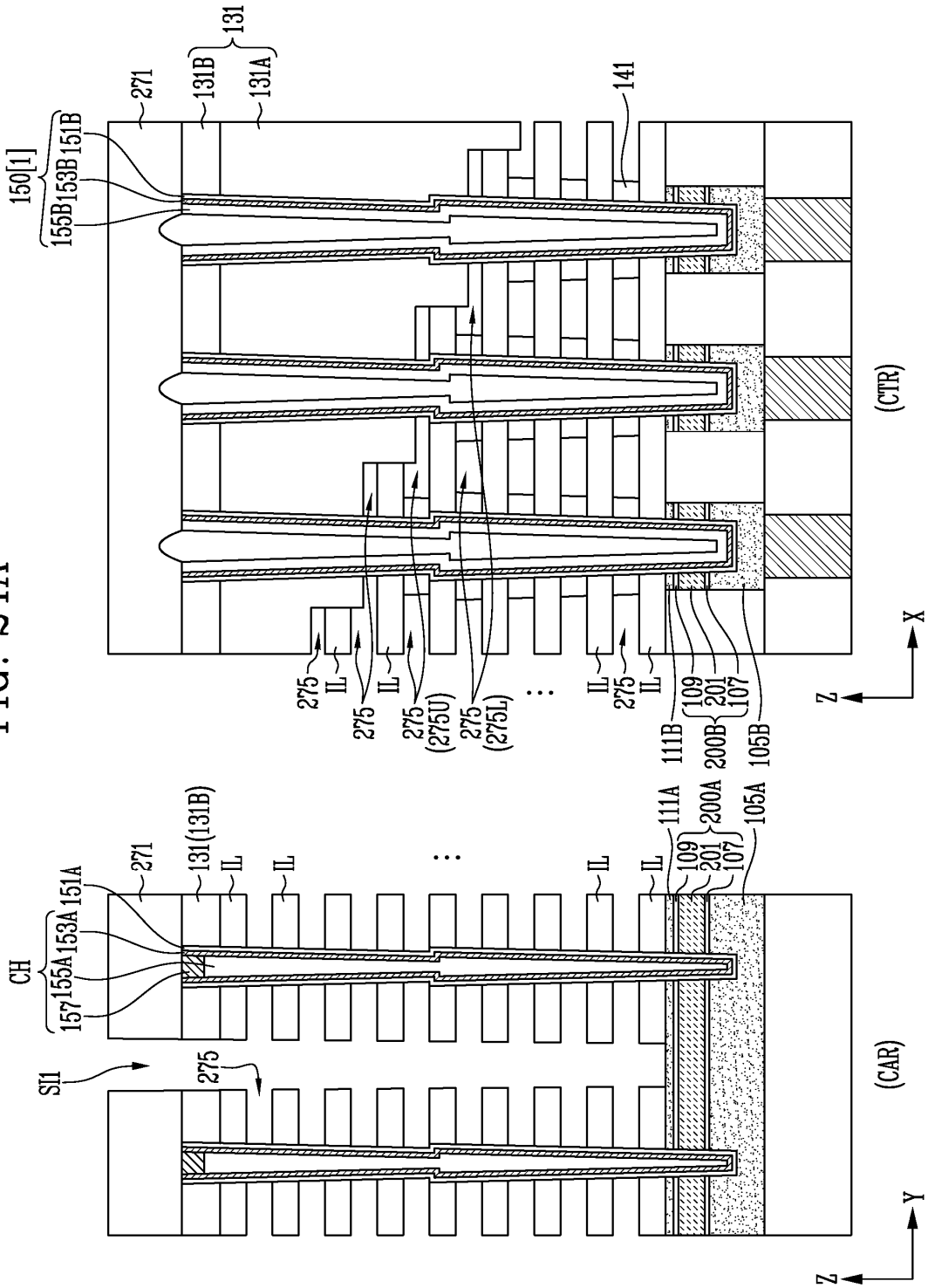

150[1]
155B
153B
151B
271
131B
131A
131
141
275
IL
275
IL
275
(275U)
275
(275L)
IL
275
IL
111B
109
201
200B
107
105B
(CTR)
X
Z
CH
157
155A
153A
151A
271
131(131B)
IL
IL
IL
IL
111A
109
201
200A
107
105A
SI1
275
(CAR)
Y
Z

FIG. 24B

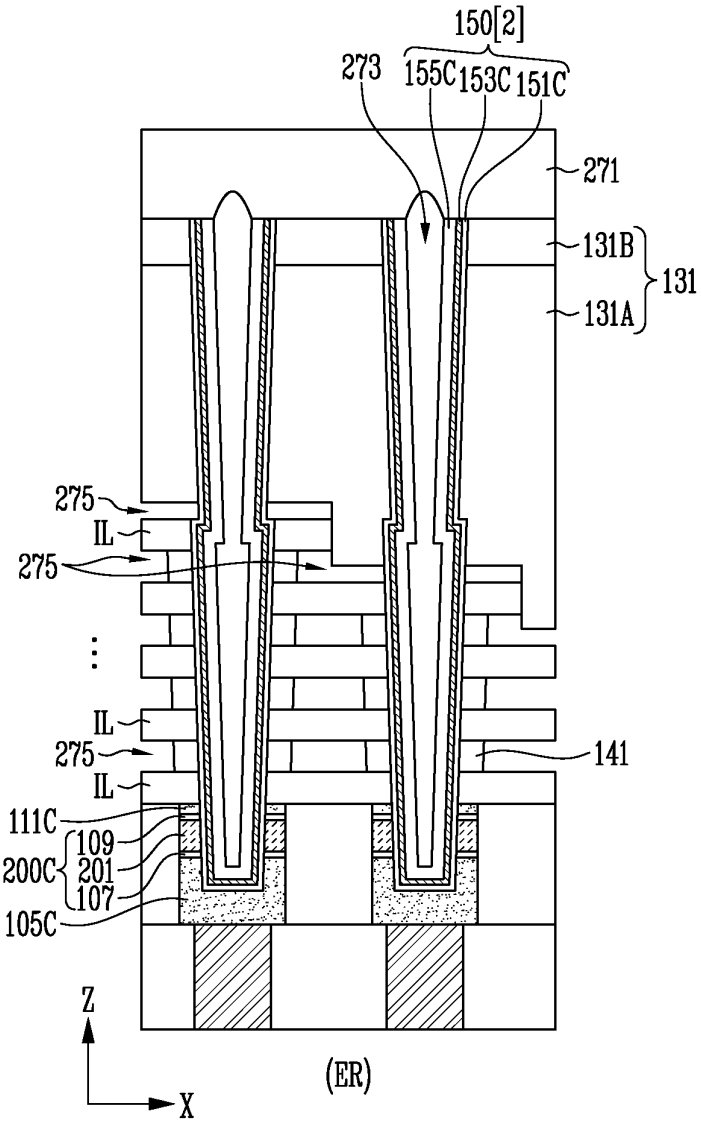

150[2]
273
155C
153C
151C
271
131B
131
131A
275
IL
275
IL
275
IL
111C
109
200C
201
107
105C
141
Z
X
(ER)

FIG. 25A

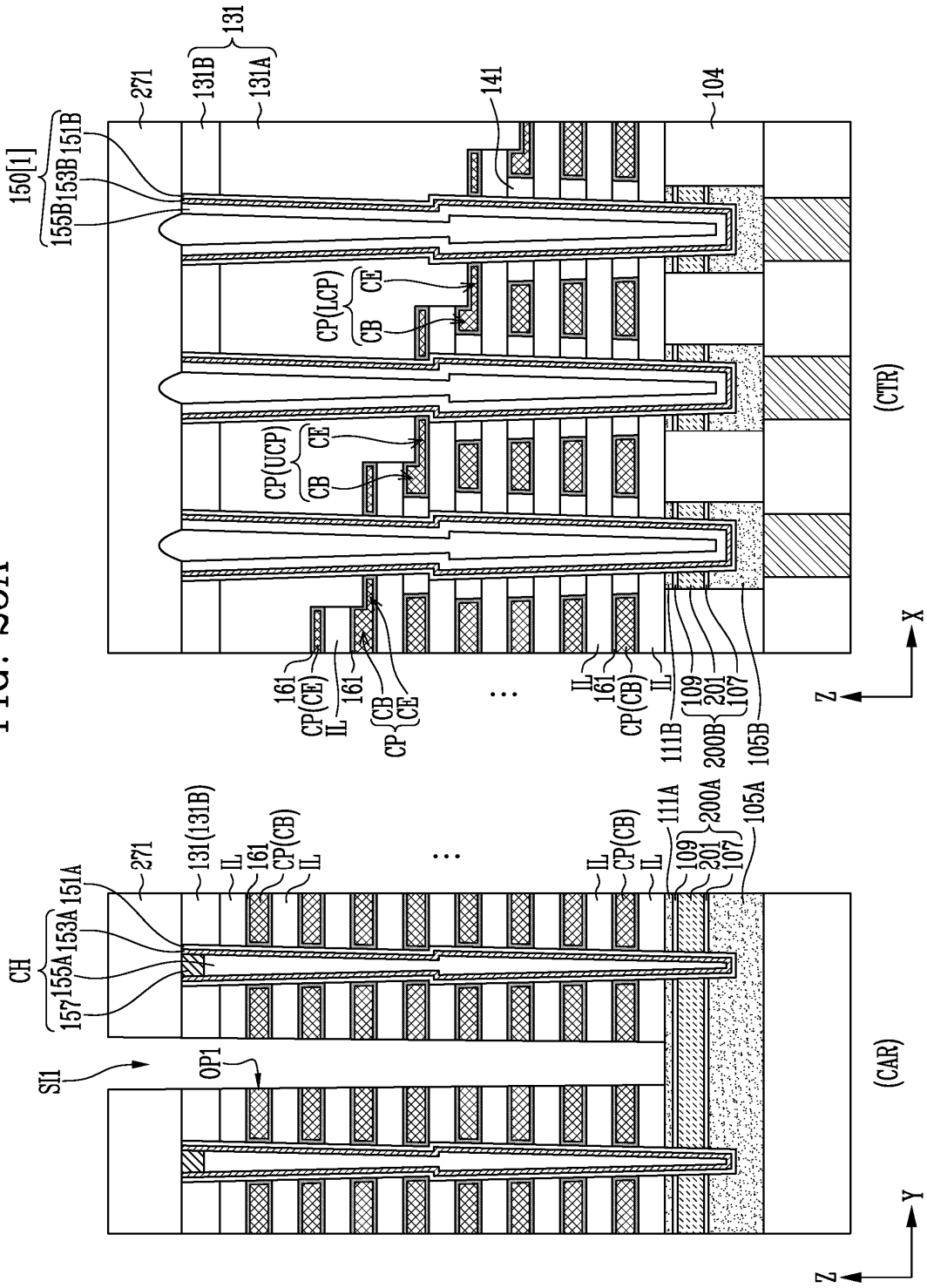

271
131B
131A
131
141
104
150[1]
155B
153B
151B
CP(LCP)
CE
CB
CP(UCP)
CE
CB
(CTR)
161
CP(CE)
IL
161
CB
CE
CP
IL
161
CP(CB)
IL
111B
109
201
107
200B
105B
X
Z
CH
157
155A
153A
151A
271
131(131B)
IL
161
CP(CB)
IL
IL
CP(CB)
IL
111A
109
201
107
200A
105A
SI1
OP1
(CAR)
Y
Z

FIG. 25B

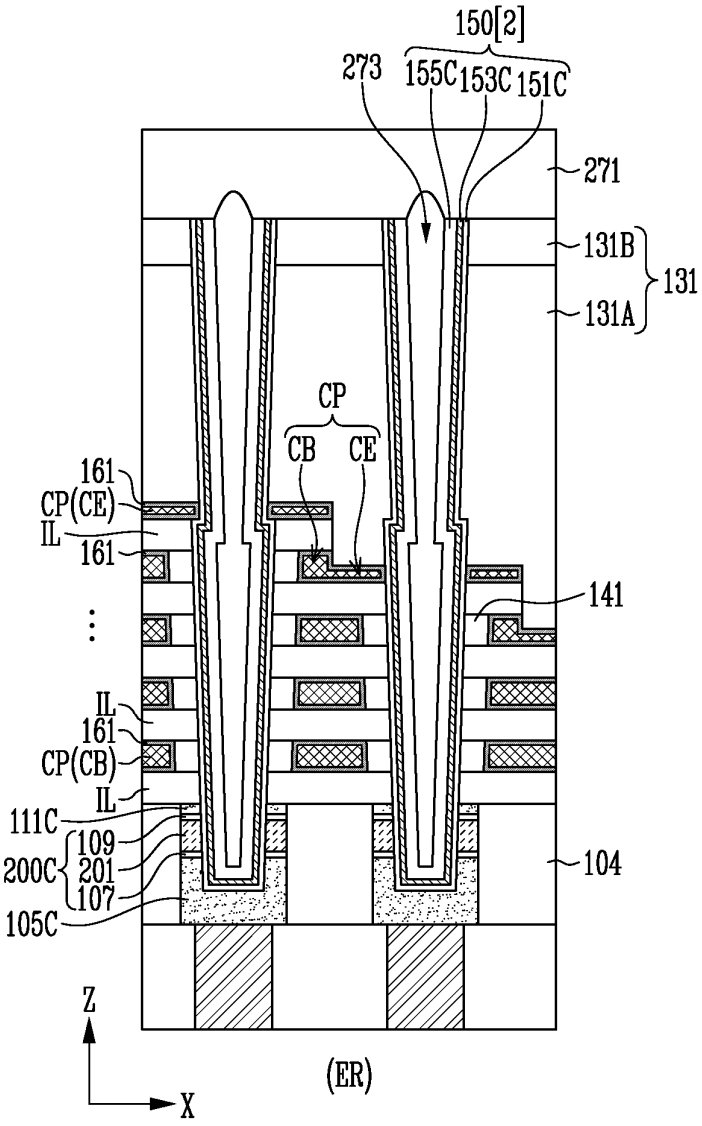

150[2]
273
155C
153C
151C
271
131B
131
131A
CP
CB
CE
161
CP(CE)
IL
161
141
IL
161
CP(CB)
IL
111C
109
200C
201
107
105C
104
Z
X
(ER)

FIG. 26

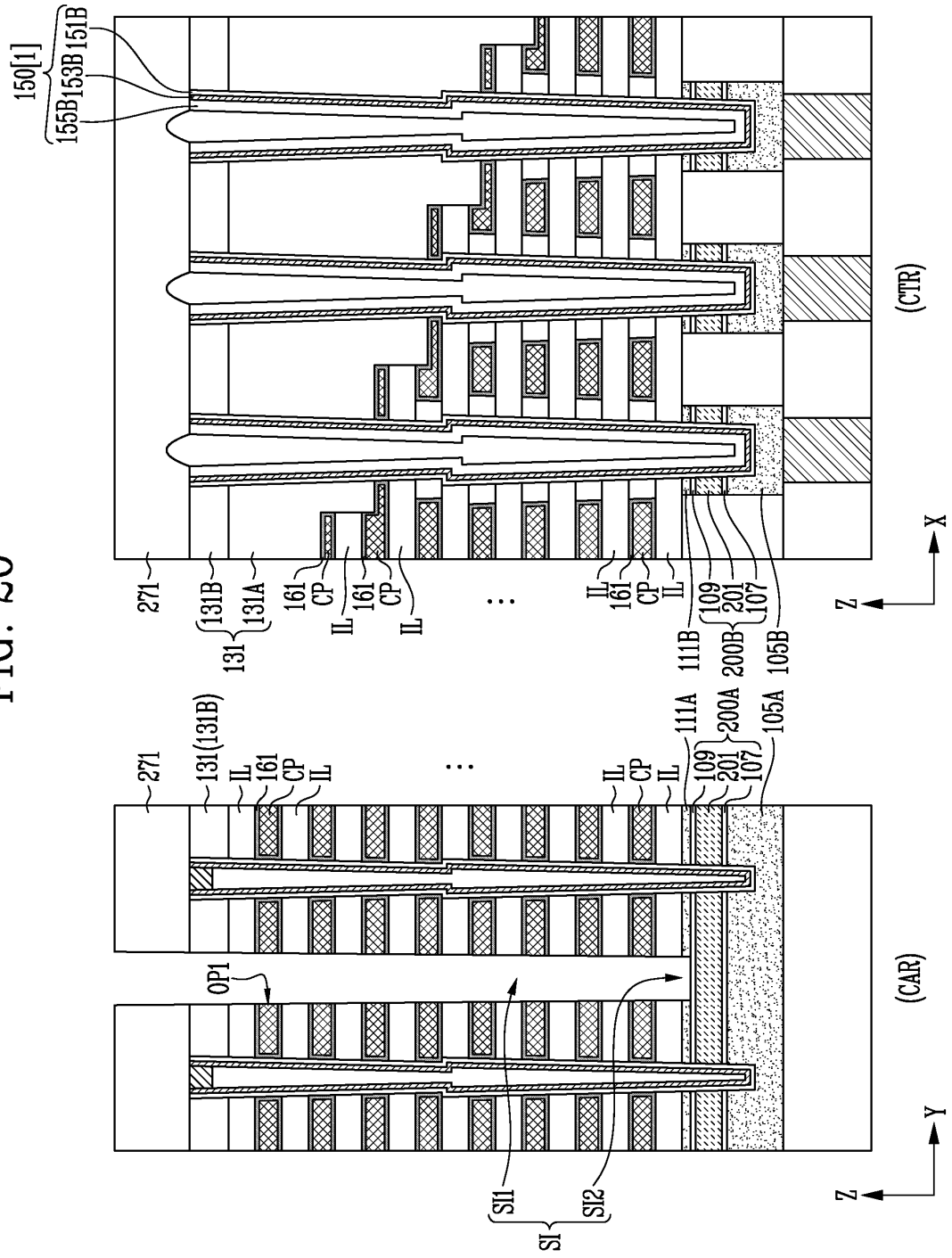

150[1]
155B
153B
151B
271
131
131B
131A
161
CP
IL
111B
200B
105B
109
201
107
(CTR)
X
Z
111A
200A
105A
(131B)
OP1
(CAR)
Y
SI1
SI2
SI

FIG. 27

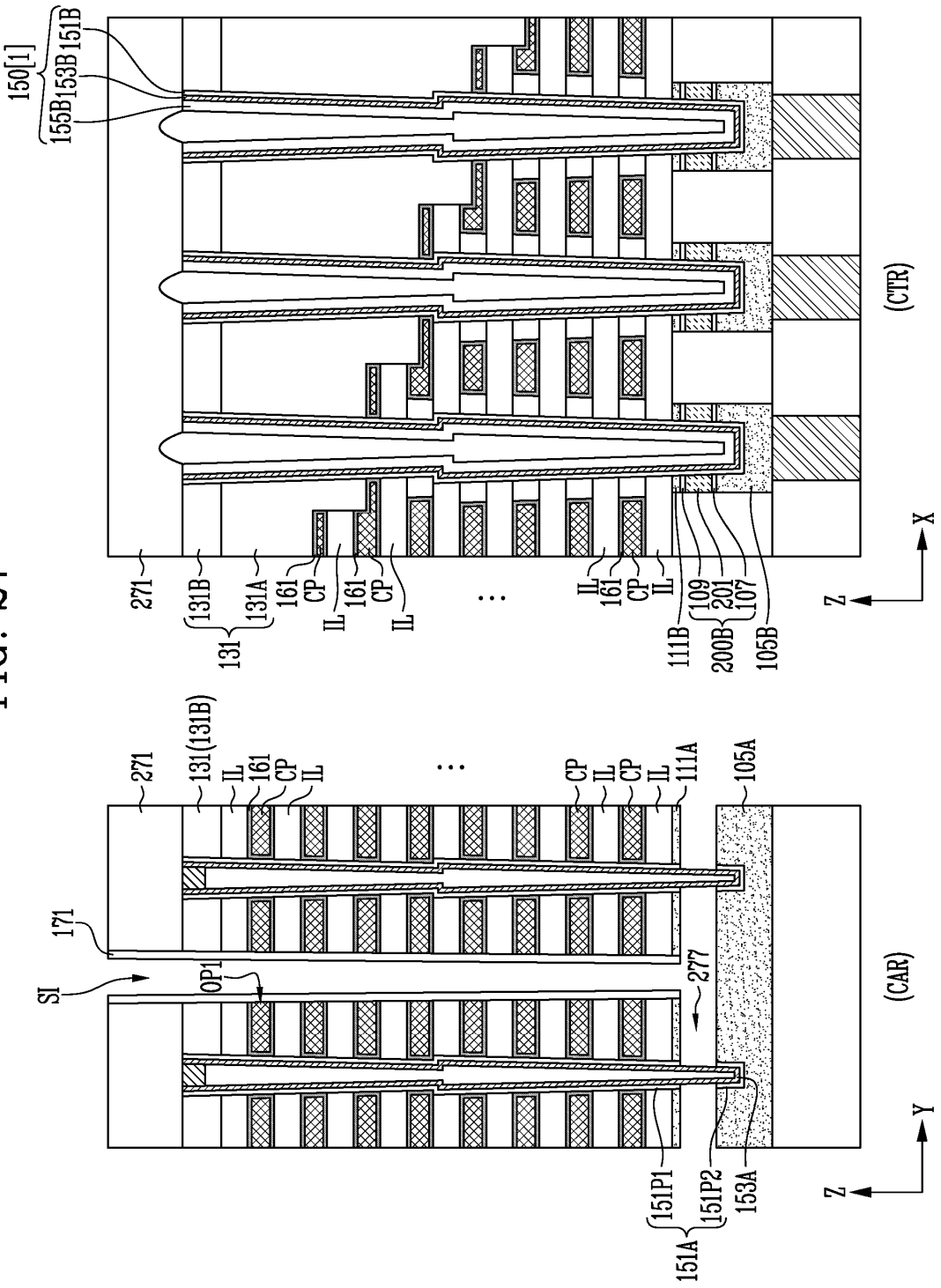

150[1]
155B
153B
151B
271
131B
131A
131
161
CP
IL
111B
200B
109
201
107
105B
(CTR)
X
Z
271
131(131B)
111A
105A
171
SI
OP1
277
151P1
151P2
153A
151A
(CAR)
Y
Z

FIG. 28A

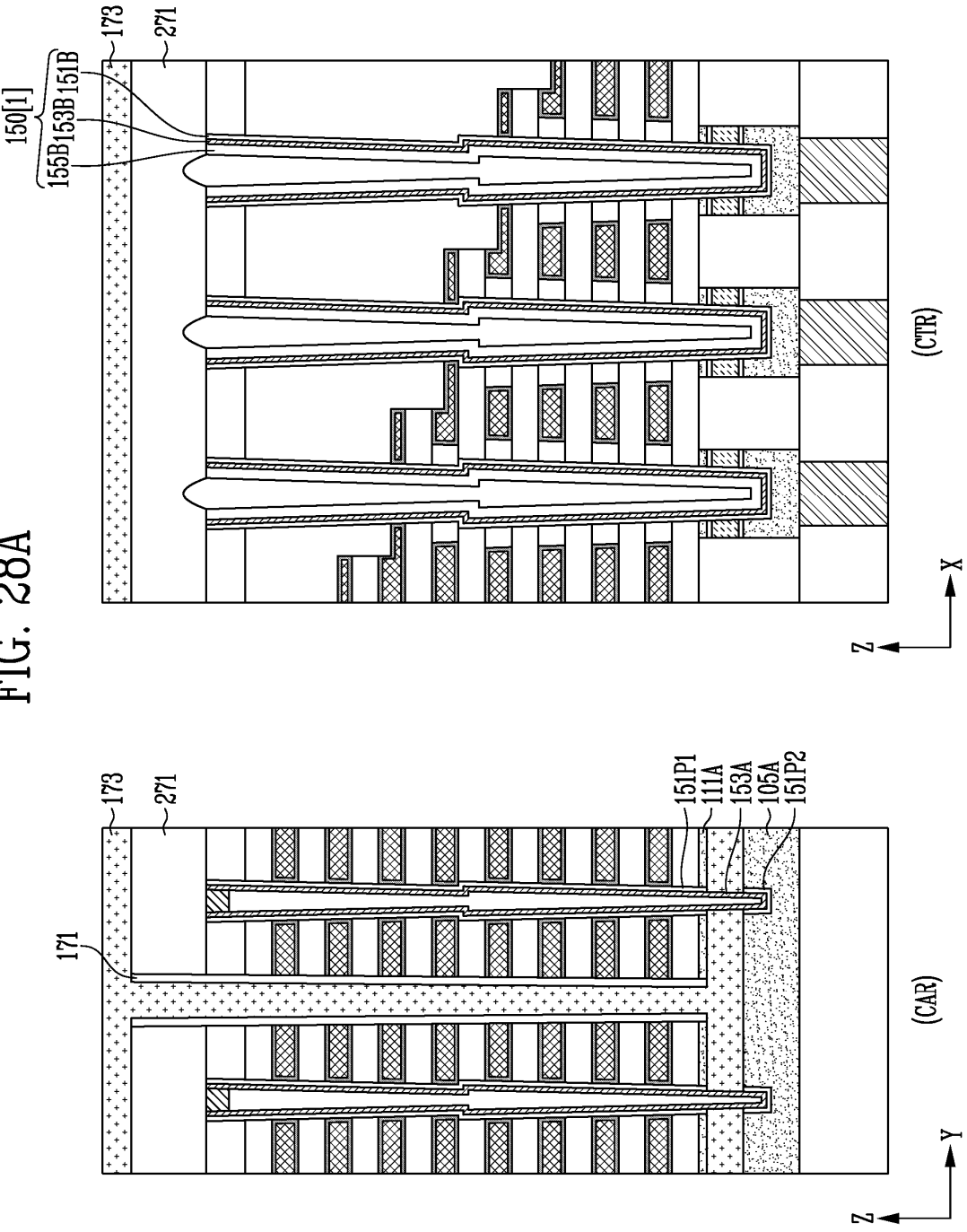

150[1]
155B
153B
151B
173
271
(CTR)
X
Z
171
173
271
151P1
111A
153A
105A
151P2
(CAR)
Y
Z

FIG. 28B

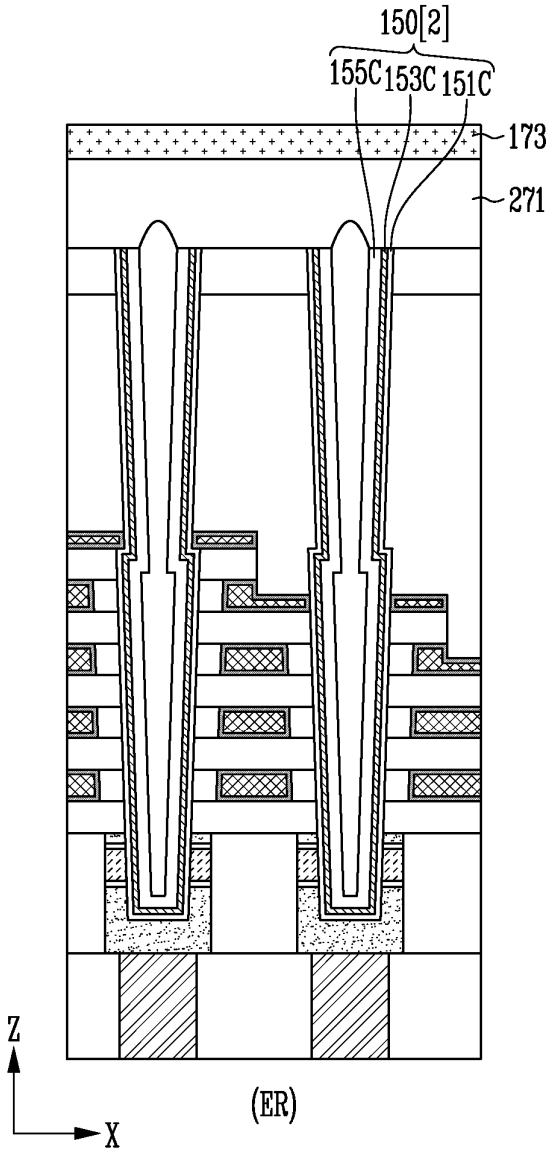


FIG. 29A

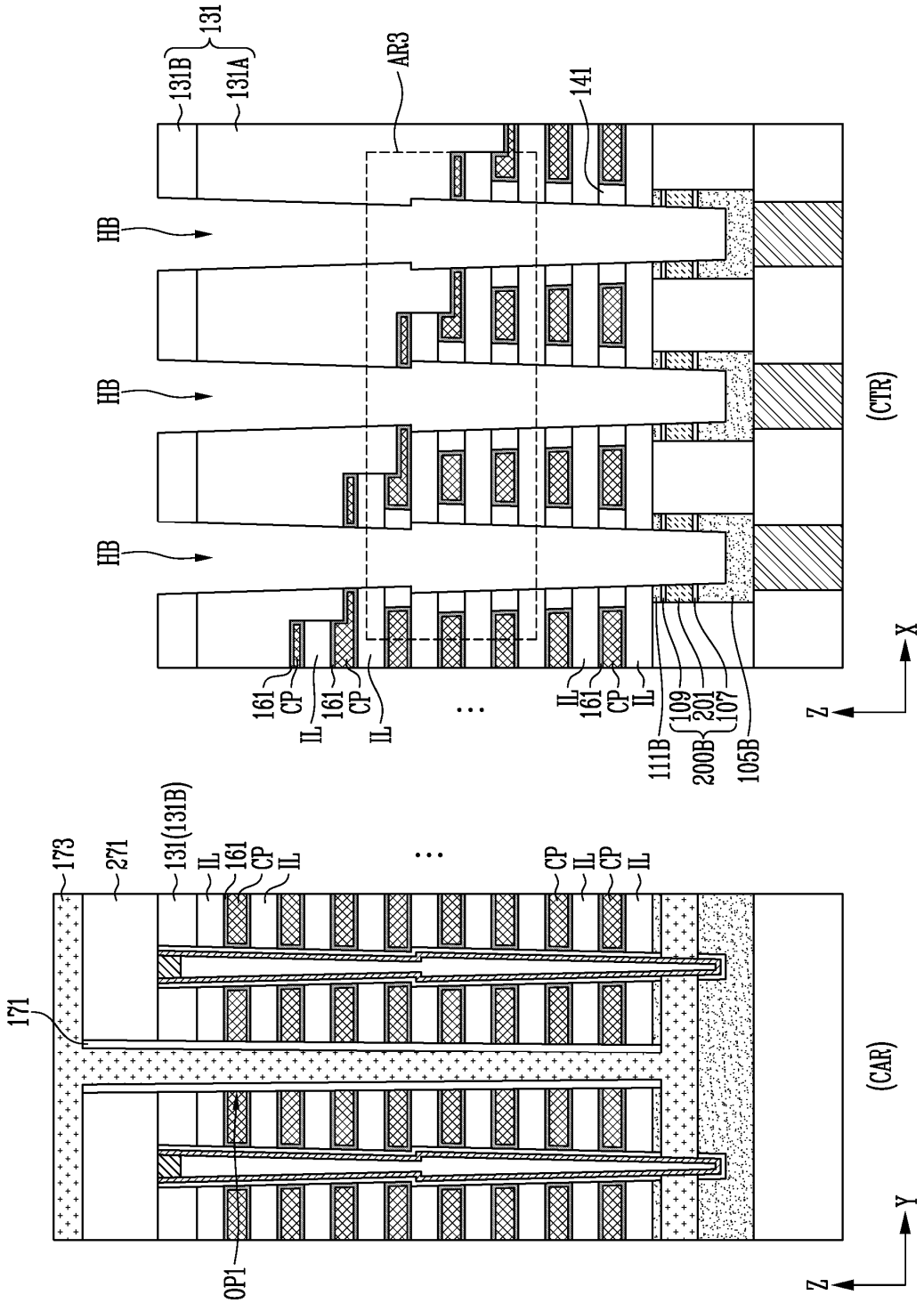

131
131B
131A
AR3
141
HB
HB
HB
161
CP
IL
161
CP
IL
IL
161
CP
IL
109
201
107
111B
200B
105B
(CTR)
X
Z
173
271
131(131B)
IL
161
CP
IL
CP
IL
CP
IL
171
OP1
(CAR)
Y
Z

FIG. 29B

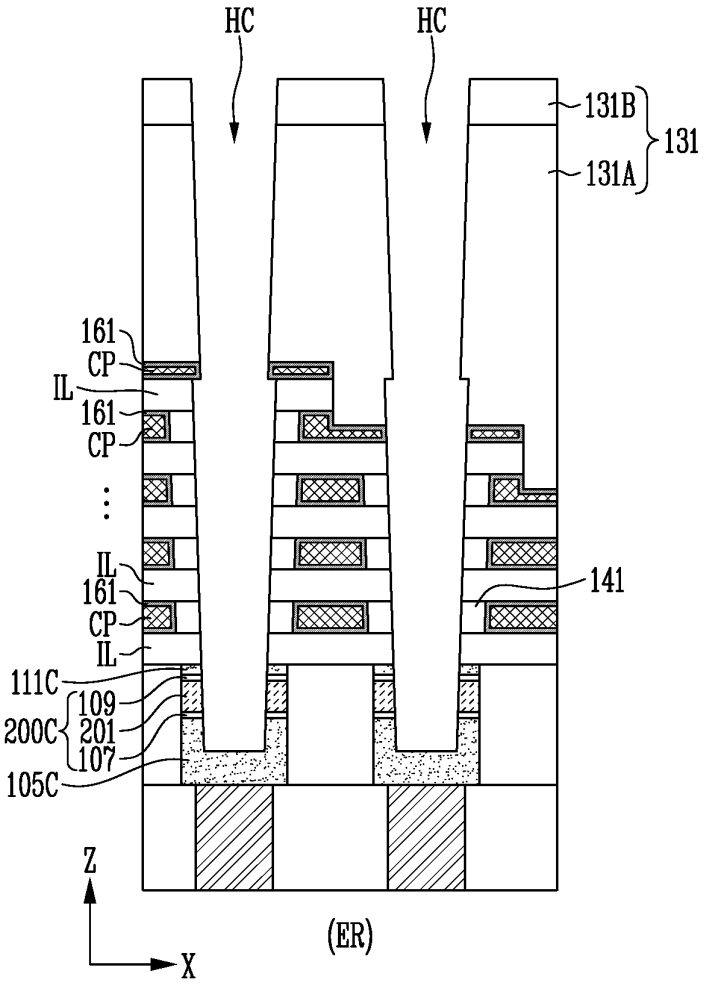

HC
HC
131B
131
131A
161
CP
IL
161
CP
IL
161
CP
IL
141
111C
109
200C
201
107
105C
Z
X
(ER)

FIG. 30A

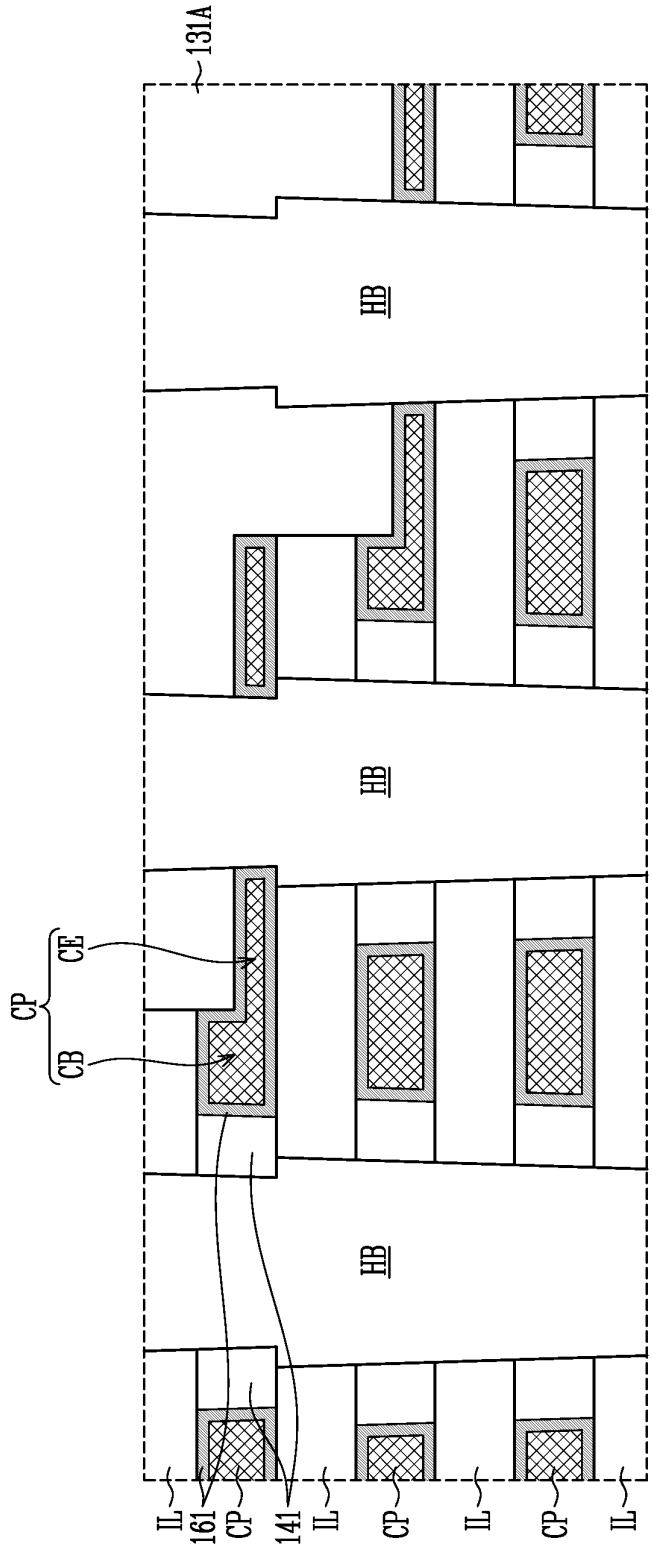


FIG. 30B

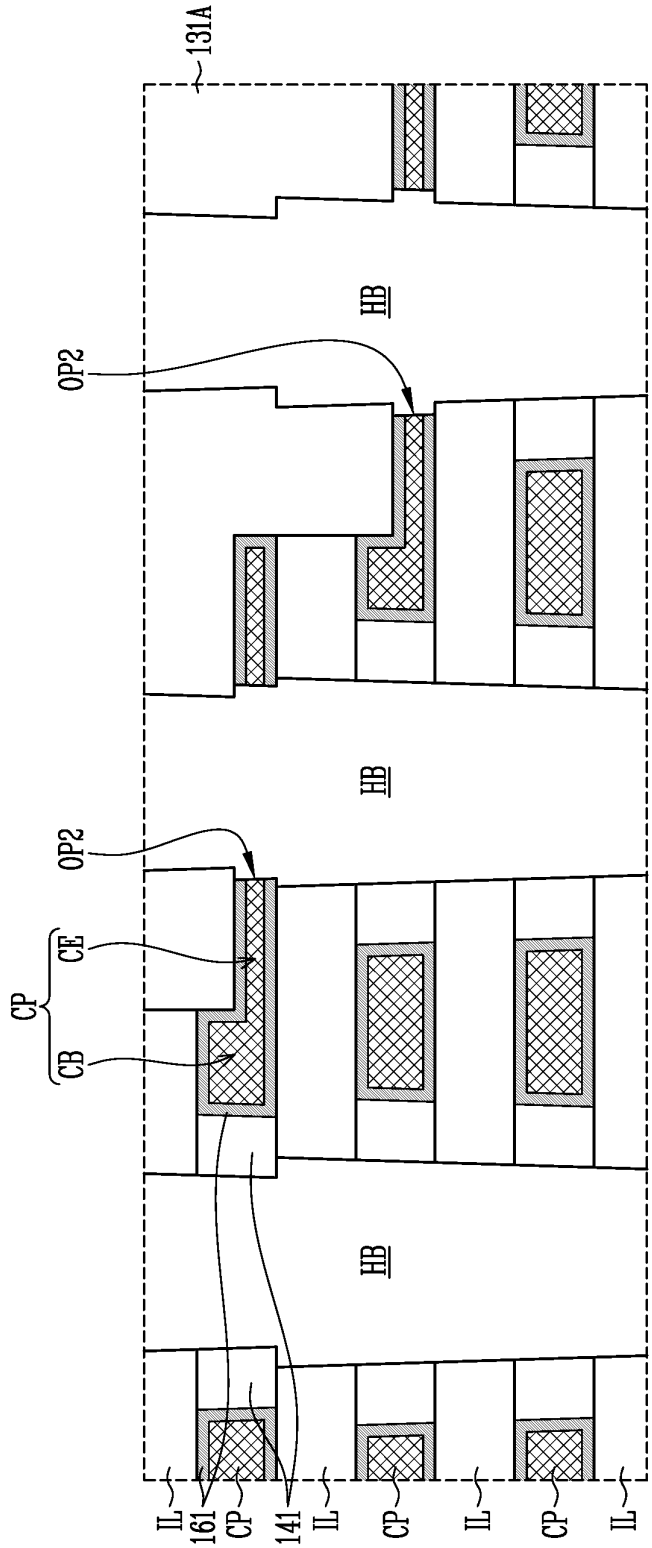


FIG. 31A

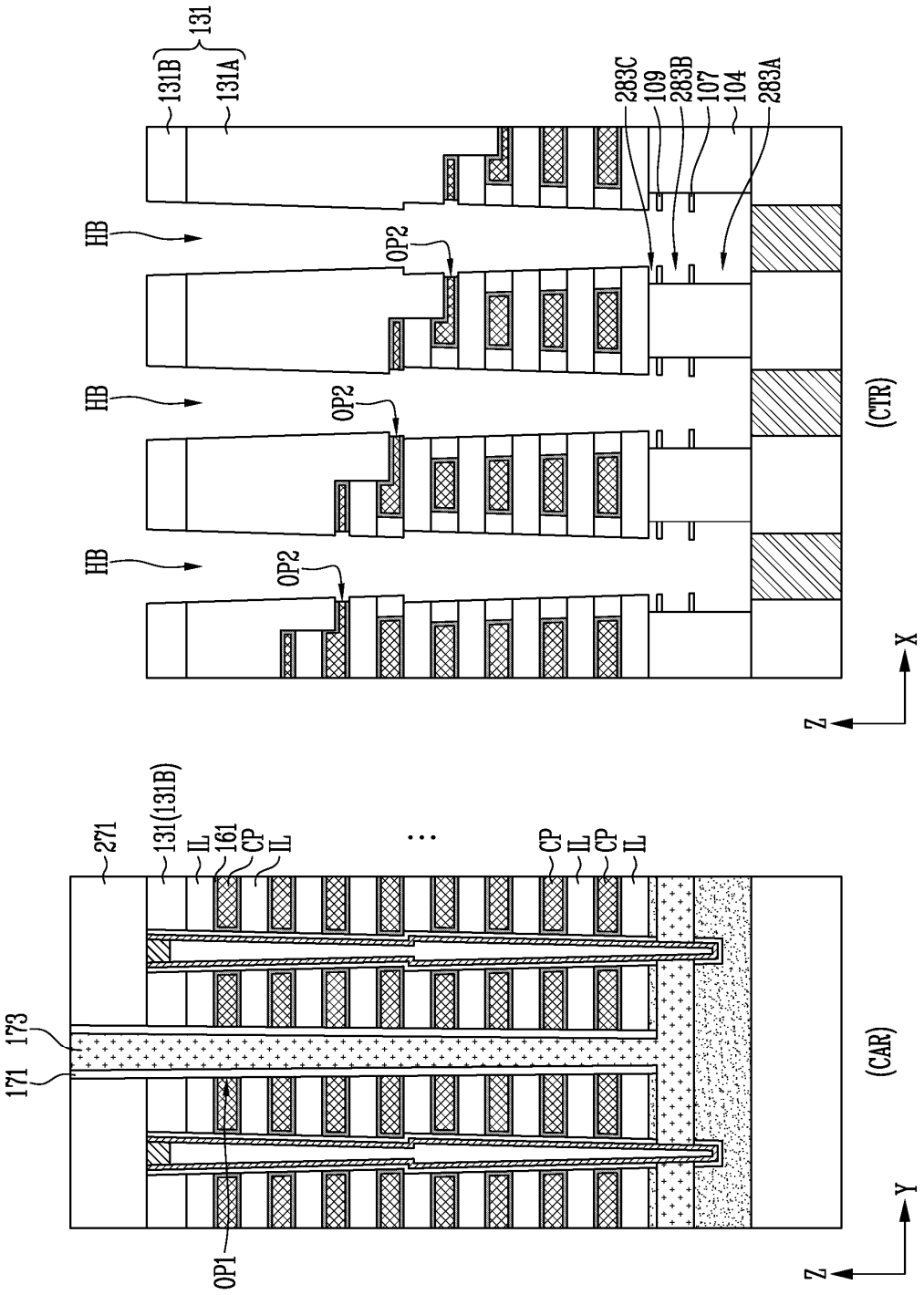

131
131B
131A
283C
109
283B
107
104
283A
HB
OP2
HB
OP2
HB
OP2
(CTR)
X
Z
271
131(131B)
IL
161
CP
IL
CP
IL
CP
IL
173
171
OP1
(CAR)
Y
Z

FIG. 31B

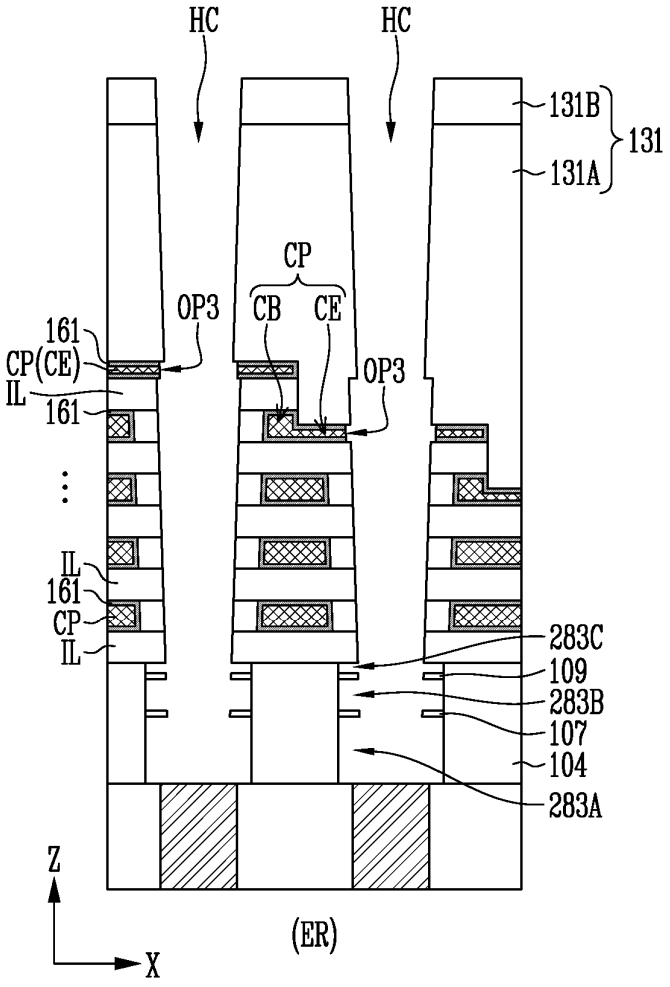

HC
HC
131B
131
131A
CP
CB
CE
OP3
OP3
161
CP(CE)
IL
161
IL
161
CP
IL
283C
109
283B
107
104
283A
Z
X
(ER)

FIG. 32A

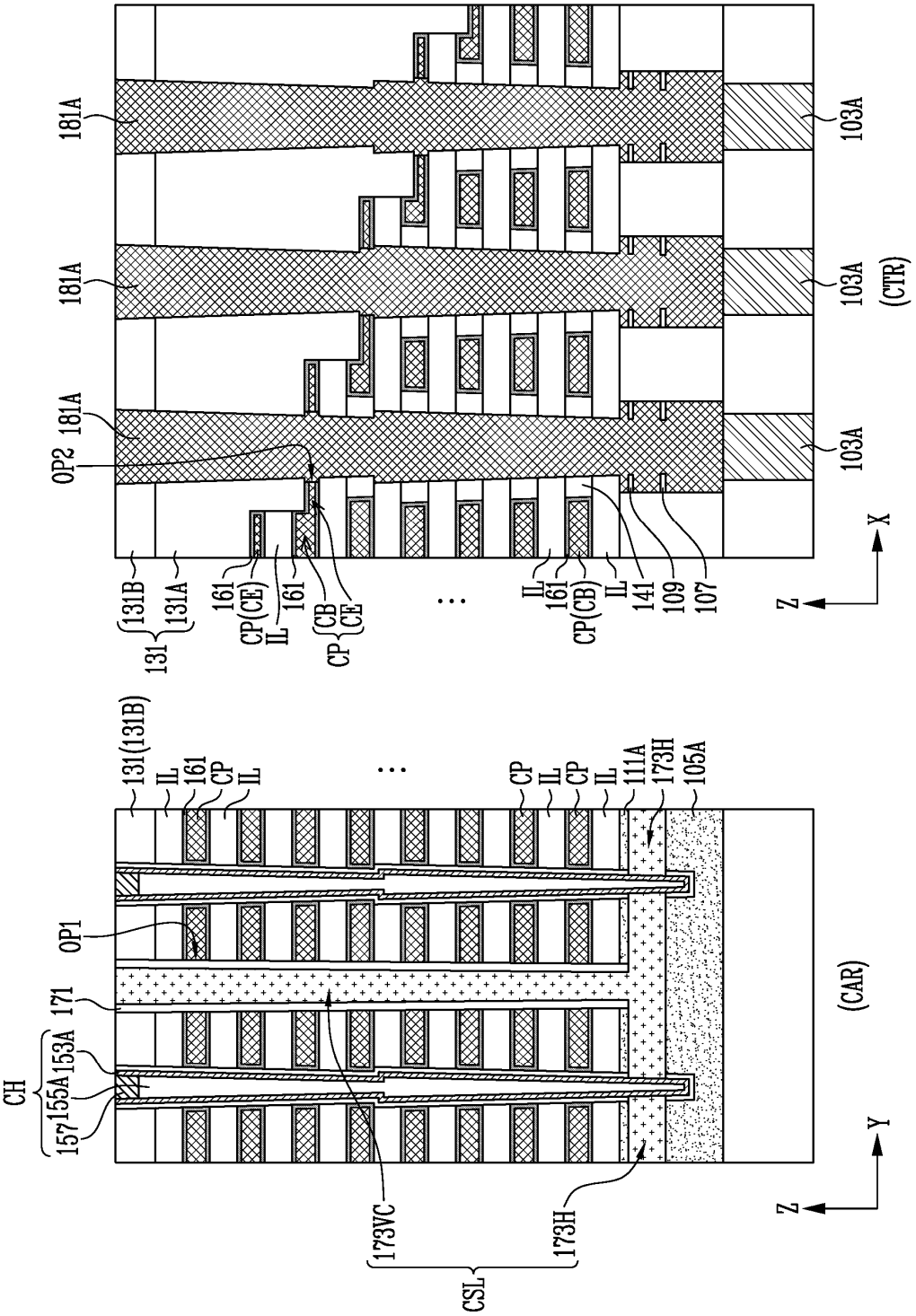

181A
181A
181A
OP2
103A
103A
103A
(CTR)
131B
131A
131
161
CP(CE)
IL
161
CB
CP
CE
IL
161
CP(CB)
IL
141
109
107
X
Z
131(131B)
IL
161
CP
IL
CP
IL
CP
IL
111A
173H
105A
OP1
171
CH
153A
155A
157
173VC
CSL
173H
(CAR)
Y
Z

FIG. 32B

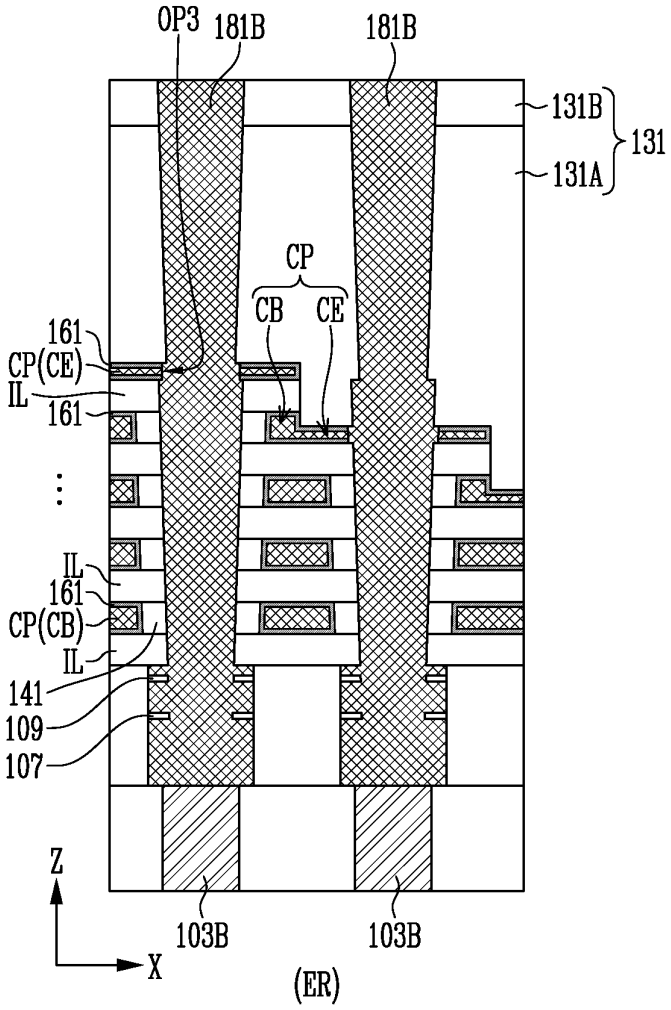

OP3
181B
181B
131B
131
131A
CP
CB
CE
161
CP(CE)
IL
161
IL
161
CP(CB)
IL
141
109
107
Z
X
103B
103B
(ER)

FIG. 33A

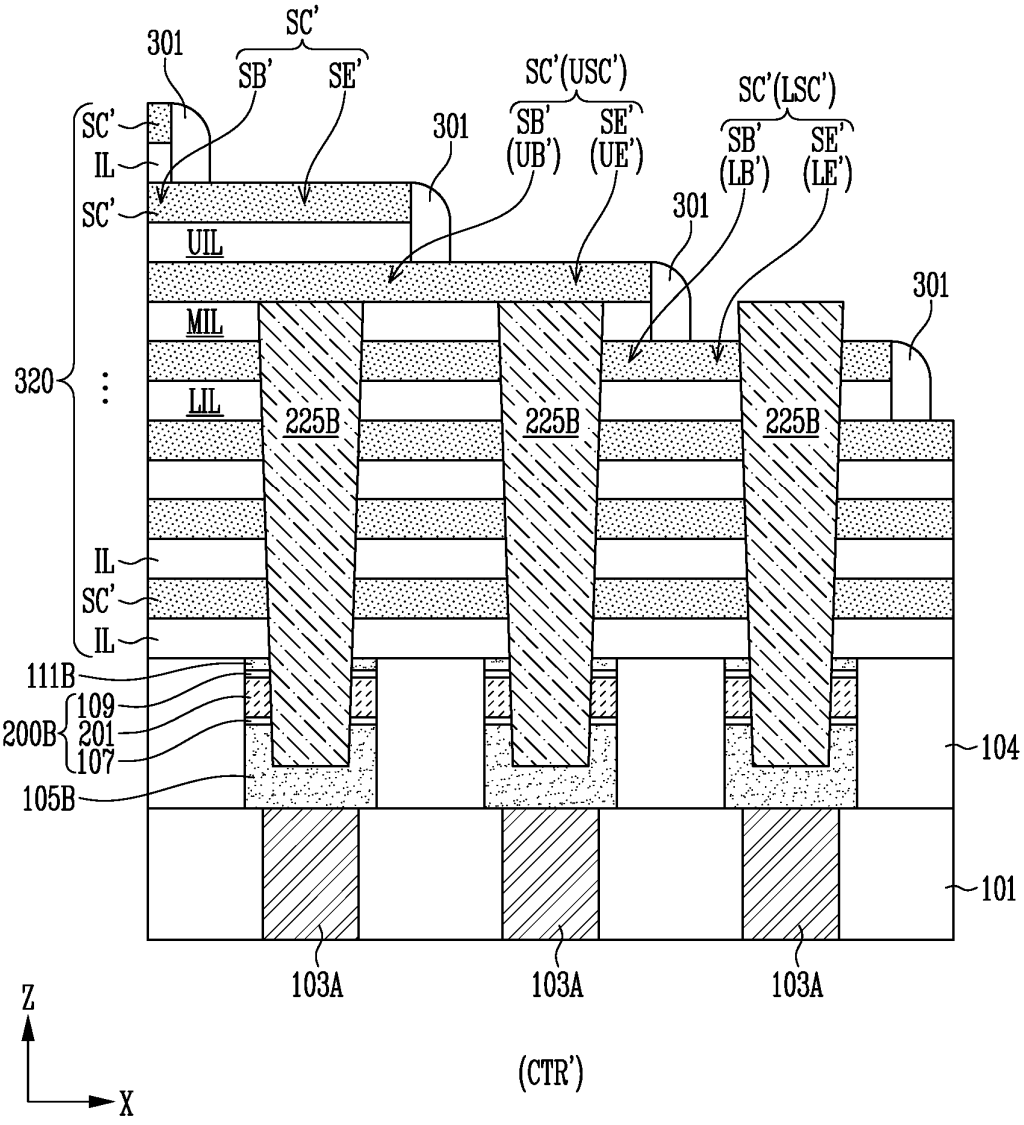

SC'
301
SB'
SE'
SC'(USC')
SB'
(UB')
SE'
(UE')
SC'(LSC')
SB'
(LB')
SE'
(LE')
301
301
301
SC'
IL
SC'
UIL
MIL
LIL
320
225B
225B
225B
IL
SC'
IL
111B
109
200B
201
107
105B
104
101
103A
103A
103A
Z
X
(CTR')

FIG. 33B

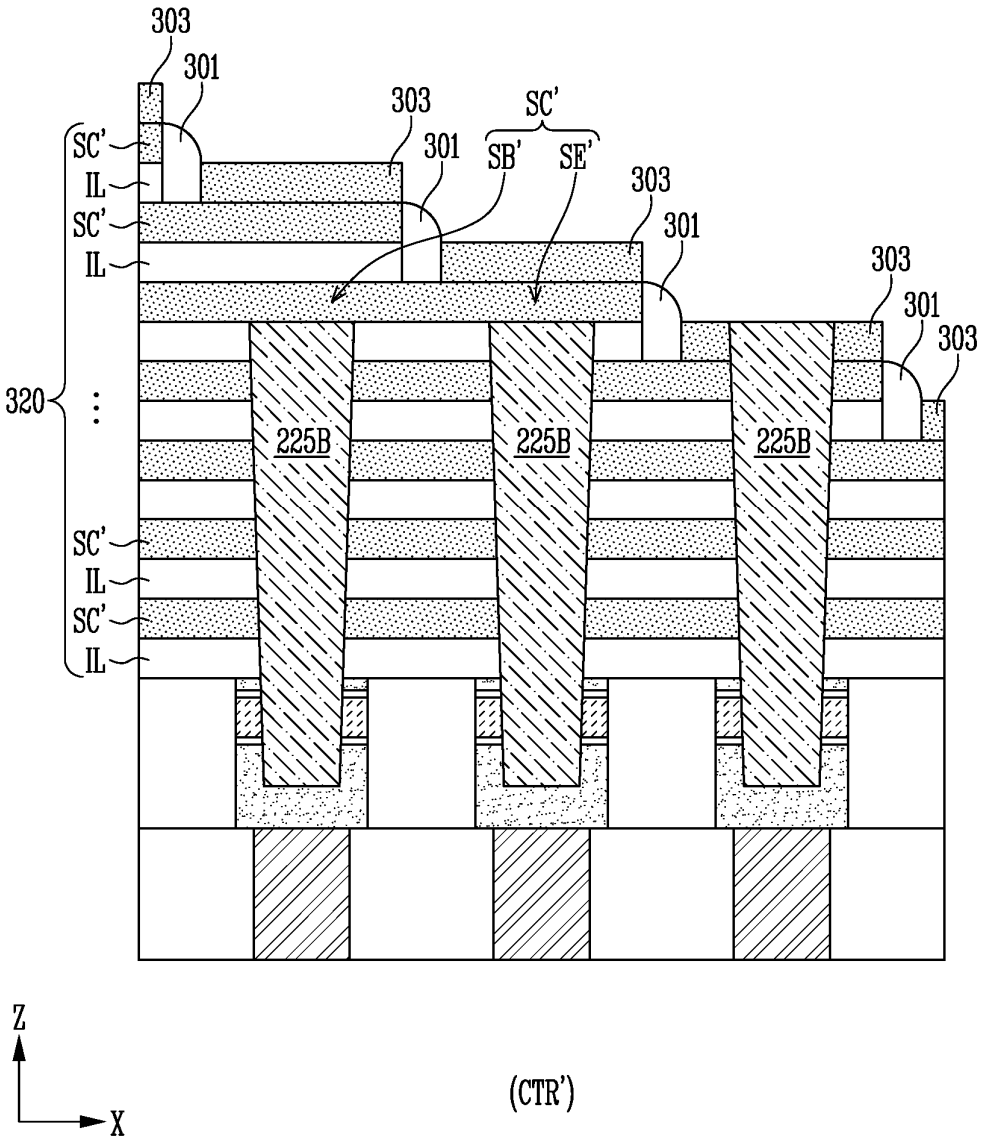

303
301
303
SC'
SC'
301
SB'
SE'
IL
303
SC'
301
IL
303
301
303
320
225B
225B
225B
SC'
IL
SC'
IL
Z
X
(CTR')

FIG. 33C

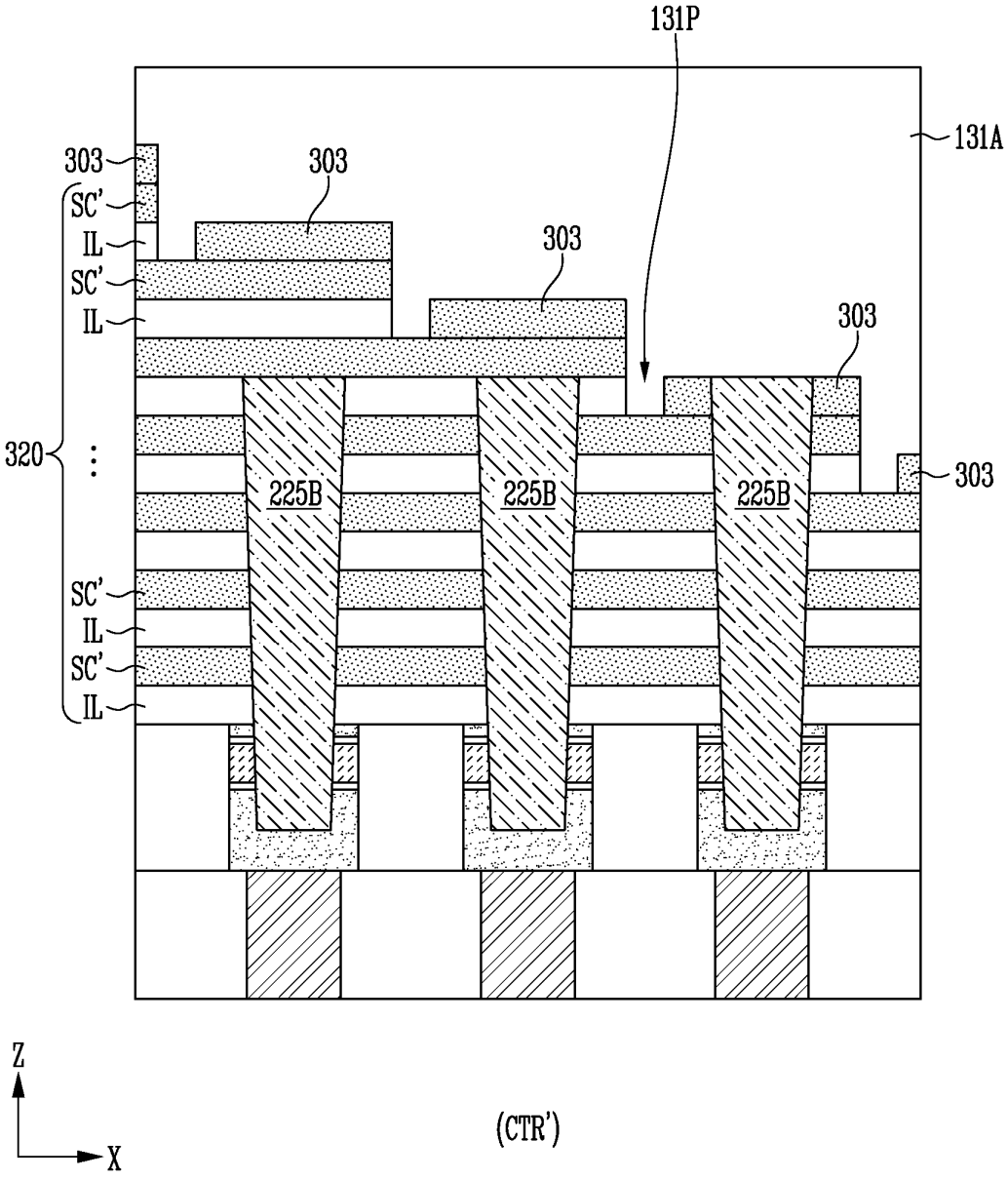

131P
131A
303
303
303
303
303
SC'
IL
SC'
IL
320
225B
225B
225B
303
SC'
IL
SC'
IL
Z
X
(CTR')

FIG. 33D

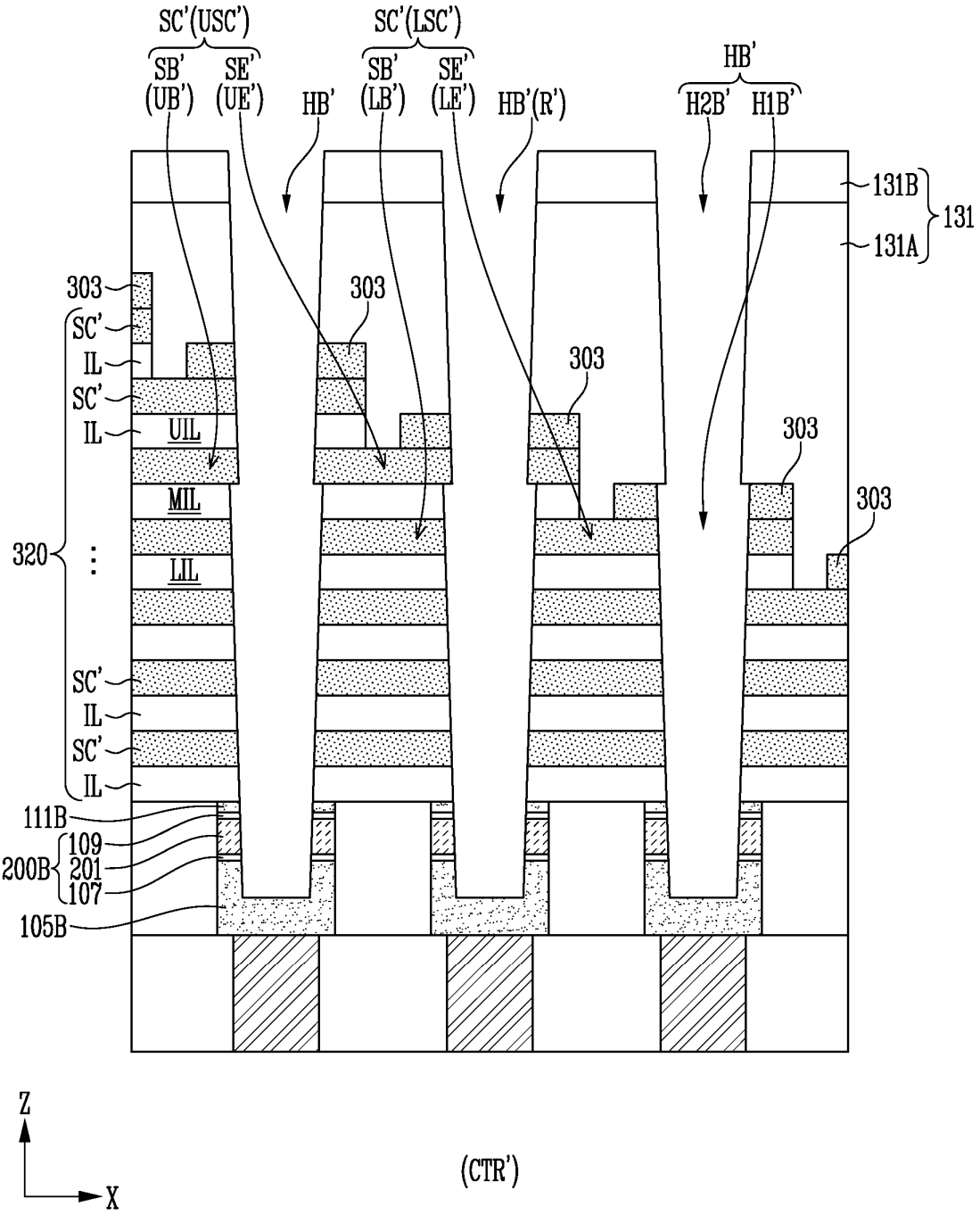

SC'(USC')
SB'
(UB')
SE'
(UE')
HB'
SC'(LSC')
SB'
(LB')
SE'
(LE')
HB'(R')
HB'
H2B'
H1B'
131B
131
131A
303
SC'
IL
SC'
IL
UIL
MIL
320
LIL
SC'
IL
SC'
IL
111B
200B
109
201
107
105B
Z
X
(CTR')

FIG. 33E

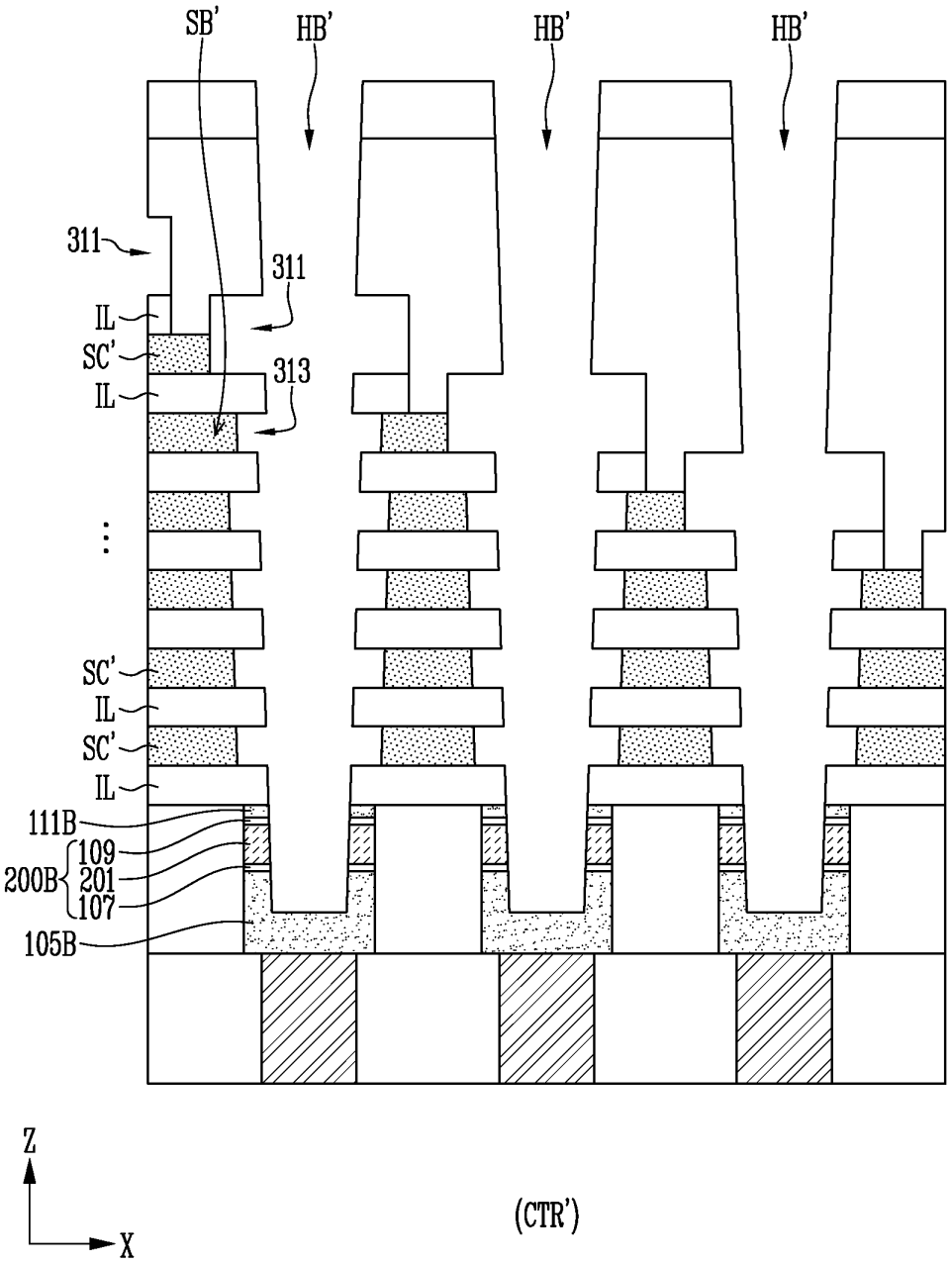

SB'
HB'
HB'
HB'
311
311
IL
SC'
313
IL
SC'
IL
SC'
IL
111B
109
200B
201
107
105B
Z
X
(CTR')

FIG. 33F

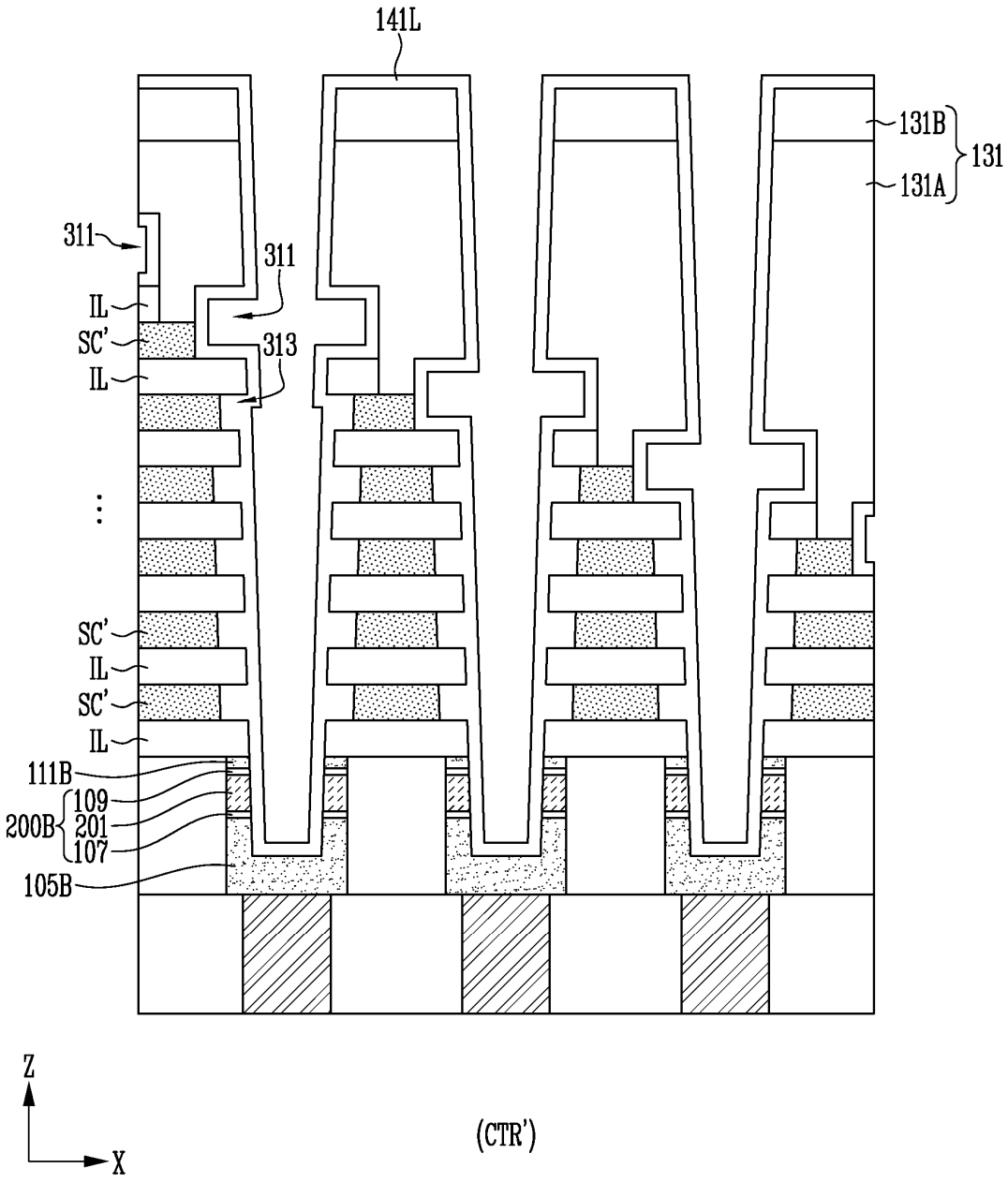

141L
131B
131
131A
311
311
IL
SC'
313
IL
SC'
IL
SC'
IL
111B
109
200B
201
107
105B
Z
X
(CTR')

FIG. 33G

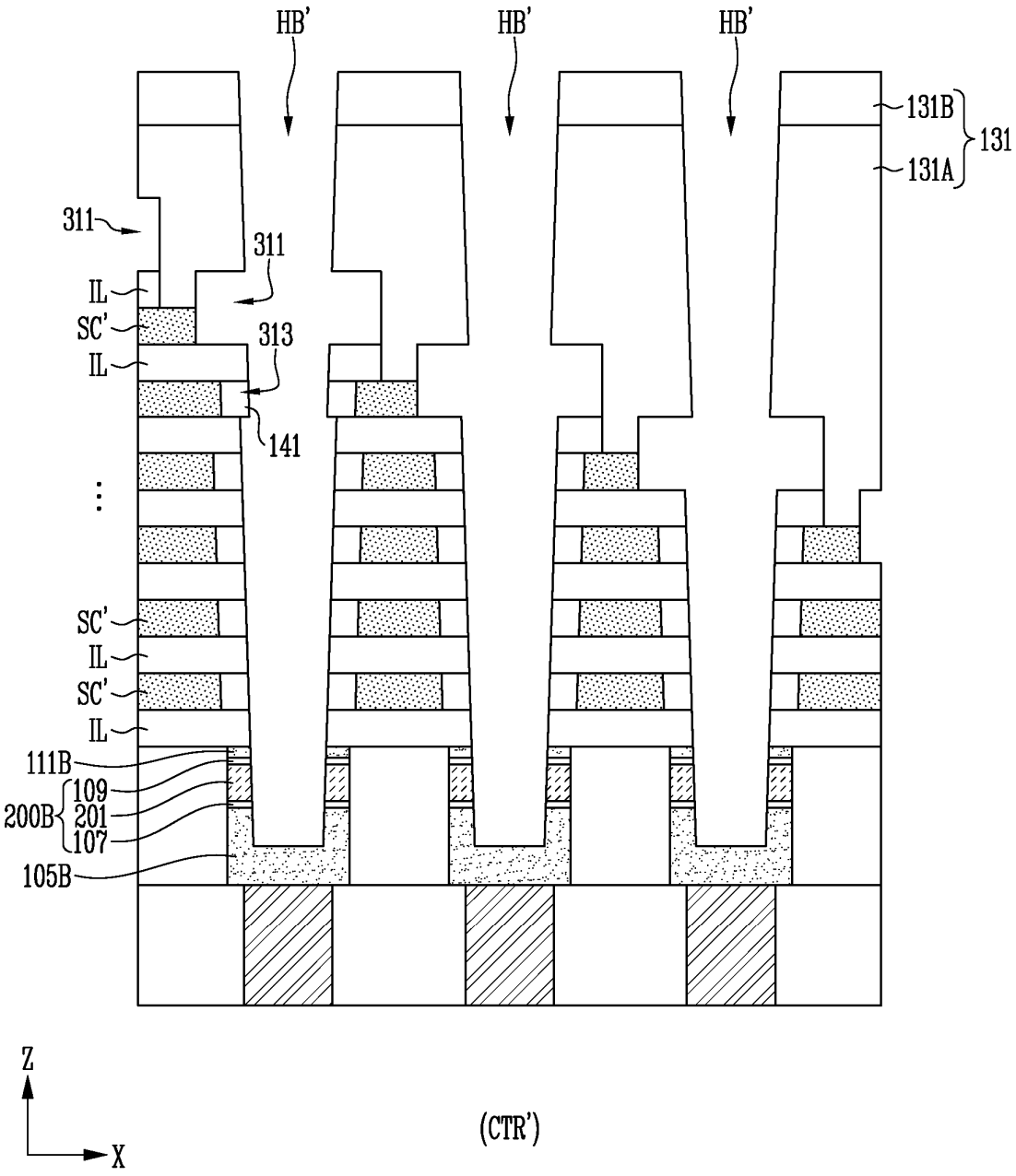

HB'
HB'
HB'
131B
131
131A
311
311
IL
SC'
313
IL
141
SC'
IL
SC'
IL
111B
109
200B
201
107
105B
Z
X
(CTR')

FIG. 33H

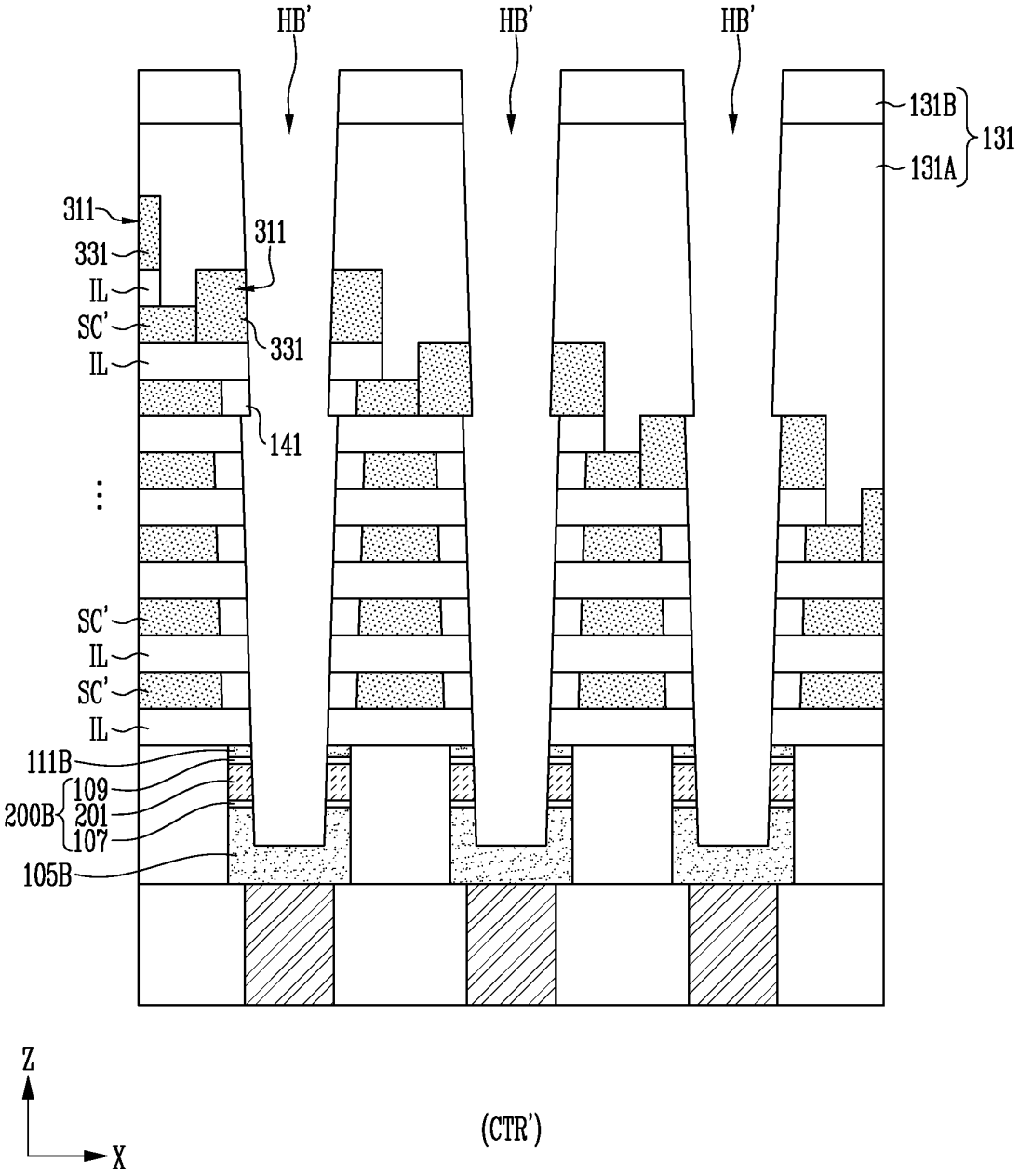

HB'
HB'
HB'
131B
131
131A
311
311
331
IL
SC'
331
IL
141
SC'
IL
SC'
IL
111B
109
200B
201
107
105B
Z
X
(CTR')

FIG. 33I

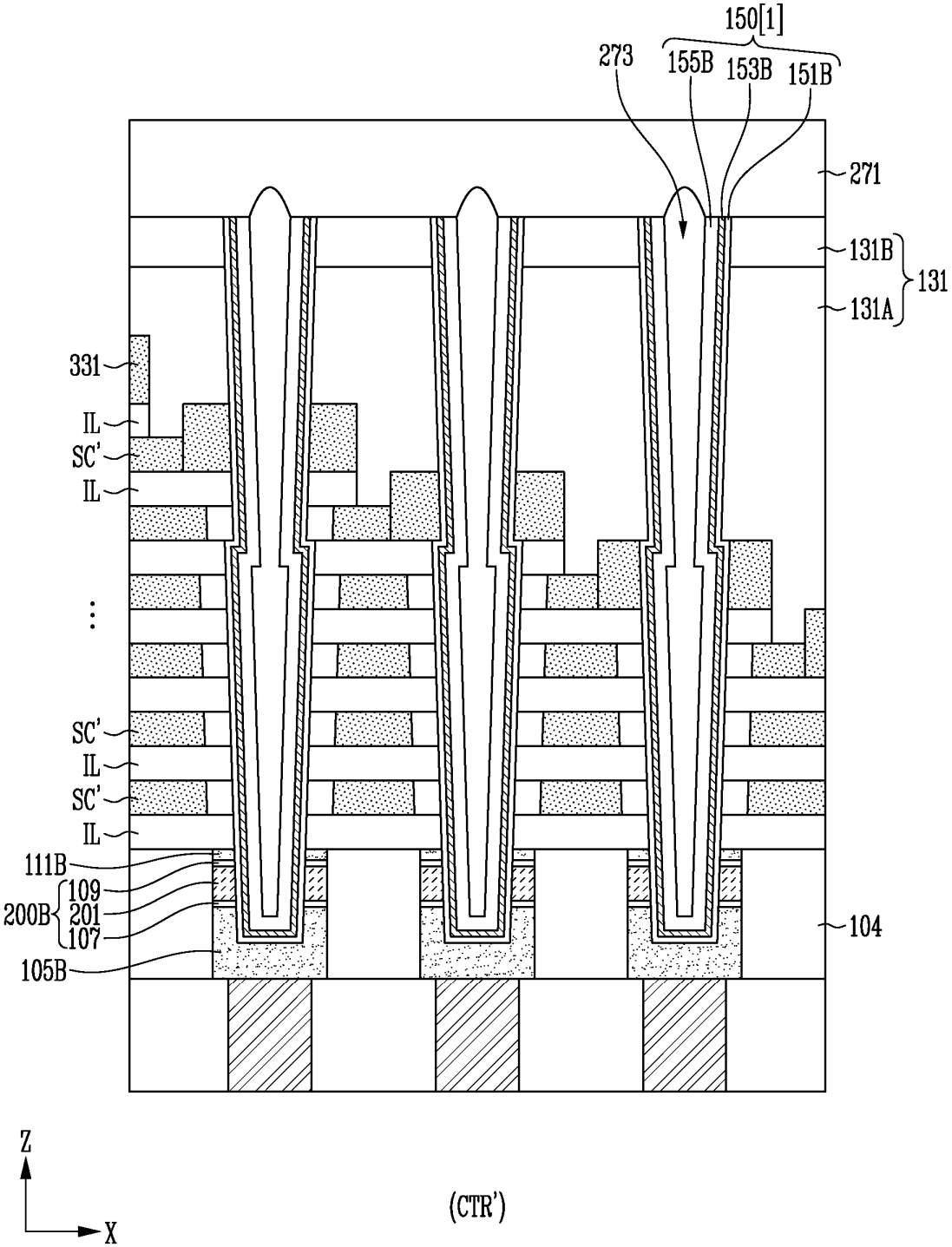

150[1]
273
155B
153B
151B
271
131B
131
131A
331
IL
SC'
IL
SC'
IL
SC'
IL
111B
109
200B
201
107
105B
104
Z
X
(CTR')

FIG. 33J

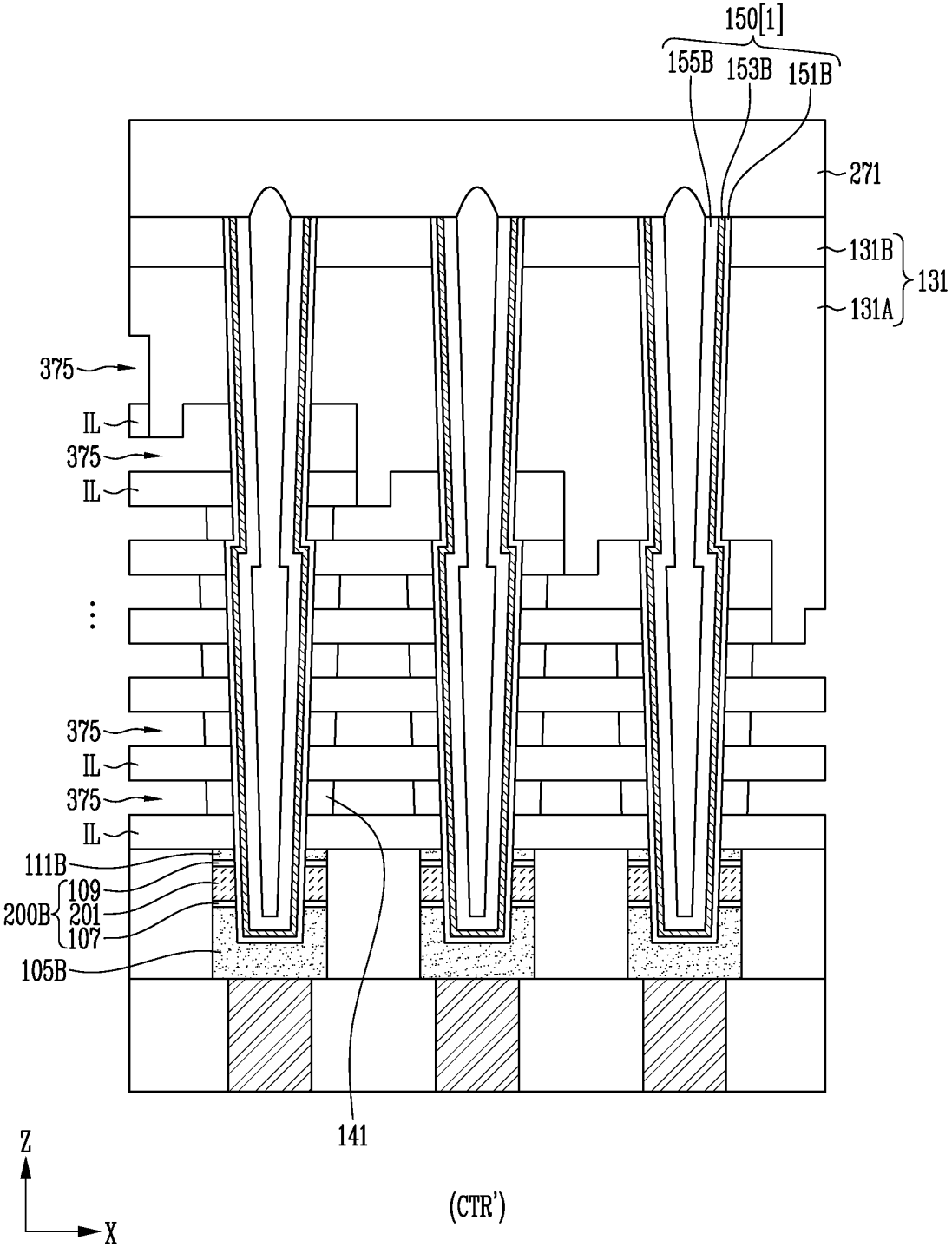

150[1]
155B
153B
151B
271
131B
131
131A
375
IL
375
IL
375
IL
375
IL
111B
109
200B
201
107
105B
141
Z
X
(CTR')

FIG. 34A

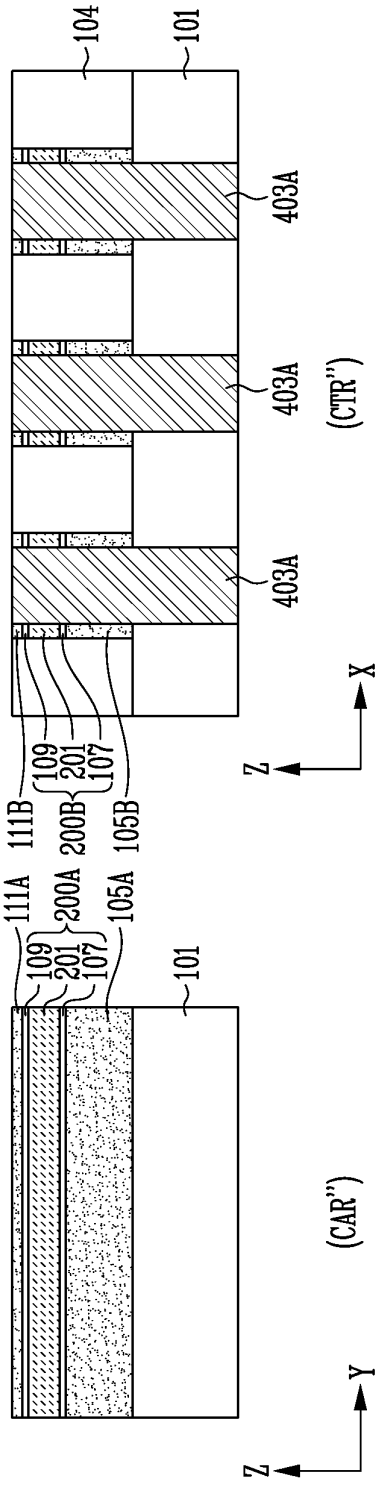

104
101
403A
403A
403A
(CTR")
111B
109
201
107
200B
105B
111A
200A
105A
101
Z
X
Z
Y
(CAR")

FIG. 34B

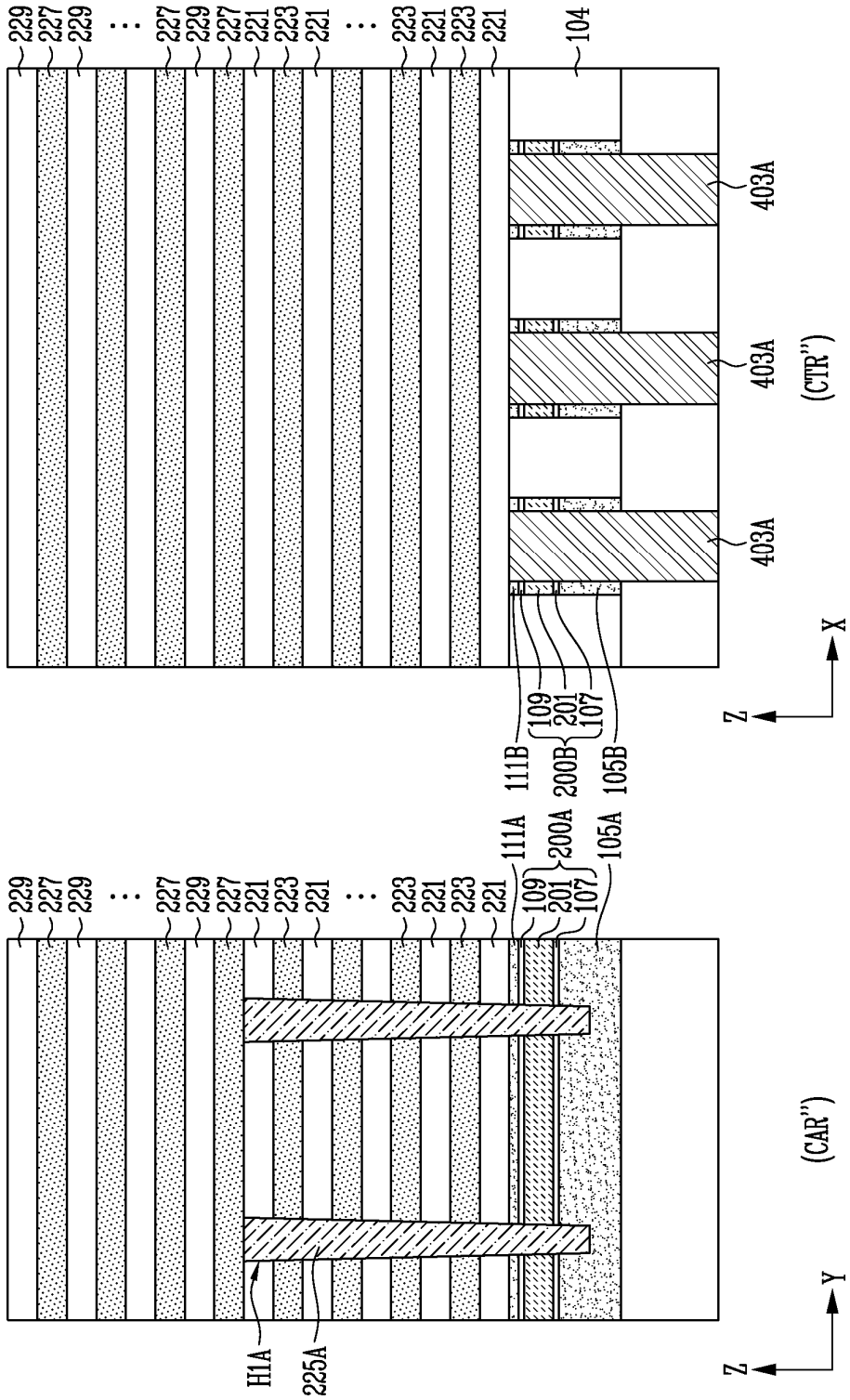

229
227
229
227
229
227
221
223
221
223
221
223
221
104
403A
403A
403A
(CTR'')
111B
109
200B
201
107
105B
111A
200A
105A
H1A
225A
(CAR'')
Z
X
Y

FIG. 34C

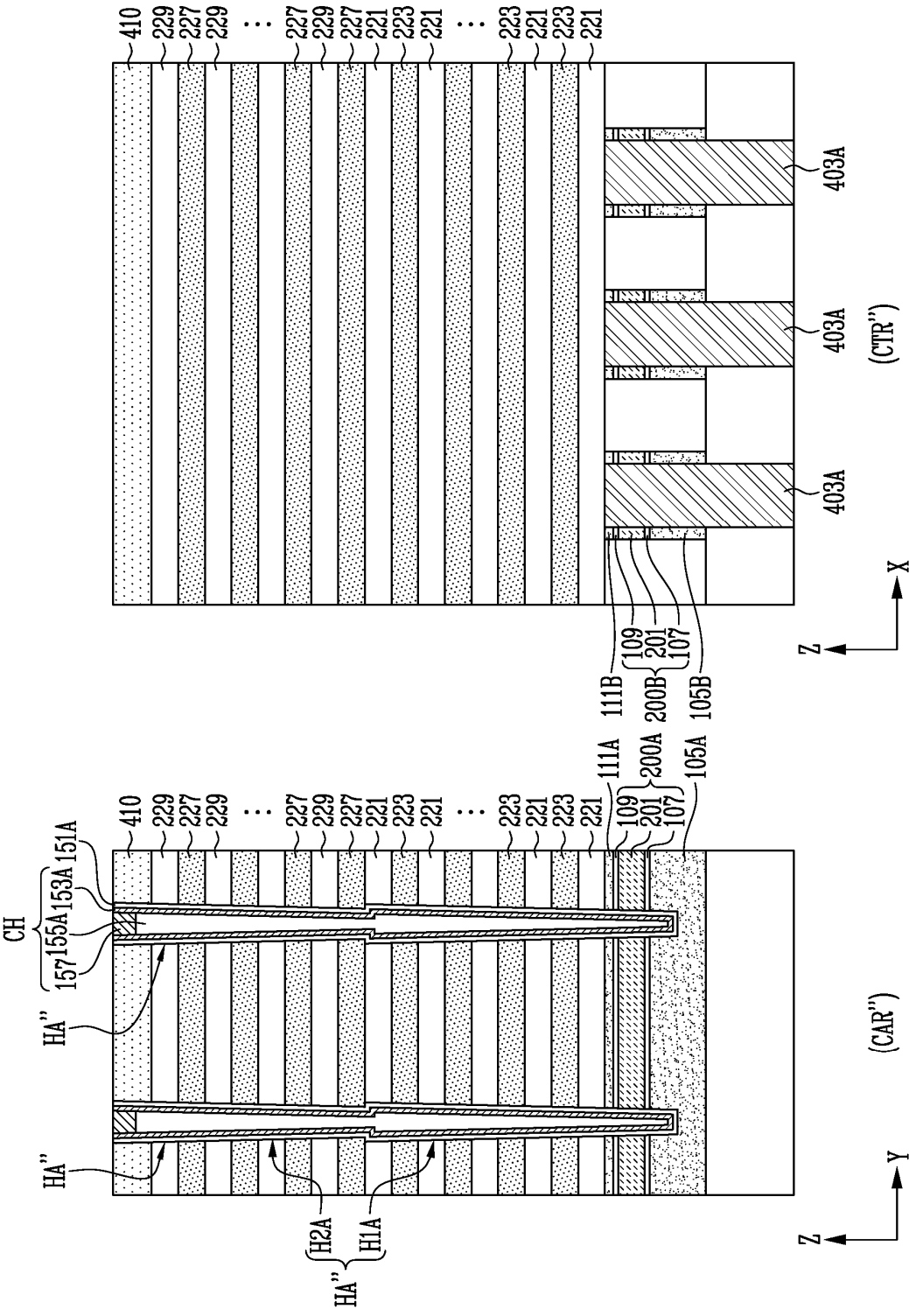

410
229
227
229
227
229
227
221
223
221
223
221
223
221
403A
403A
403A
(CTR'')
X
Z
111B
109
201
200B
107
105B
111A
200A
105A
151A
153A
155A
157
CH
HA''
HA''
H2A
H1A
HA''
(CAR'')
Y
Z

FIG. 34D

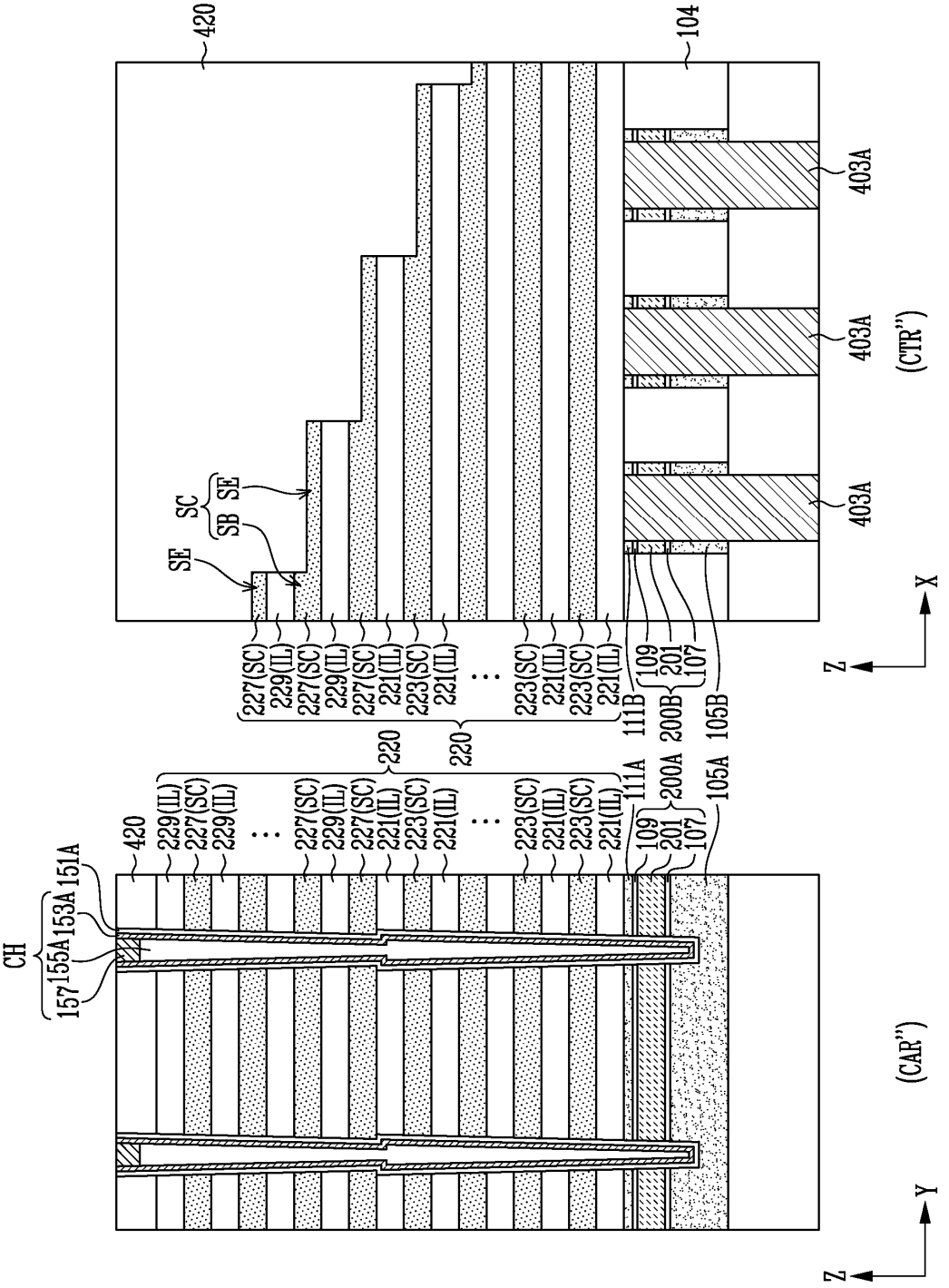

420
104
403A
403A
403A
(CTR")
SE
SB
SC
SE
227(SC)
229(IL)
227(SC)
229(IL)
227(SC)
221(IL)
223(SC)
221(IL)
223(SC)
221(IL)
223(SC)
221(IL)
111B
109
200B
201
107
105B
220
220
Z
X
CH
157
155A
153A
151A
420
229(IL)
227(SC)
229(IL)
227(SC)
229(IL)
227(SC)
221(IL)
223(SC)
221(IL)
223(SC)
221(IL)
223(SC)
221(IL)
111A
109
200A
201
107
105A
(CAR")
Z
Y

FIG. 34E

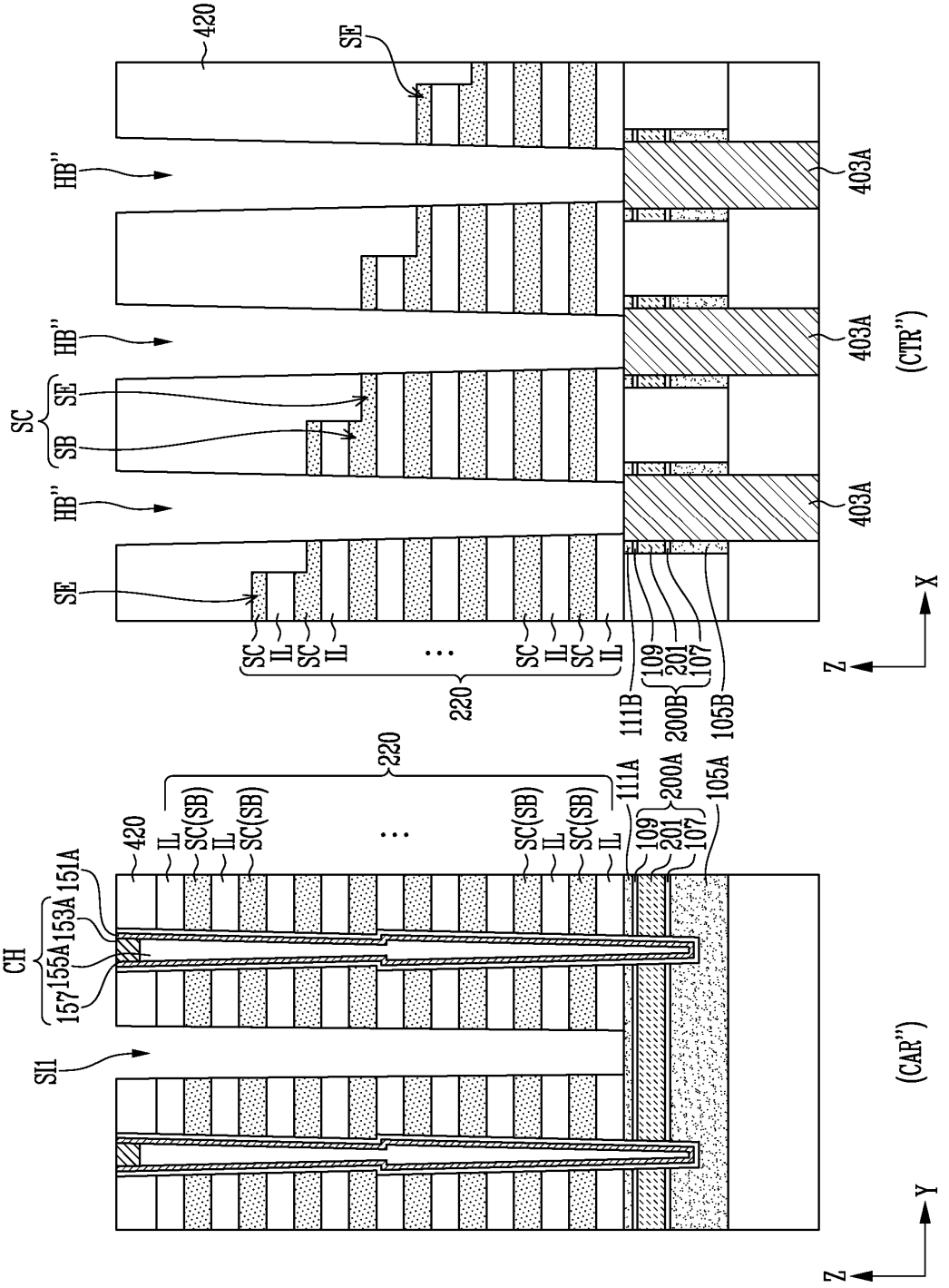

420
SE
HB"
403A
SC
SB
(CTR")
220
111B
200B
105B
109
201
107
X
Z
111A
200A
105A
SC(SB)
IL
CH
151A
153A
155A
157
SI1
(CAR")
Y

FIG. 34F

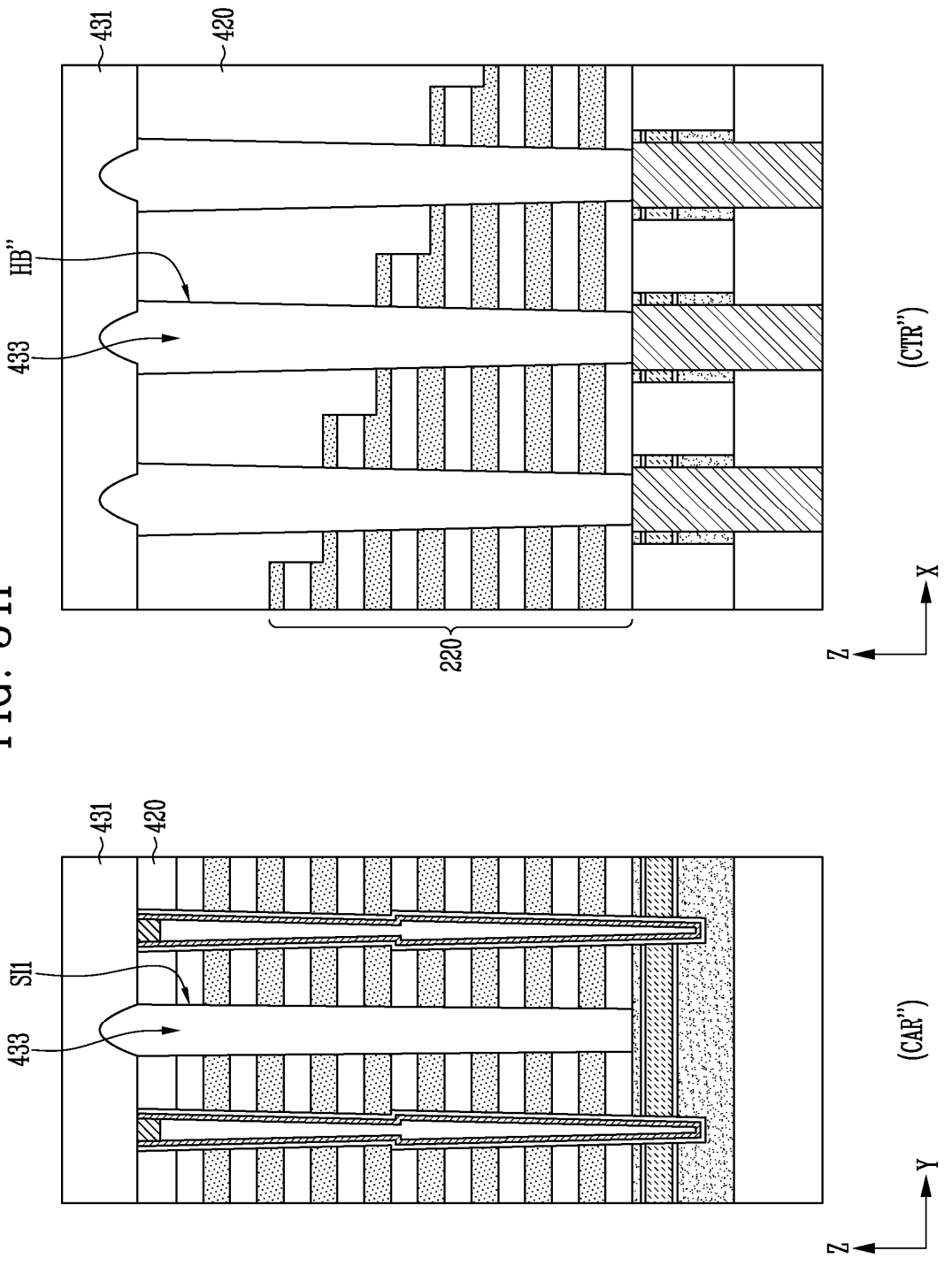


FIG. 34G

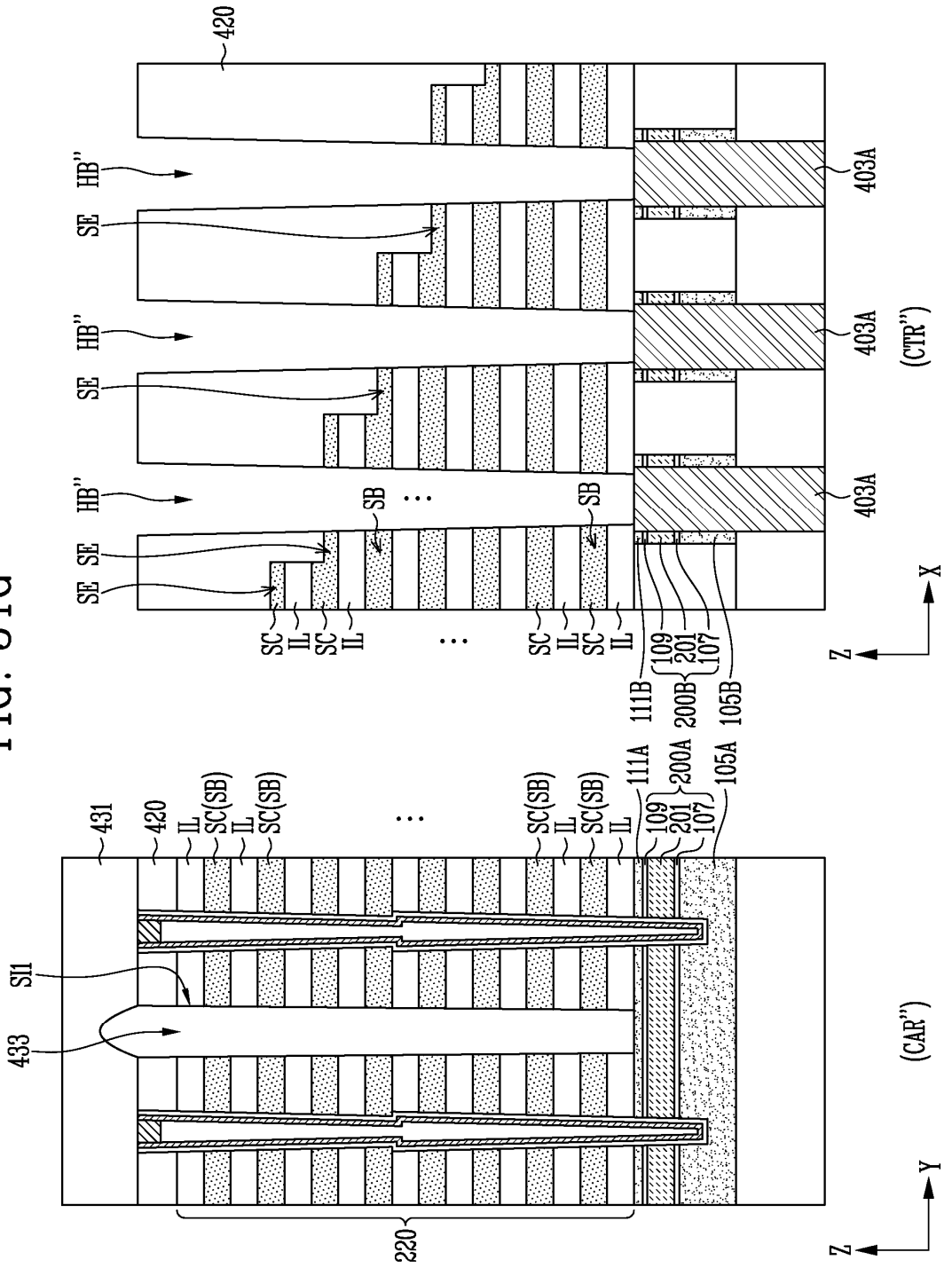

420
HB''
SE
403A
(CTR'')
SB
SC
IL
111B
109
201
200B
107
105B
Z
X
431
SC(SB)
111A
200A
105A
SI1
433
220
(CAR'')
Y

FIG. 34H

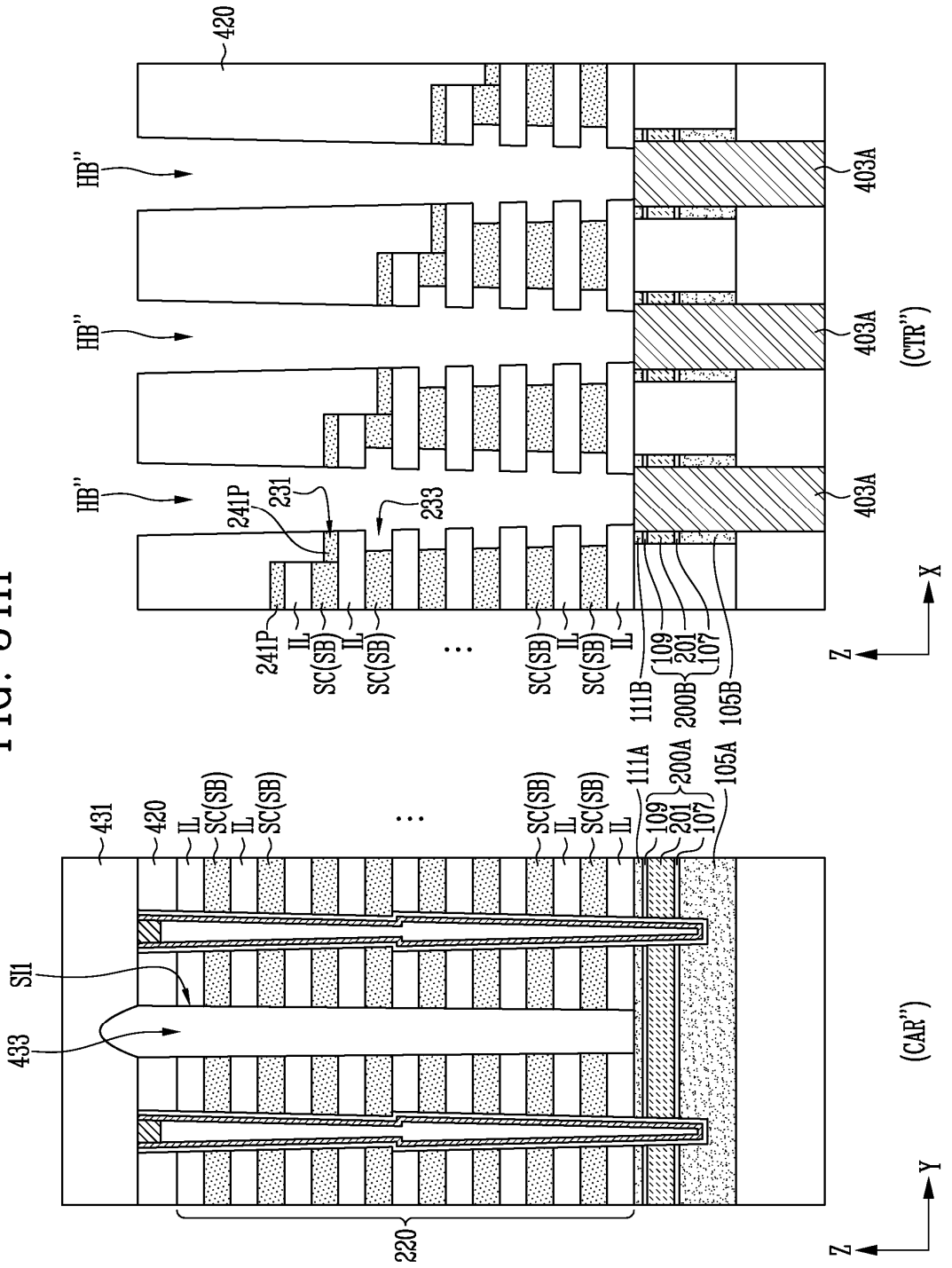

420
HB''
403A
(CTR'')
241P
231
233
IL
SC(SB)
111B
109
201
107
200B
105B
111A
200A
105A
X
Z
431
SI1
433
220
(CAR'')
Y

FIG. 34I

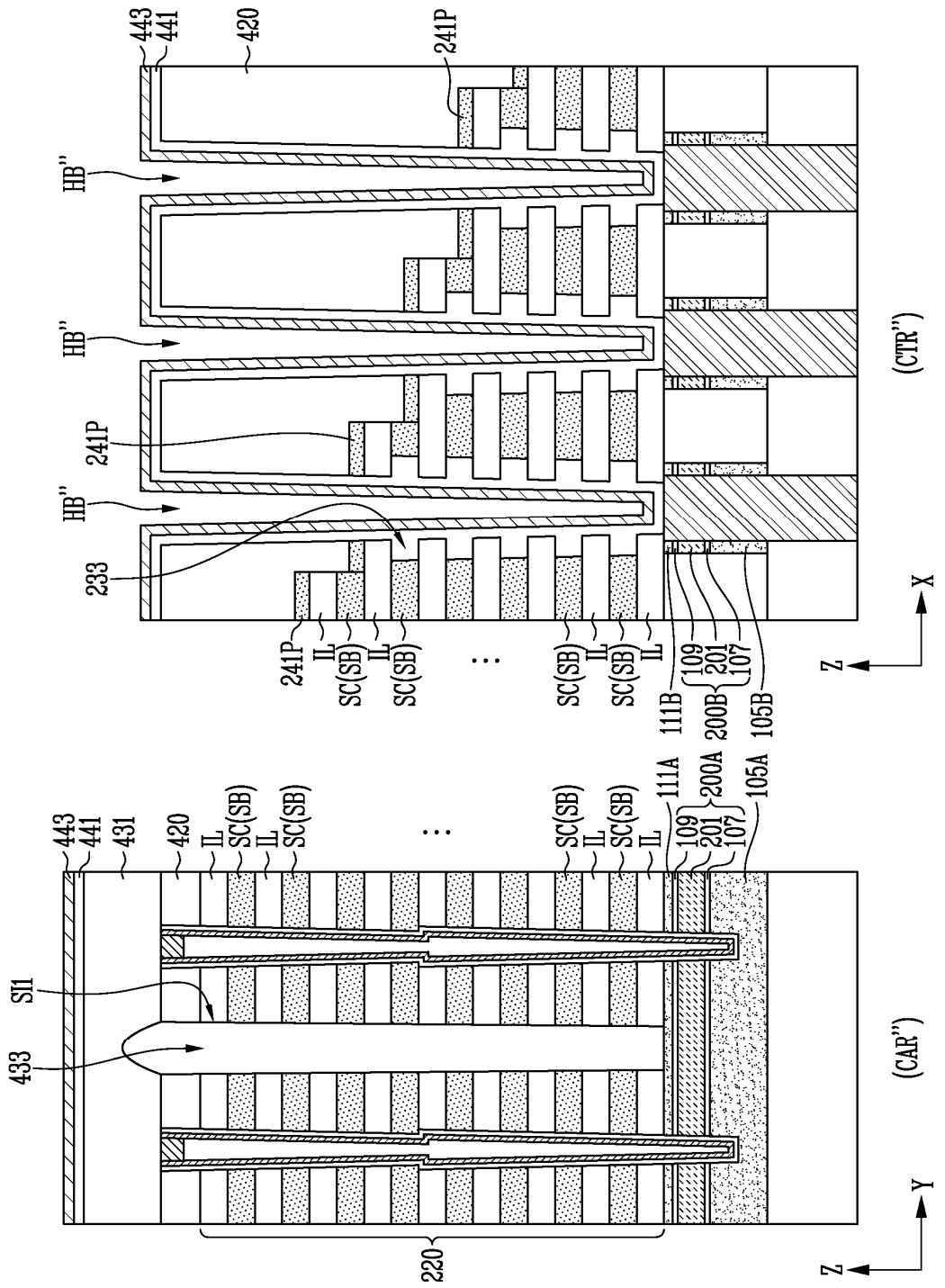

443
441
420
241P
HB''
HB''
HB''
241P
233
241P
IL
SC(SB)
IL
SC(SB)
SC(SB)
IL
SC(SB)
IL
111B
109
201
107
200B
105B
(CTR'')
Z
X
443
441
431
420
IL
SC(SB)
IL
SC(SB)
SC(SB)
IL
SC(SB)
IL
111A
109
201
107
200A
105A
SI1
433
220
(CAR'')
Z
Y

FIG. 34J

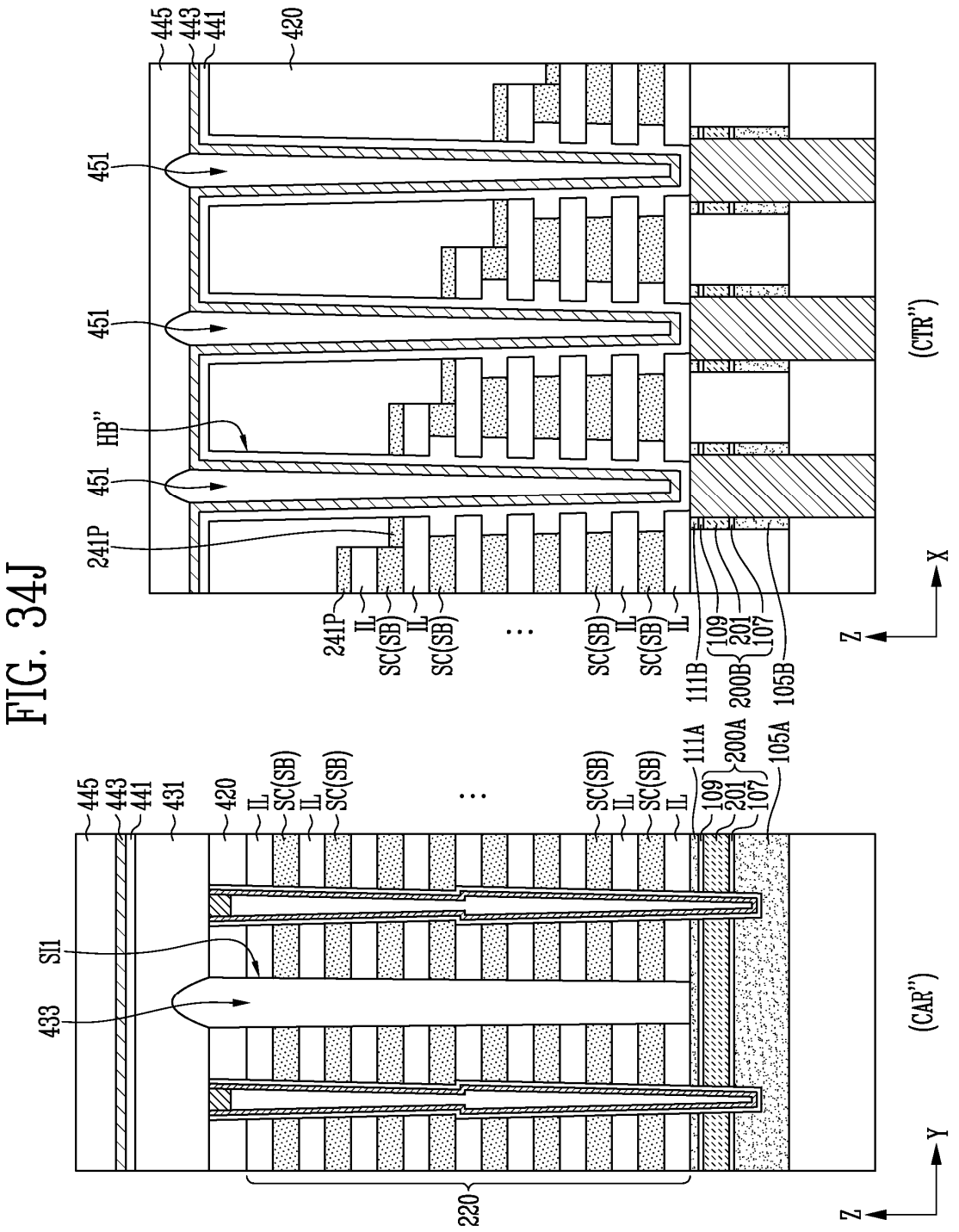

445
443
441
420
451
451
HB''
451
241P
241P
IL
SC(SB)
IL
SC(SB)
SC(SB)
IL
SC(SB)
IL
111B
109
201
107
200B
105B
(CTR'')
Z
X
445
443
441
431
420
IL
SC(SB)
IL
SC(SB)
SC(SB)
IL
SC(SB)
IL
111A
109
201
107
200A
105A
SI1
433
220
(CAR'')
Z
Y

FIG. 34K

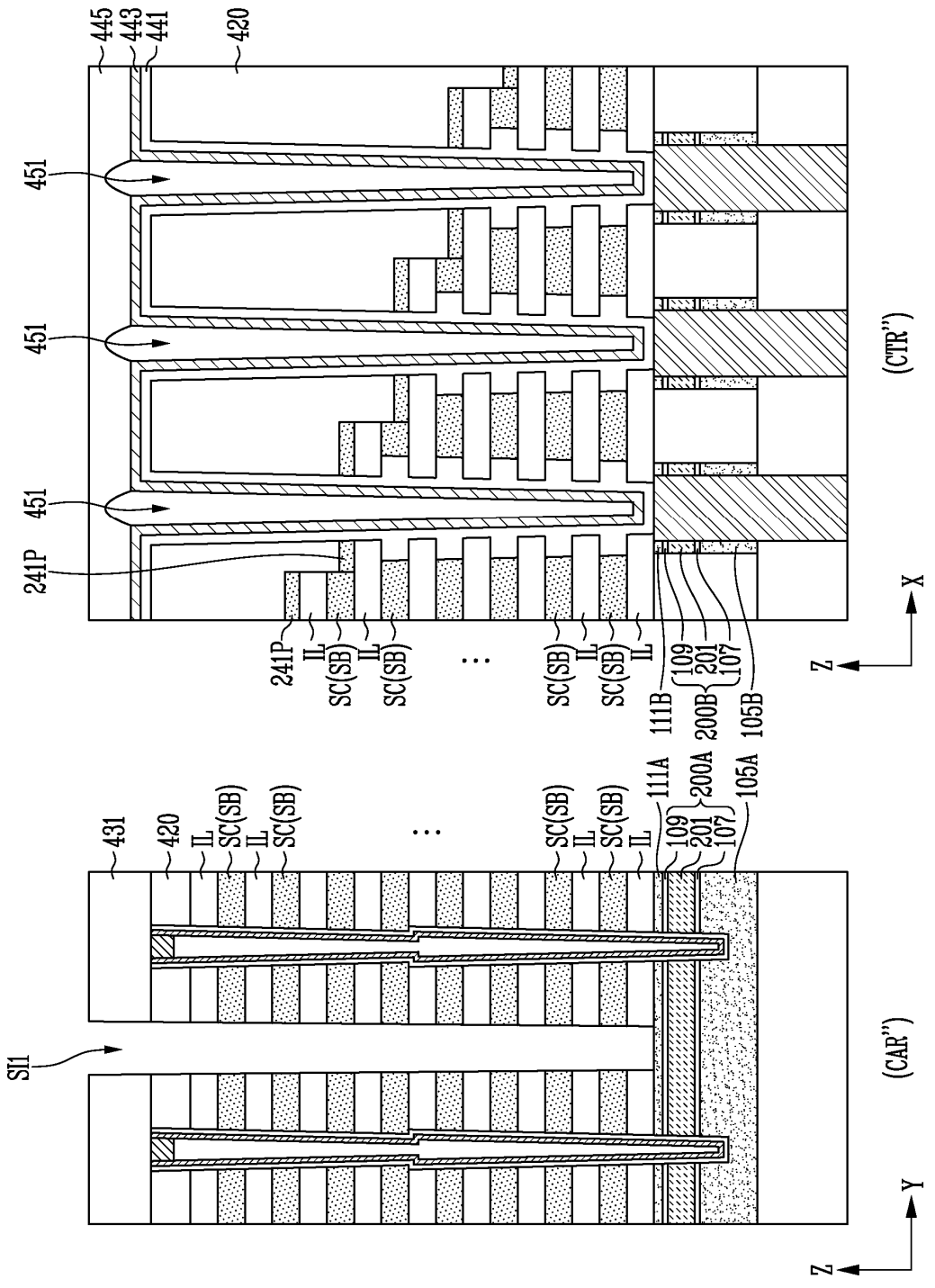

445
443
441
420
451
451
451
241P
241P
IL
SC(SB)
IL
SC(SB)
SC(SB)
IL
SC(SB)
IL
111B
109
201
107
200B
105B
(CTR")
Z
X
431
420
IL
SC(SB)
IL
SC(SB)
SC(SB)
IL
SC(SB)
IL
111A
109
201
107
200A
105A
SI1
(CAR")
Z
Y

FIG. 34L

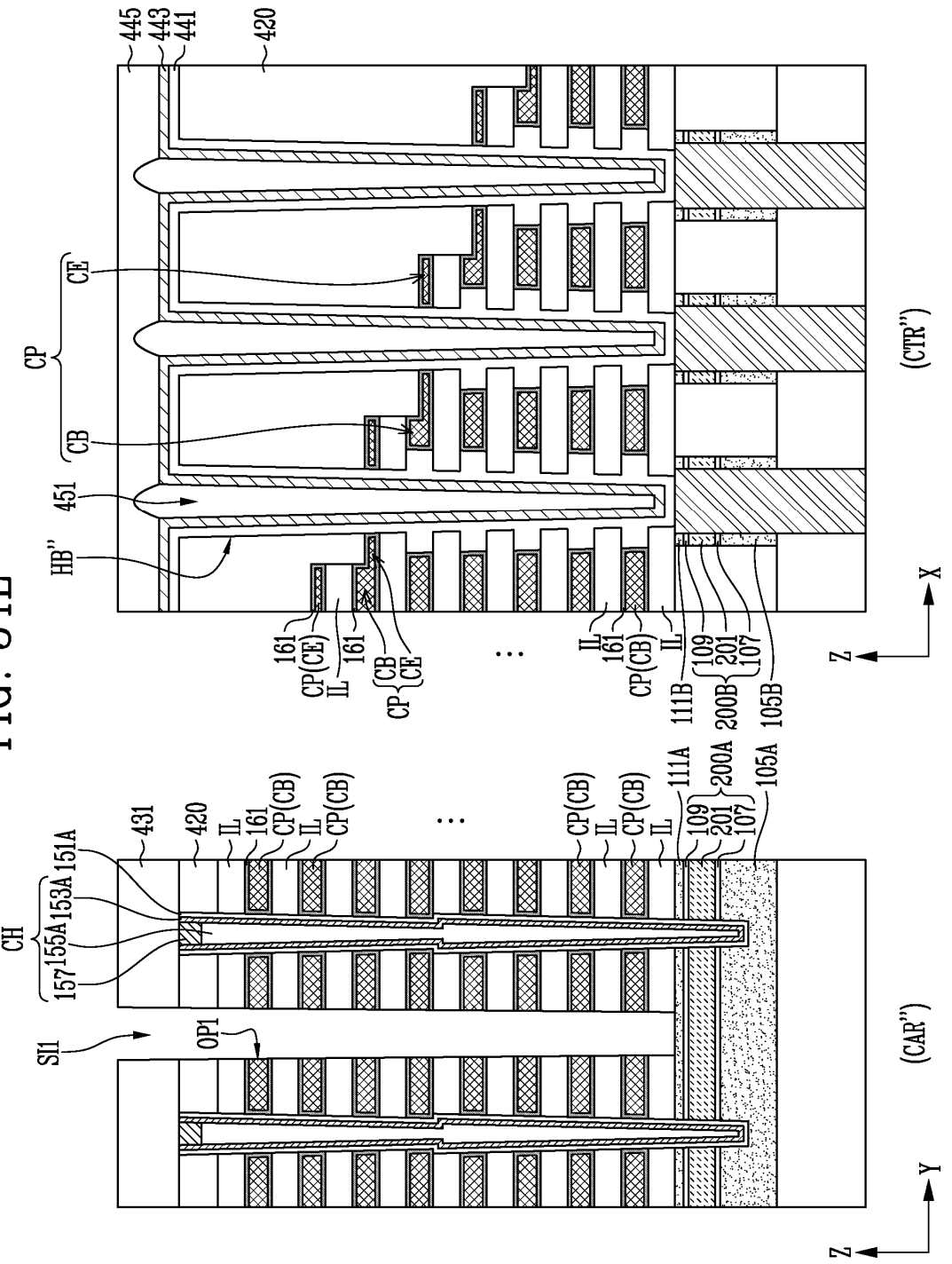

445
443
441
420
CP
CE
CB
451
HB''
161
CP(CE)
IL
161
CB
CE
CP
IL
161
CP(CB)
IL
111B
109
201
107
200B
105B
(CTR'')
Z
X
431
420
IL
161
CP(CB)
IL
CP(CB)
CP(CB)
IL
CP(CB)
IL
111A
109
201
107
200A
105A
CH
157
155A
153A
151A
SI1
OP1
(CAR'')
Z
Y

FIG. 34M

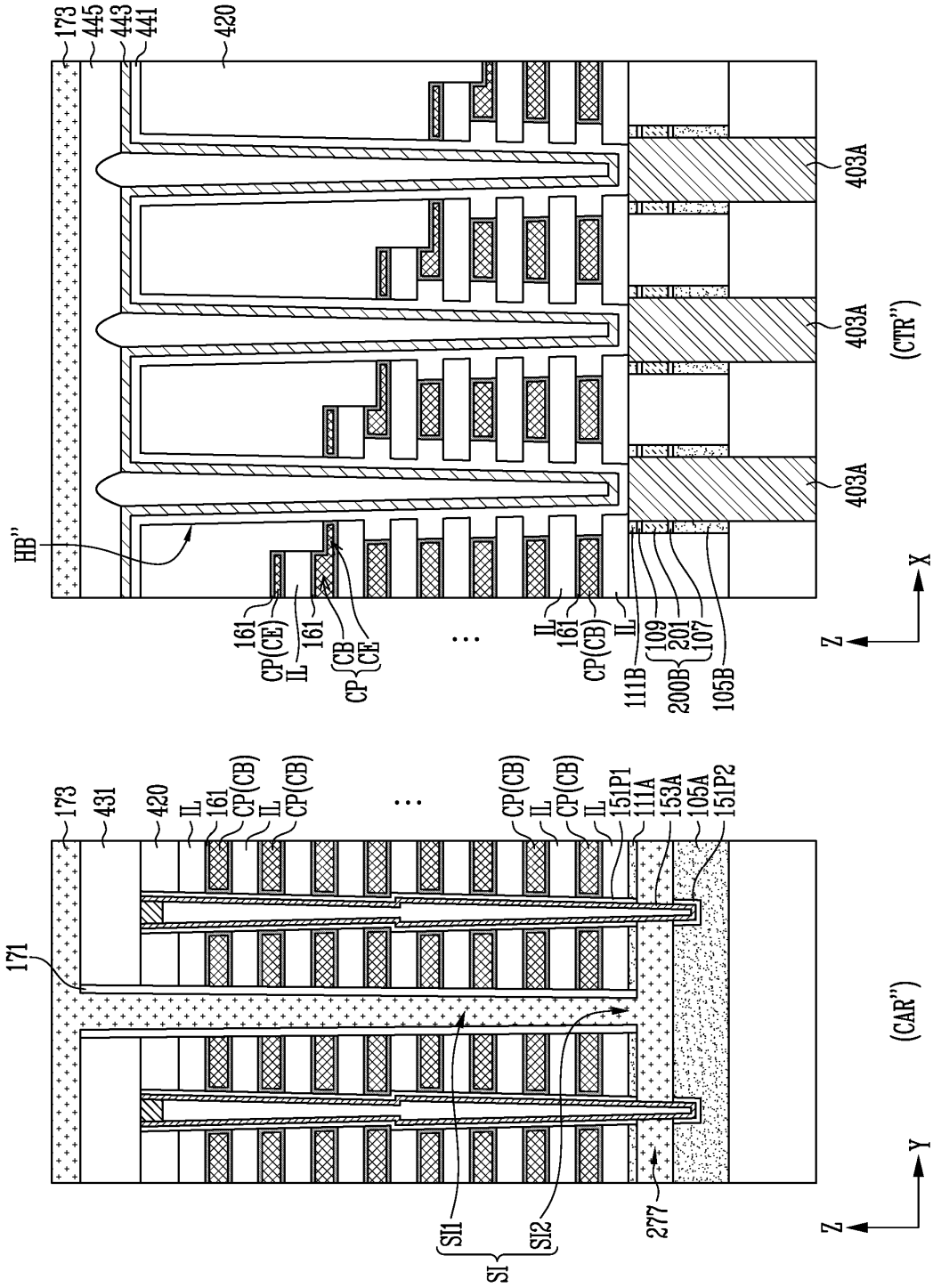

173
445
443
441
420
403A
403A
403A
(CTR")
HB"
161
CP(CE)
IL
161
CB
CP
CE
IL
161
CP(CB)
IL
111B
109
200B
201
107
105B
Z
X
173
431
420
IL
161
CP(CB)
IL
CP(CB)
CP(CB)
IL
CP(CB)
IL
151P1
111A
153A
105A
151P2
171
SI1
SI2
SI
277
(CAR")
Z
Y

FIG. 34N

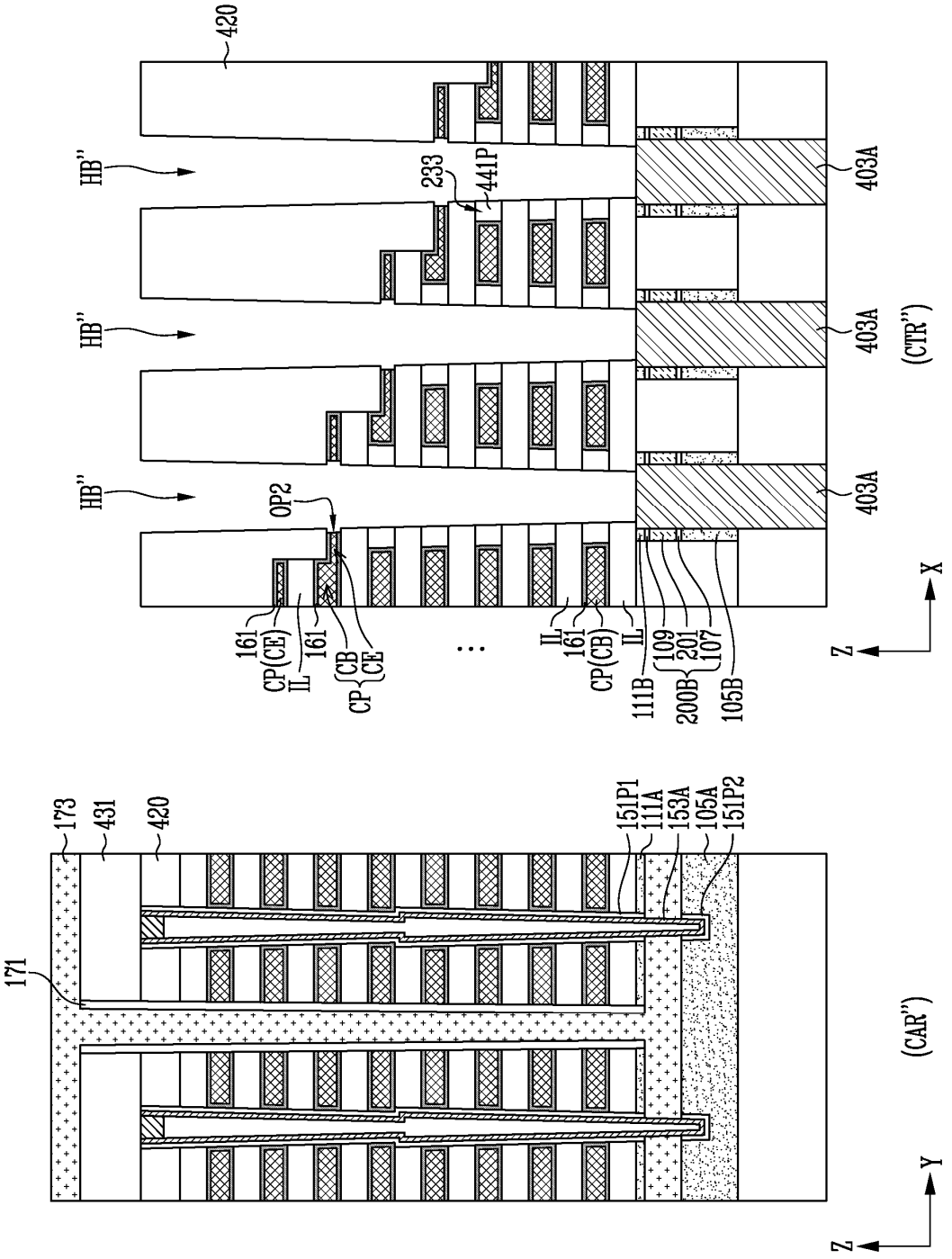

420
HB''
233
441P
403A
OP2
161
CP(CE)
IL
CB
CE
CP(CB)
111B
109
201
200B
107
105B
(CTR'')
X
Z
171
173
431
151P1
111A
153A
105A
151P2
(CAR'')
Y

FIG. 34O

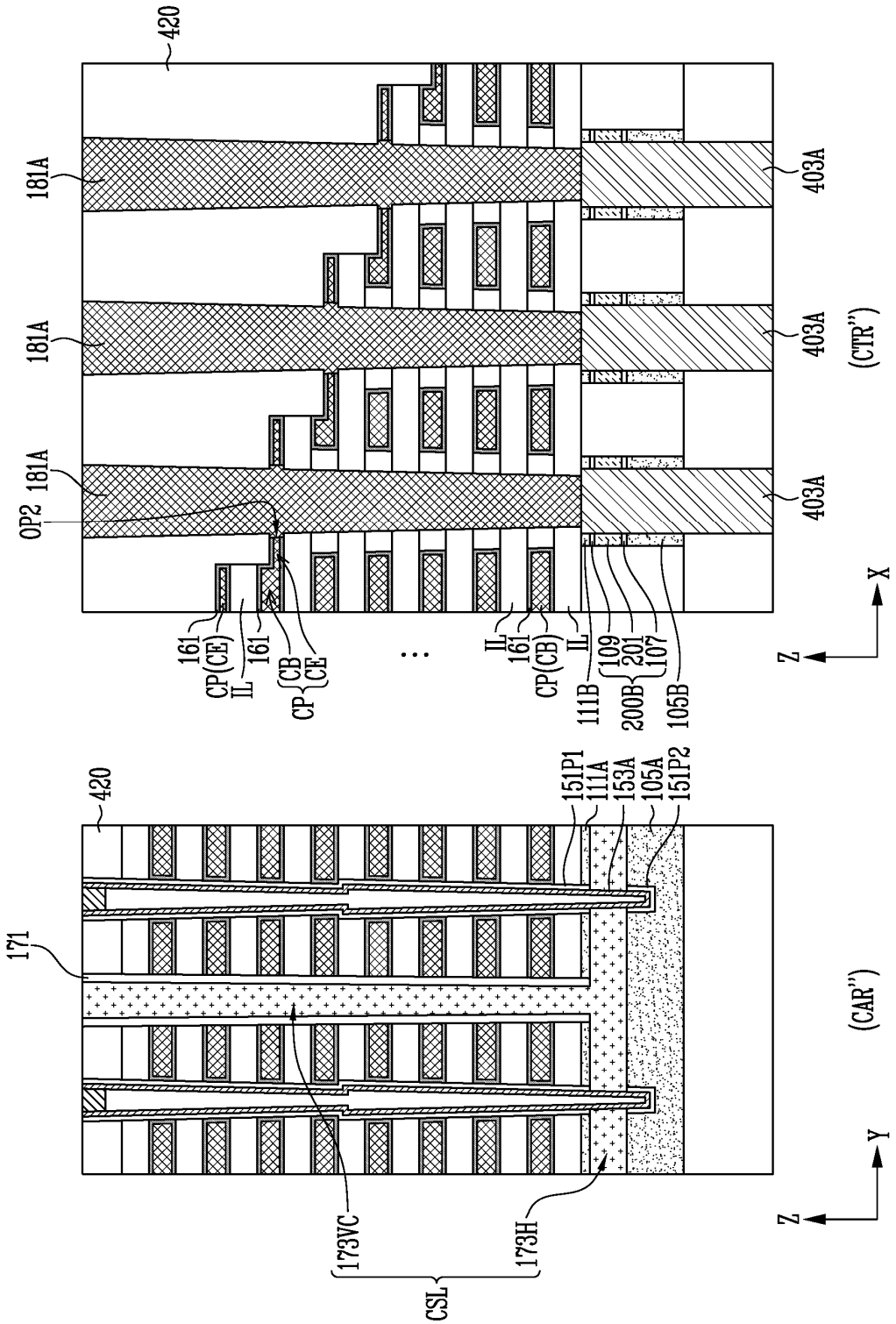

420
181A
181A
181A
OP2
403A
403A
403A
(CTR'')
161
CP(CE)
IL
161
CB
CP
CE
IL
161
CP(CB)
IL
111B
109
200B
201
107
105B
X
Z
420
151P1
111A
153A
105A
151P2
171
173VC
173H
CSL
(CAR'')
Y
Z

FIG. 35

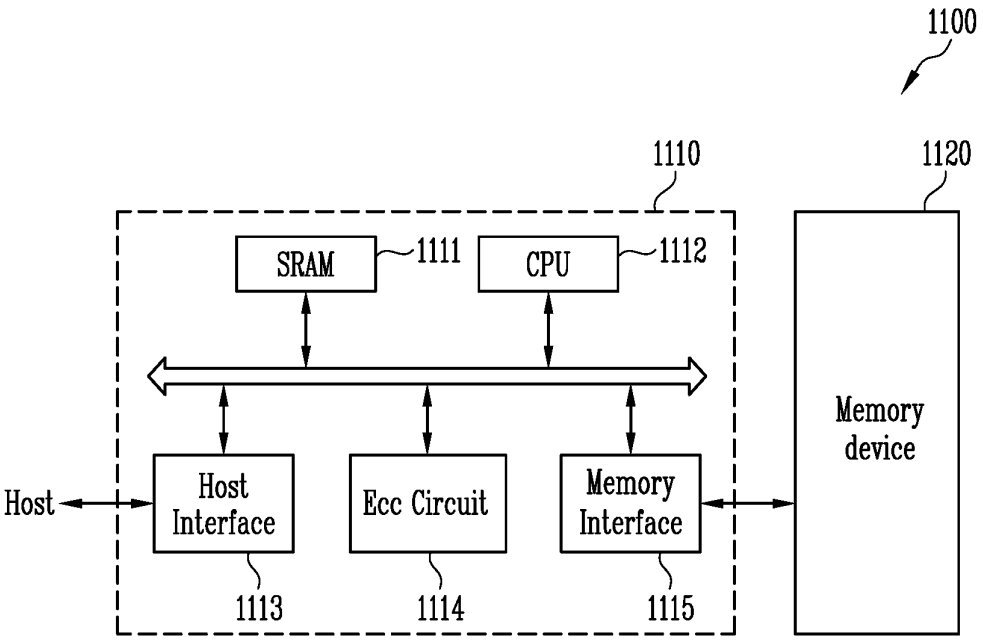
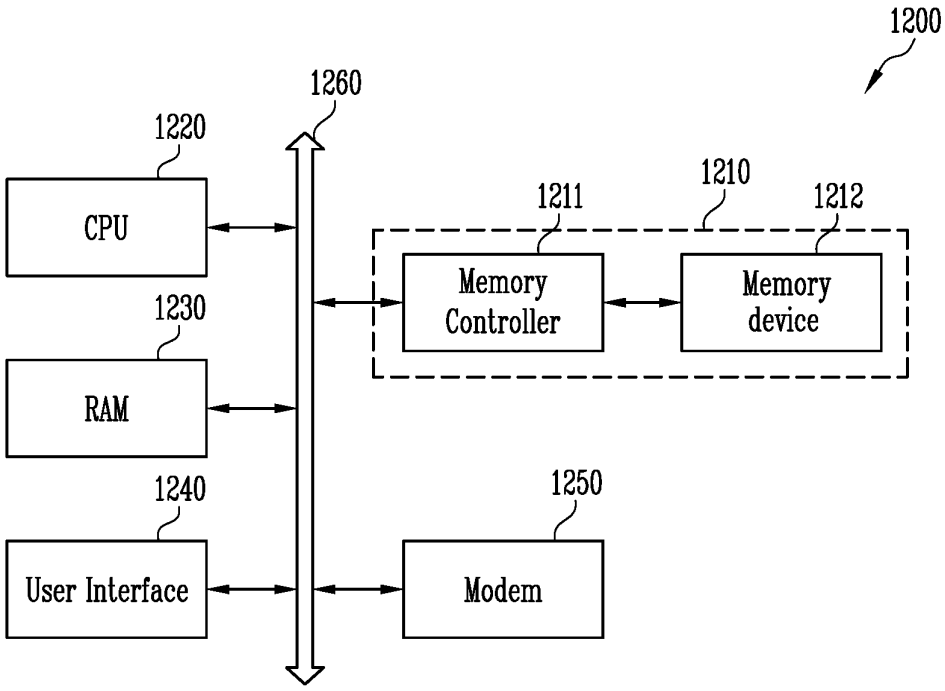

1100
1110
1120
SRAM
1111
CPU
1112
Host
Host Interface
Ecc Circuit
Memory Interface
Memory device
1113
1114
1115

FIG. 36


1200
1260
1220
CPU
1230
RAM
1240
User Interface
1211
1210
1212
Memory Controller
Memory device
1250
Modem