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2003 01 06

(30) JP-P-2001-00190397 2001 06 22 (JP)

(73) 가 가 2 2 3

(72) 가 2 2-3 가 가

(74)

:

(54)

(101) (101a) (101a) (102)
(110) (102) (110) (101)

2

1 1 .
2 1 .
3 1 .
4 1 .
5 1 .

6	1	.
7	1	.
8	1	.
9	2	.
10	2	.
11	2	.
12	2	.
13	2	.
14	2	.
15	2	.
16	2	.
17	3	.
18	3	.
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22	3	.
23	3	.
24	3	.
25	3	.
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27	4	.
28	4	.
29	4	.
30	4	.
31	4	.
32	4	.
33	4	.
34	5	.
35	5	.
36	5	.
37	5	.
38	5	.
39	5	.
40	5	.
41	5	.
42	5	.
43		.
44		.

< >

101 : ()

101a :

102 : (HDP)

103 : ()

104 :

104a :

104b, 122b :

105 :

106 : (n -)

107 : ()

108 : (n +)

109 : (HDP)

110, 111, 112, 113, 114 : ()

120 :

121 : ()

121a, 122a :

121b :

122 : 2

123, 124 :

1
1

1

2

2

2

1

1

1

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(1)

1 1 2 1

1 (101) 101 10 cm P ()

가 (101a) 101a (101) 300nm 102

HDPCVD(High Density Plasma Chemical Vapor Deposition)

(, 「HDP (SiON) 103

가 3nm 104 1 (104a) (104b)

(P +) 10keV, 5E15cm⁻² , P P N N (B

F₂ +)가 3keV, 5E15cm⁻² 105 가 100nm 106

(n -) 가 30keV, 1E14cm⁻² , 45 (101)

107 가 50nm 108

(n +) 가 50keV, 5E15cm⁻² , 7 (101)

109 가 700nm HDP

110 (102) (110) (108) (108)

가 30nm (102) (102) (108)

120 , 0.1 μ m 121 (120)
 () (121) TiN/Ti=20nm/20nm (121a) (121b)
 2a) , 가 100nm (122) TiN/Ti=20/20nm (12) (122b)
 2 , 1 (104a) N (123)
 2 (104a) N (123)
 가 가 () (110) (123)
 (110) , 20 30 μ m 0.2 0.4 μ m (123)
) , 10 15 μ m 1 3 8 1
 , 3 (101) (131) , 30nm ()
 (131) (132) (132) 150nm (132) (132)
) (131) (131) (101) (102) HDP (101a) 500nm (101)
 CMP (101a) (102) (102) 150nm
 , 4 (102) (132) 가 (131) (110) (101)
) 30nm (133) (102) (110) (133) (110)
 , 5 (133) (110) (103) (6) (103) (SiON)
 3nm (133) (103) (104a) 100nm
 , (104a) (104a) N (123)
 , 6 (123) (123) (110) (: 110)
 (123) (123) (123) 가
 , () (123) N (104a) N
 , (P +) 10keV, 5E15cm⁻² (104a) P (BF₂⁺) 3keV, 5E
 15cm⁻² 가 , P (104a) P (BF₂⁺) 3keV, 5E
 , 7 (104a) (104b) 100nm (105) (104)
 (105) (104b) (105) 100nm (104a) (104)
 , (n - : 106) , (As +) 30keV, 1E14cm⁻² , 45 (101)
 , (104) (107) , 50nm (107) 5
 0keV, 5E15cm⁻² (101) (106) 가 (n
 + : 108) (109) HDP 1000nm (109) 300nm
 CMP (109) (109) (134) (110) ()
 , (134) (110) ()
 , (109) (109) 0.2 μ m ,
 (110) (120) (110)

가
(101)
(110) (102) (101) (101)
(109) (101) (120)
가 (110) (101)
2) (120) (101)
(110) (108) (102)
8 (102) TiN/Ti (121a)
20nm/20nm (120) CVD(Cheical Vapor Deposition) 200
nm CMP(Cheical Mechanical Polishing)
(121b)가 (121b) (121a) (121b)
(121)가 (121) (122a) TiN/Ti 20/20nm
(122b) 100nm (122a) (122b)
(121) 2 (122)
102) (110) (108) (120)
(101) 가
(120) (102), (102)
(121a) (121b) (120) (121)
1 (110) (110) 가
(110) (123))
(1 5 (110))
((110) 가
(2 5 N 가 P (123)
1 N (123)
1 (110) (108)
(120) (110) (12
(110) (110)
(102) (110) 가)
(105) (105) ()
2 5 가)
(108) (110) 가)
(110) 가 (2, 4) 가)
(2) 1 가
2
9 2 2 10
9 10 1 2

(121a) (121b) (121)가 (121b)가 (120) (122a) (122a) TiN/Ti (122b) 20/20nm (121)가 (122b) (121) 2 100nm (122a) (122b) 2 (121) (122) (108) (102) (101) (111) (120) (120) (102) (102) (121a) (121b) (120) (121) (121) (111) (111) 가 (111) (111) 가 (102) (102) (101) (11) 1) 가 가 (120) (102) (101) 3 eDRAM(embeded DRAM) (3) 2 3 3 17 3 18 17 18 , 9 10 17 (102) (101) (102) 250nm (112) (102) (102) (102) (101a) (112) (102) (108) (102) 가 (112) (123) (112) (102) (123) 가 가 () . 2 3 19 24 3 , 19 19 2 11 1) 20 (103) (102) (132) (131) (102) (10) (103) (103) (104a) (SiON) 3nm (104a) 100nm (104a) N P (104b) (104b) (104a) : 105) 100nm (104b) (104a) (105) (As +) 30keV, 1E14cm⁻², 45 (101) (104a) (n - : 106) 50nm (102) (112) (104) (107) 21 (107) 50keV, 5E15cm⁻² (101) (106) 가 (n + : 108)

(121a) (121b) (121)

4 (113) (113) 가

(113) 30 (123) ()

102) 4 (102) eDRAM DRAM (reversely-narrowed) ()

4 (102) 5 가 (102)

(101) (102) CMP (102) (102)

(5) 4 (102) (102)

5 (102) (102)

5 (102) (102)

34 5 35 26 27 35

34 35 (102) (101) (102)

(114) (114) 가 (102) (124)

()

5 36 41 5

36 36 4 28

37 (132) (131) (102) (10)

1) (103) (103) (104a) (SiON) 3nm (104a) 1 가 ()

104b) 100nm (104a) N P (104b) (: 105) 100nm (104a)

(105) (105) (104b) (104a)

(n⁻ : 106) (As⁺) 30keV, 1E14cm⁻², 45 (101)

50nm (102) (114) (104)

(107) (107) (106) 가 50keV, 5E15cm⁻² (101)

(101) (106) (n⁺ : 108) (136)

(136) (136) (136) (124)

(124) (124) (124) (124)

39 (124) (124) (114) (124)

(124) (124) (112) (124)

(124) (124) (124) 가 (124)

2 (124) (124) (124) 가 (124)

40 (136) (108) ()
 (125) (109) (136) HDP 1000nm (109) 300nm
 CMP (108) (109) (114) (134) (109) (134)
 (120) (109) 0.2μm (101)
 41 (120) TiN/Ti (121a)
 20nm/20nm (121b) CVD 200nm CMP
 (121a) (121b) (121)가 (120) (122a)
) TiN/Ti 20/20nm (122b) 100nm (121) (122)
 (122a) (122b) (121) 2 (108) (120) (122a)
 102) (114) 가 (120) (102) (102) (120)
 01) (120) (120) (102), (102) (120)
 (121a) (121b) (120) (121)
 5 (114) (114) 가
 (124) (114), (114) (114)
 5 (114) 4
 5
 42 5 5 (125) (126)
) 5 300nm (126) (120) (120)
 (120) (120)

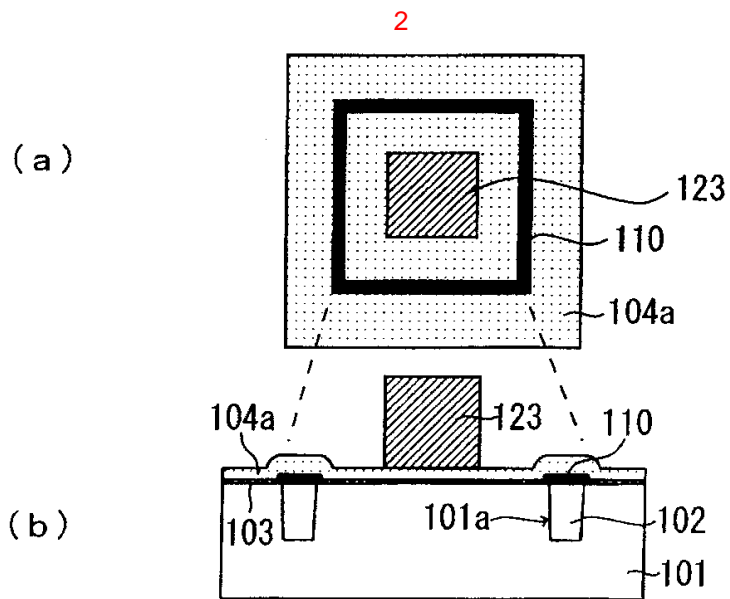
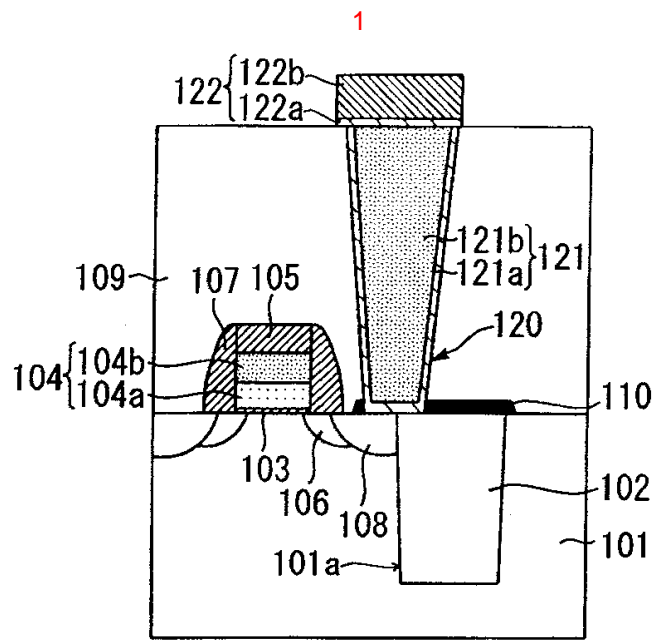
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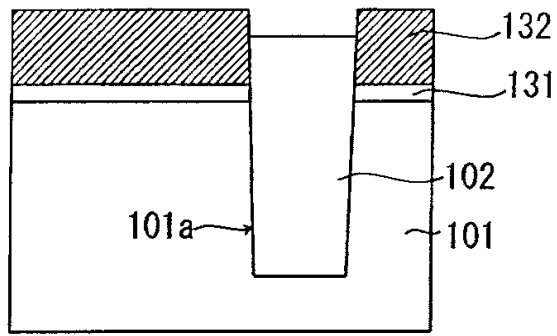
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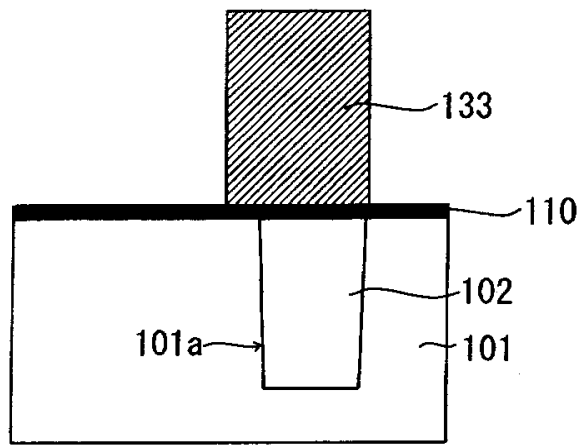
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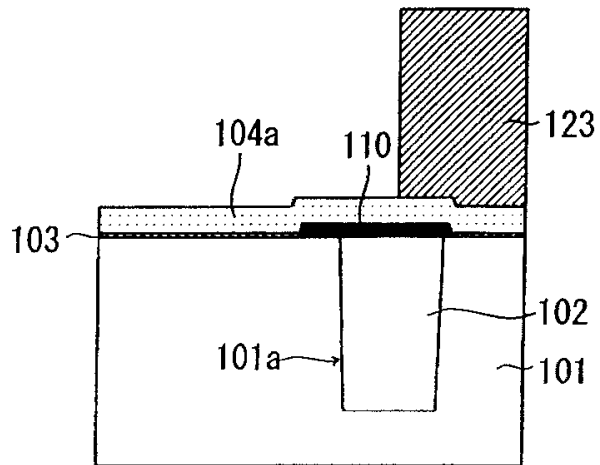
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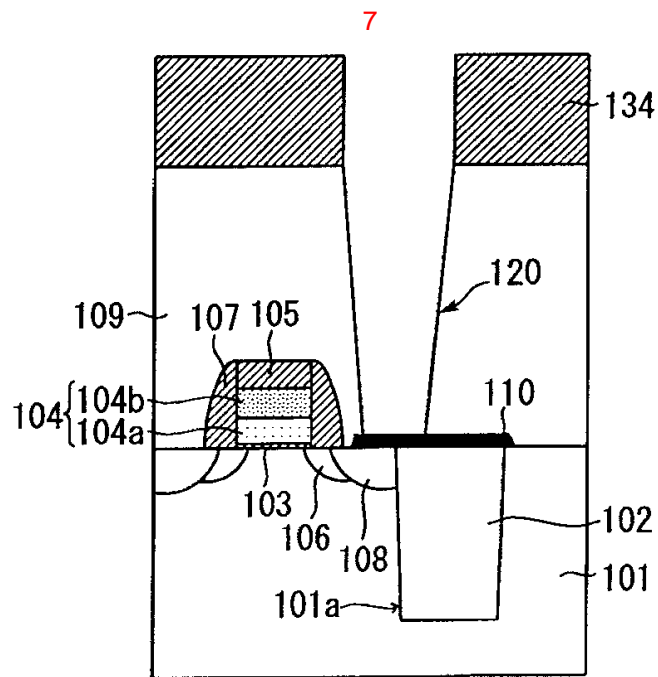
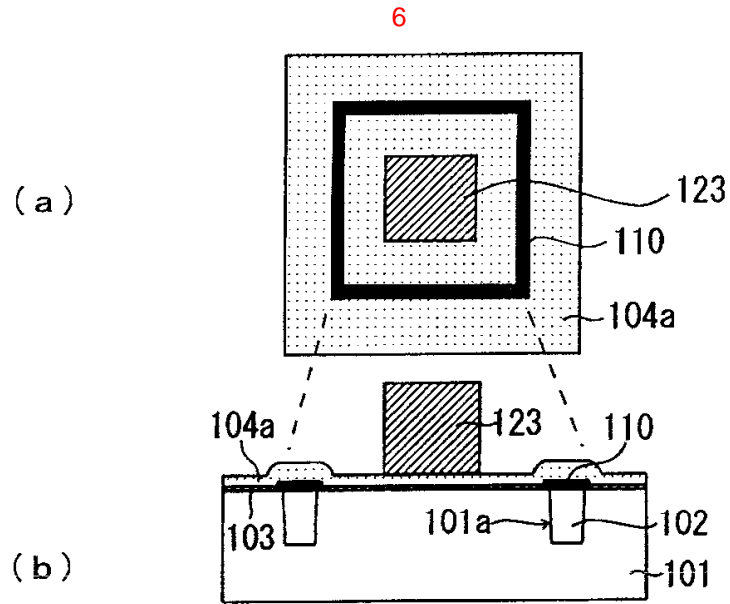


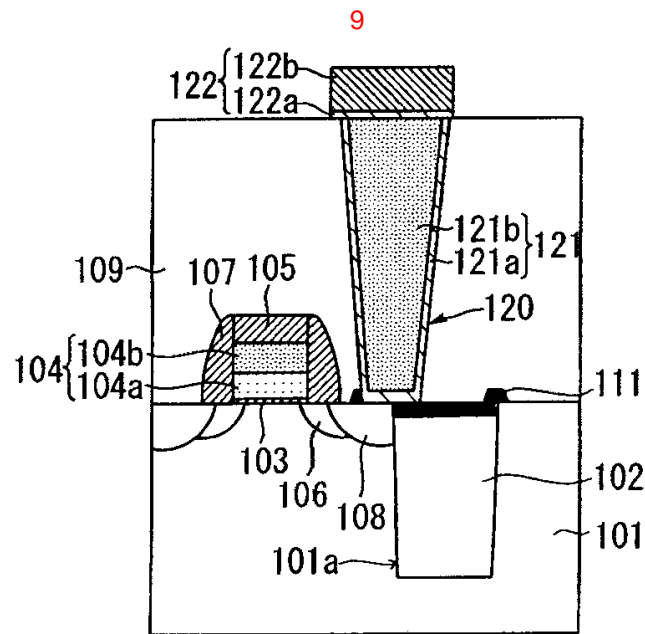
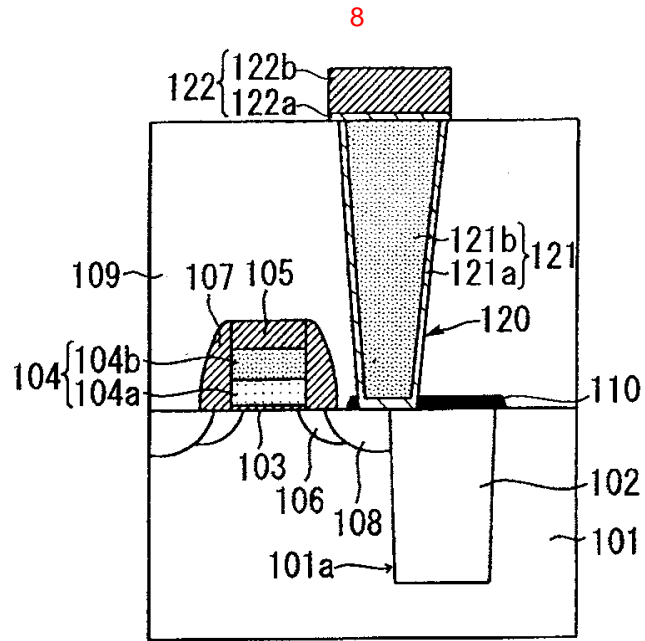
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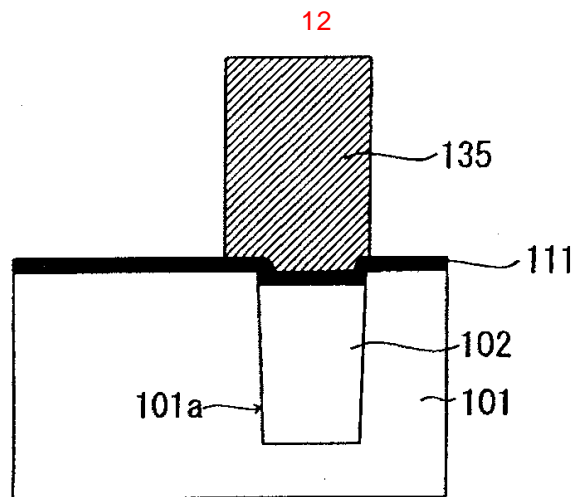
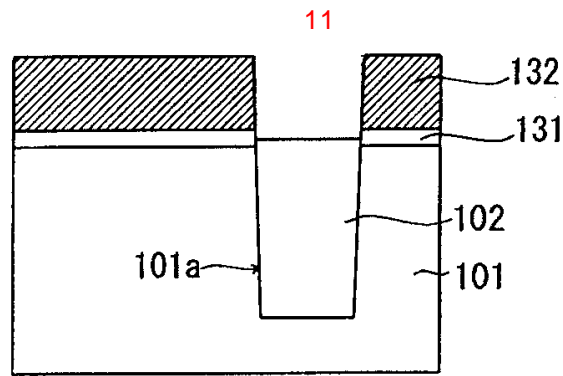
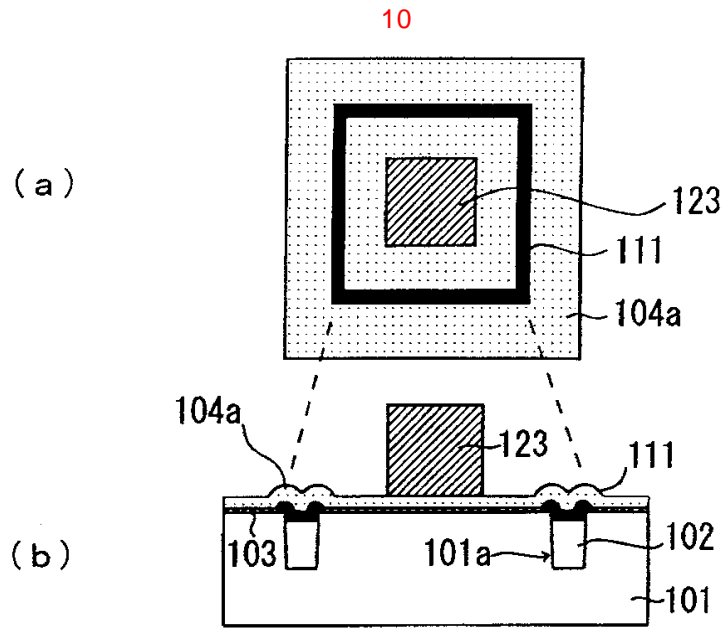


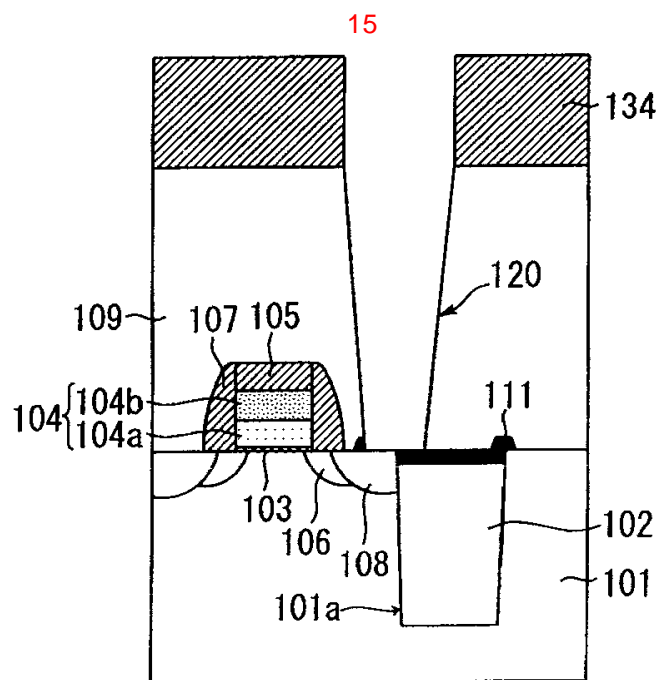
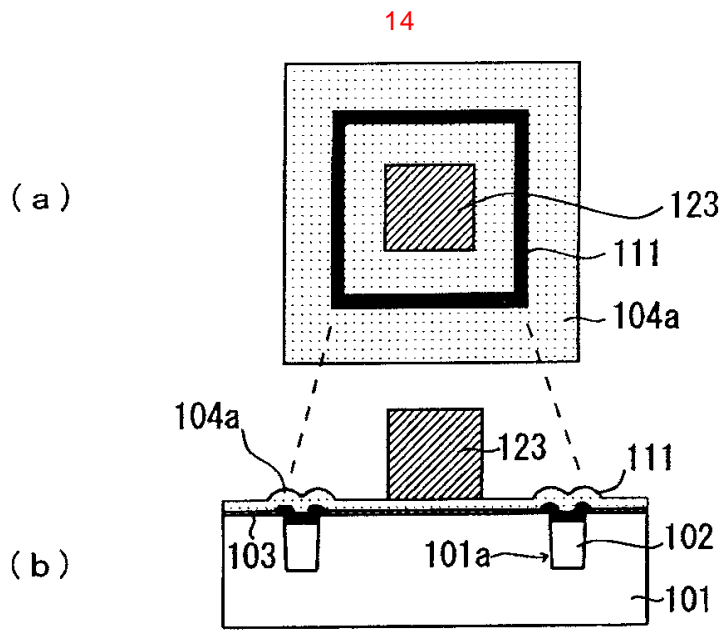
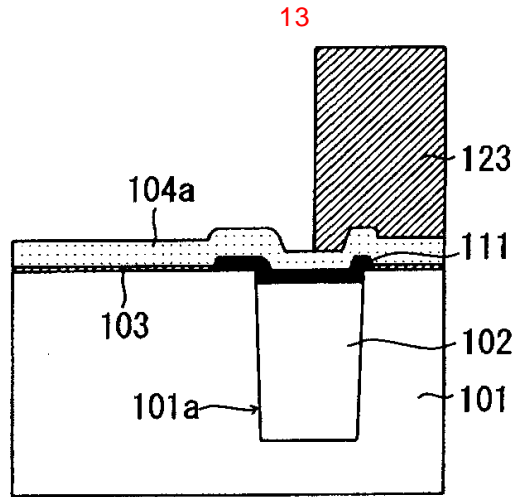
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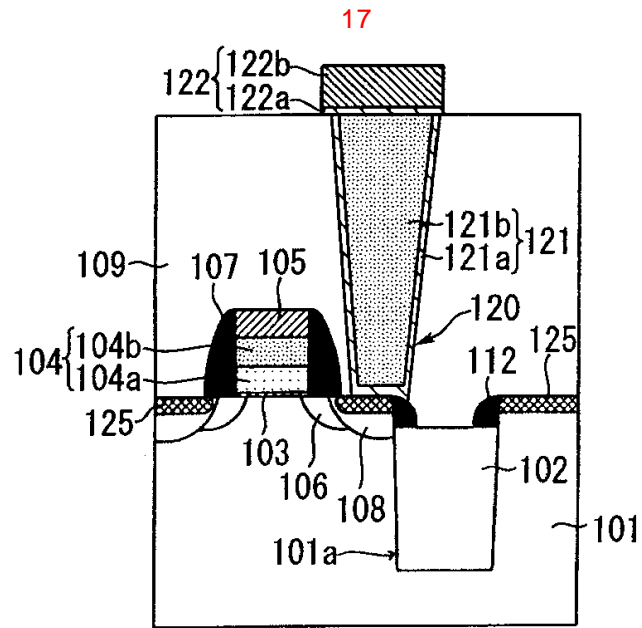
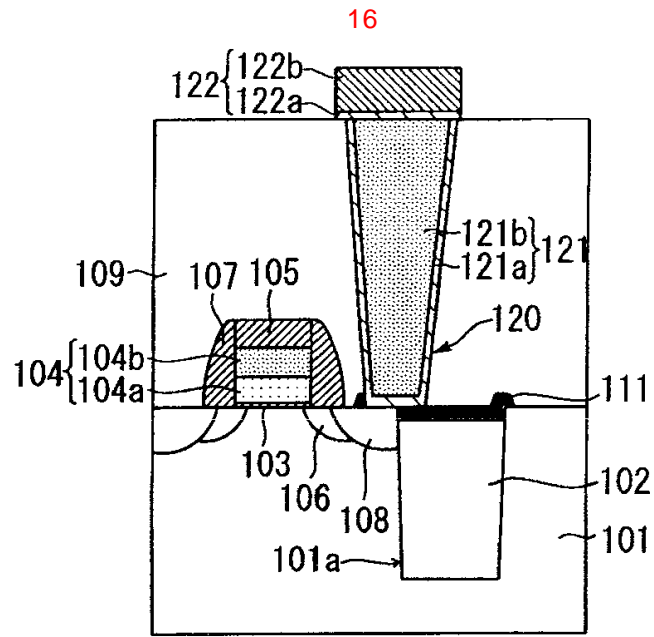




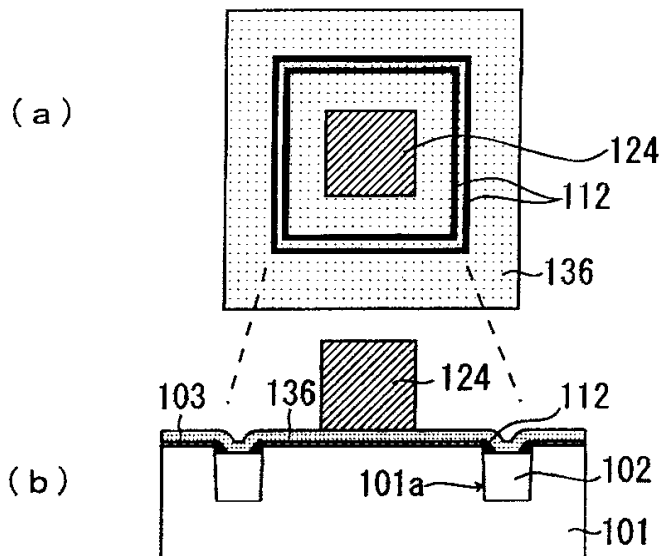




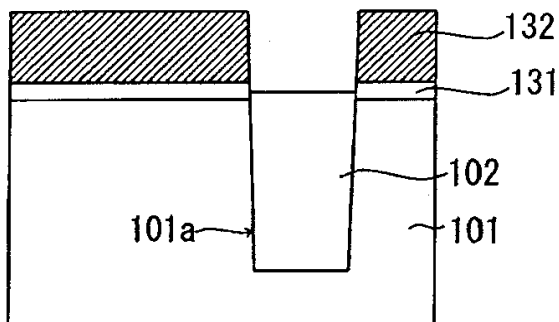




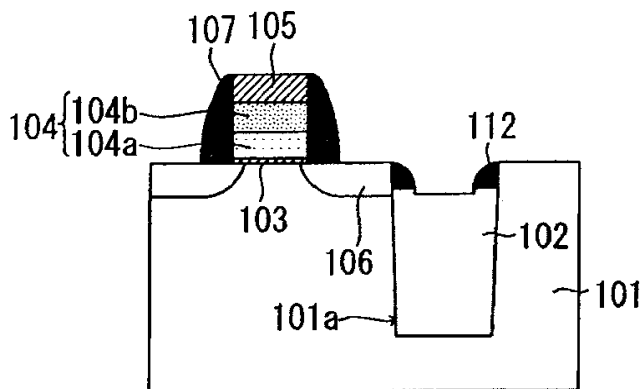
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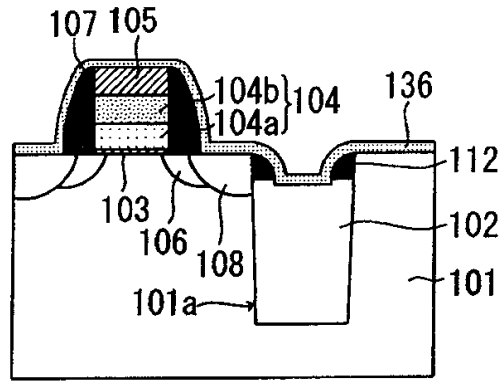
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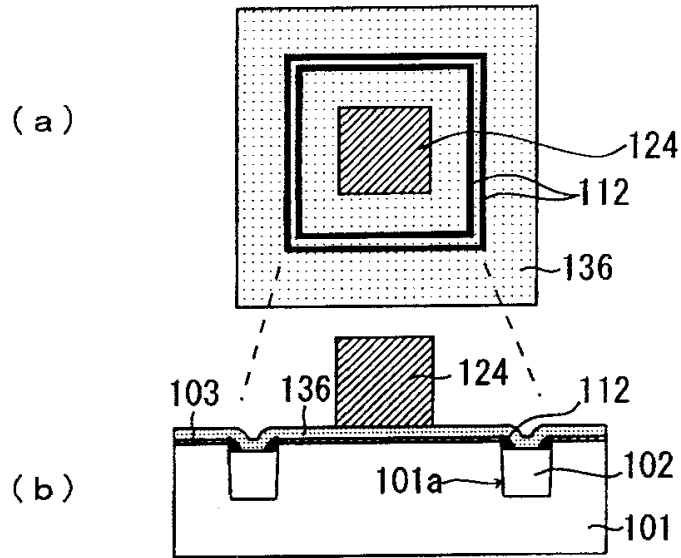
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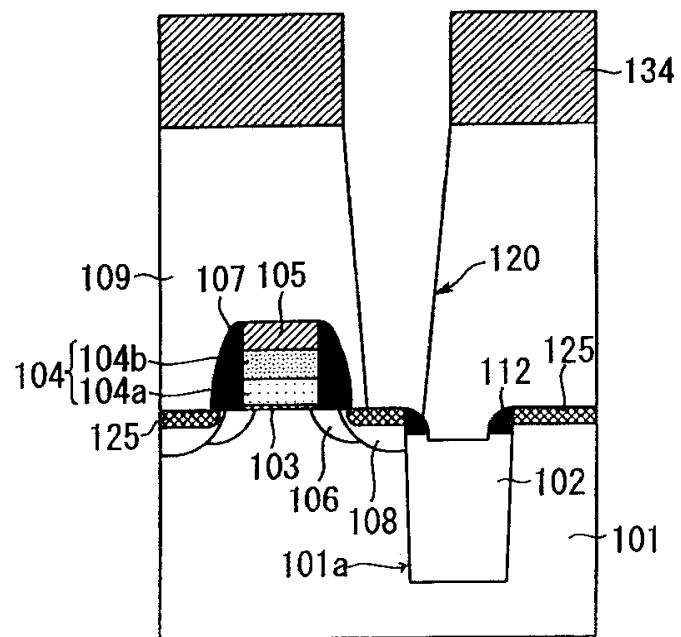
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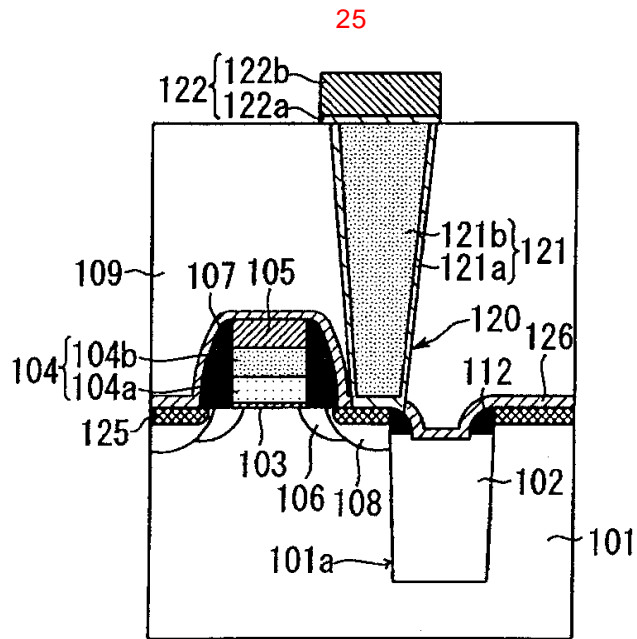
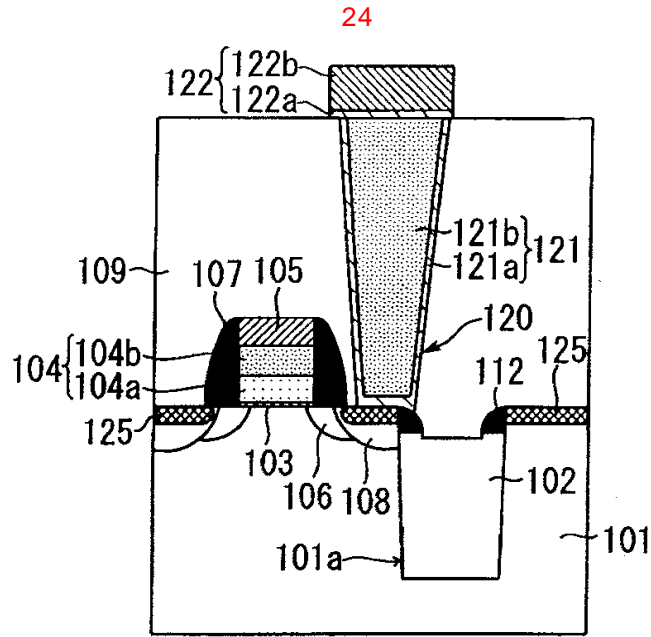


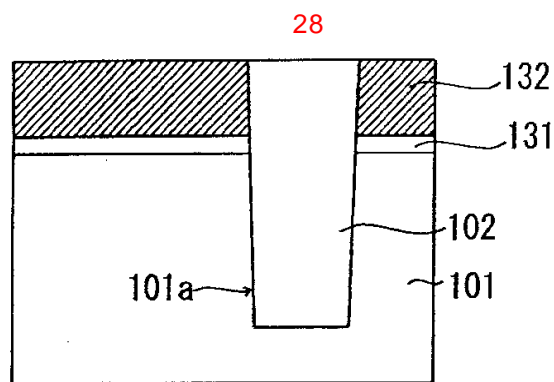
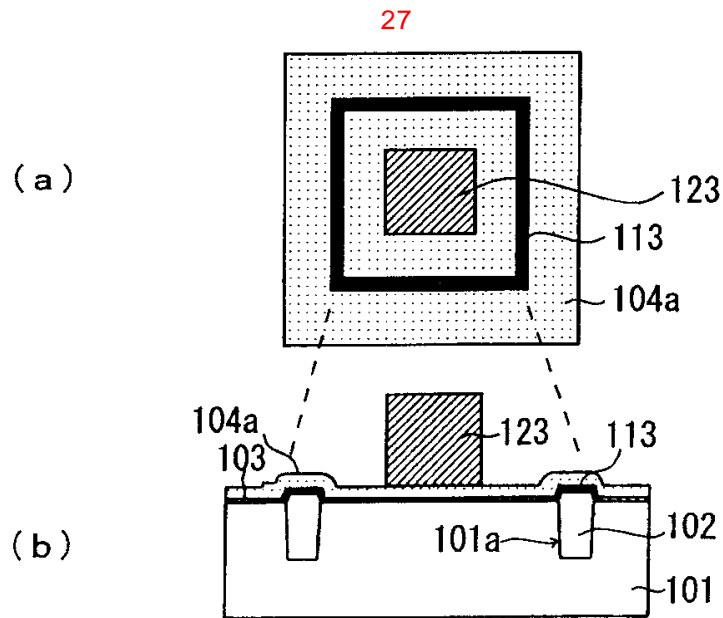
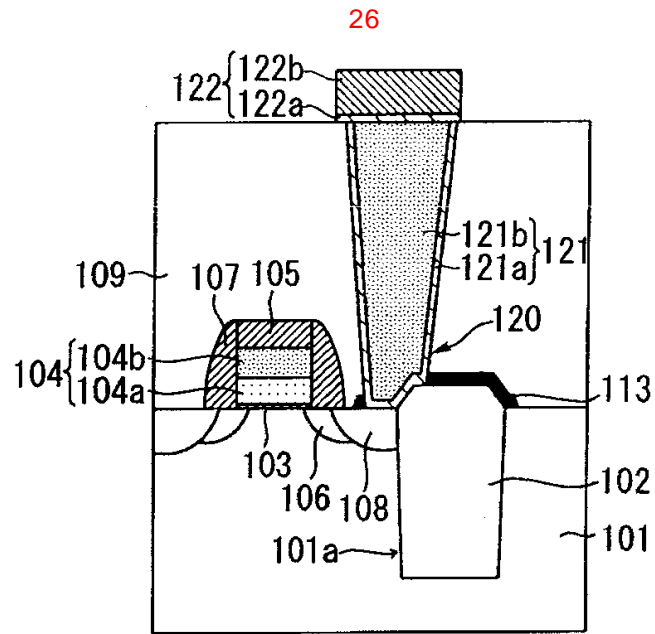
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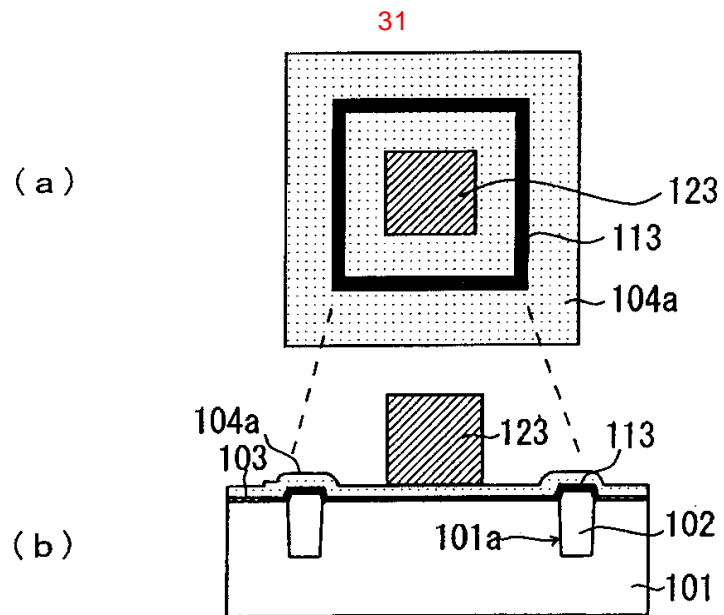
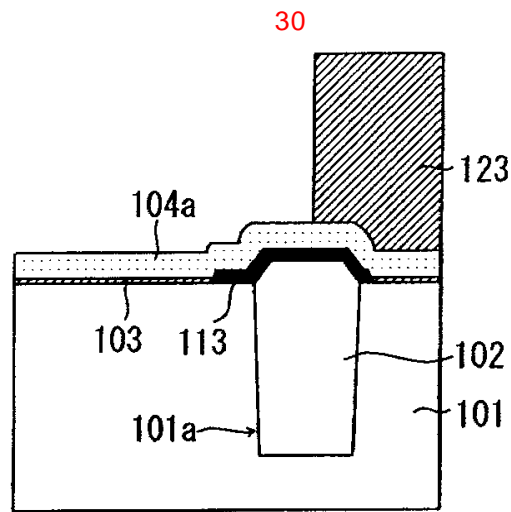
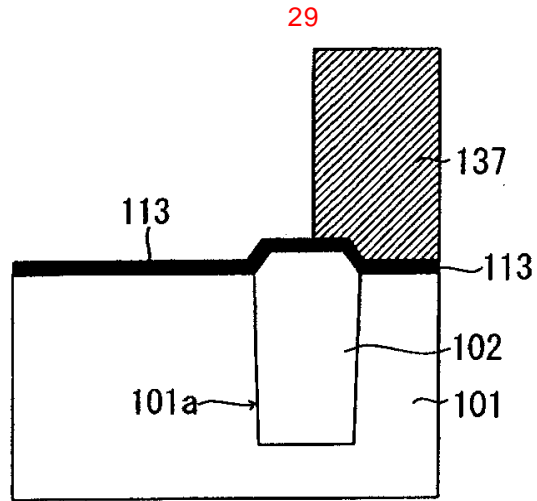


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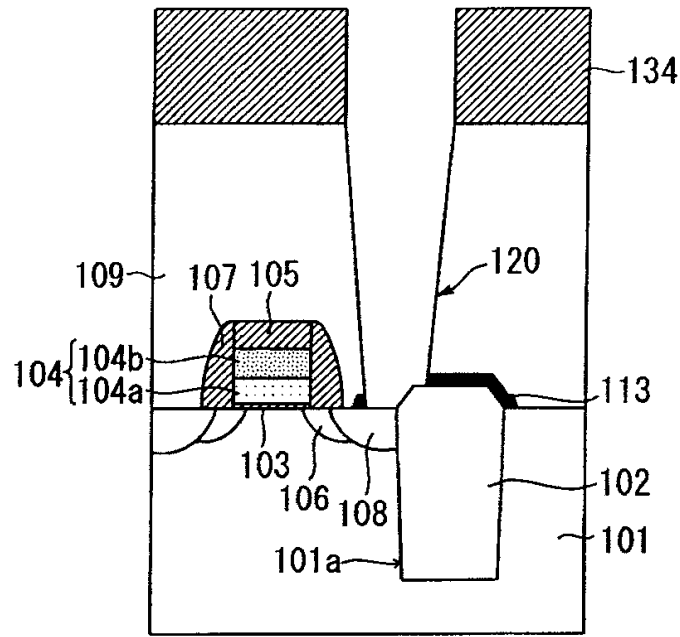




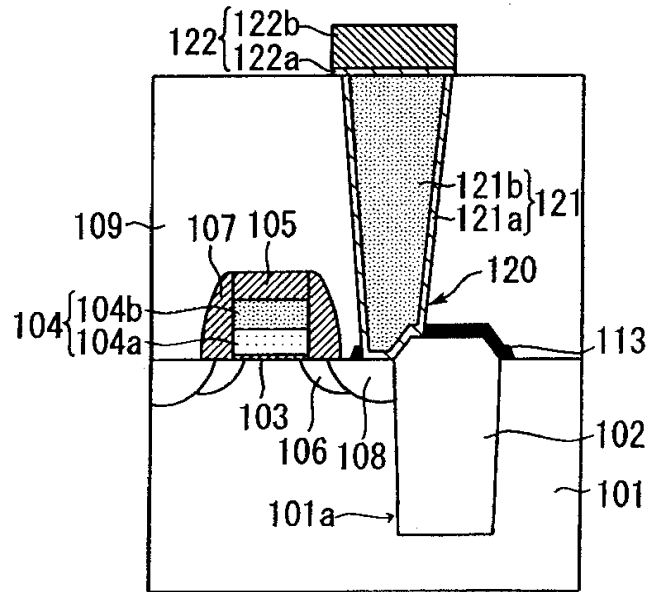


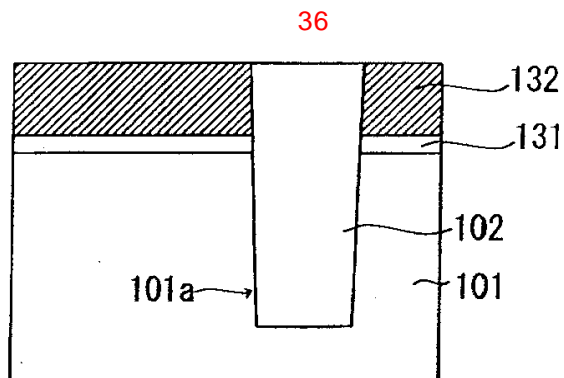
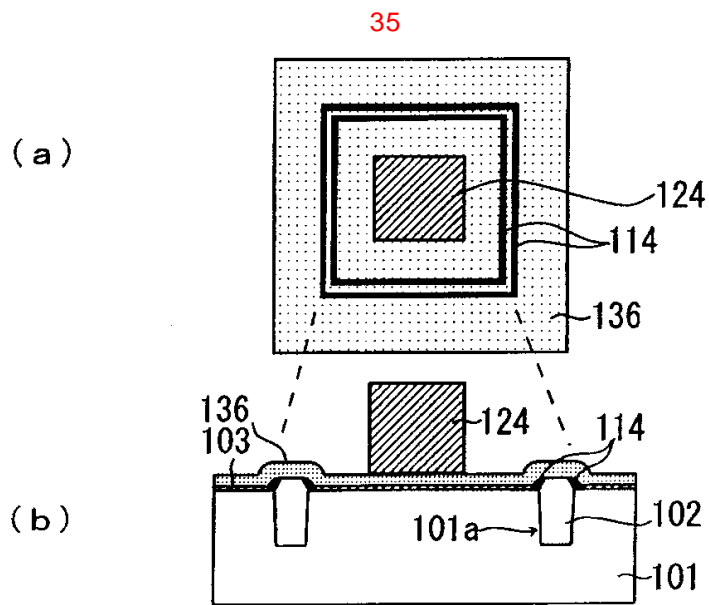
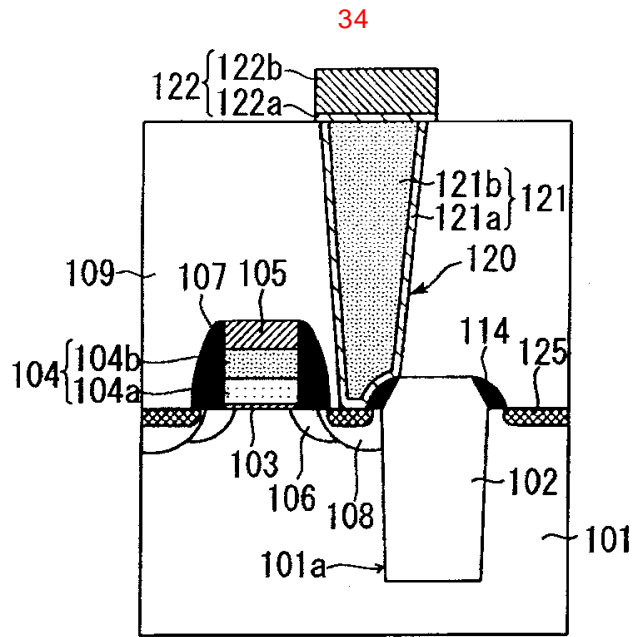


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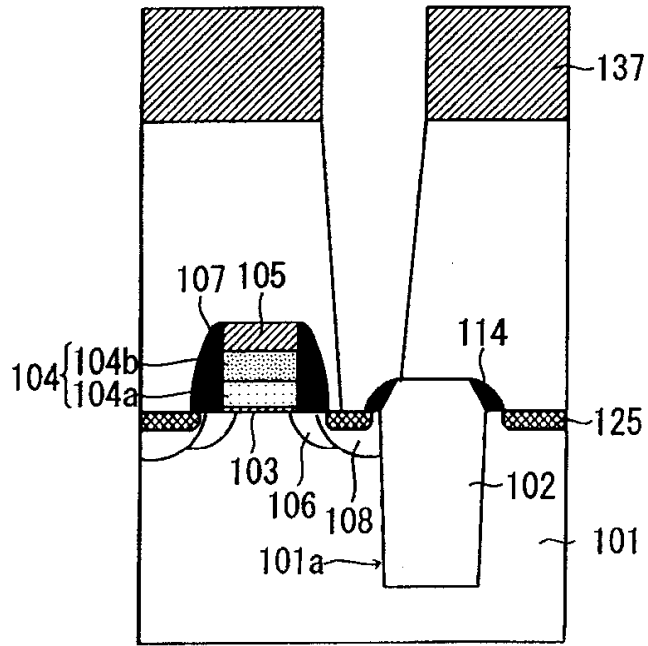


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