

(19)
(12)

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(11)
(24)

2001 11 17
10 - 0313695
2001 10 23

(21) 10 - 1999 - 0049589
(22) 1999 11 10

(65) 2000 - 0035360
(43) 2000 06 26

(30) 1998 - 320595 1998 11 11 (JP)

(73) 가 가

1 1 1

(72) 가 가 8가 가

가 가 8가 가

가 가 가 가 580 - 1가 가

(74)

:

(54)

STI (trench) ,

(103) () , ()
) (101) (104b) ,
가 , (104) (104a) (103) 가 (104b) (103) ,

(105)

(stopper)

1

, , , , , , , , ,

1 가 .

2 1 1 .

3 1 2 .

4 , NAND EEPROM , (a)
, (b) (a) 1B - 1B , (c) (a) 1C - 1C .

5 4 (b) , STI NAND EEPROM
1 .

6 5 2 .

7 6 3 .

8 7 4 .

9 8 5 .

10 9 6 .

11 10 7 .

12 11 8 .

13 6 .

14 (a) (e) , STI

101, 1 :

102 :

103 :

104, 23 :

104S :

105 :

106 :

3 : (STI)

4 :

5 :

6 : FG

7 : (ONO)

8 : CG가

9 : /

10 :

SG1, SG2 :

21 :

22 :

25 : ()

31 : (CVD)

61 :

62 :

, STI(Shallow Trench Isolation)

14 (a) (e) , STI

14 (a) , P (901) (911).

(911) (904) (905), 14 (b) (912), (905), (904) (901) (902)

14 (c) (902) (913).

(902) TEOS (tetraethoxysilane) (903) 14 (d) CMP(chemical mechanical polishing) (903) (912) (902) 가

14 (e) (912) 가 , ONO ,

905), (901) (904), (905) (905) STI (904) (901) STI , STI 가 ,

(8 - 17948).

14 (b) , CMP (912) (902) D1, STI W1 가 D1, W1 D1/ W1 (903) , STI 가 (903)

STI (903) ()

(904) (가) 가

가 .

가 . 가 , , 가 .

STI

1 , 1 1 , 1

1 가 , 1 , 1

가 , 1

가

1 , 가 (101)

MOS (102) STI (103)

(103) /

(103) (104) (104a)가 (104b)

(104S) (104b) (104a)가

(104a) (104b) (104S)

(104a) (103) (104b) (101)

(104) (105) (104) (104a)가 , ,

가 (seam)

가

가

(104) , 2 (103)

(106) (106) (101) (104b)

(106) (103) 가 (103)

가 (104a) (104b) (3).

(104) (104) CVD(Chemical Vapor Deposition)

(105) (106) CMP(chemical mechanical polishing)

(105) (106) 1

(106) (2)가

(103) (103) 가

(103) 가

가 (profile)

가

NAND EEPROM, AND EEPROM, DINOR EEPROM, NOR EEPROM

, NAND EEPROM

4 (a) (c) , NAND EEPROM

4 , (a) , (b) (a) 1B - 1B , (c) (a) 1C - 1C

(1) STI (STI3) (4)

STI3 (stripe) (4)

(4) , / (9) (5)

FG (6)

(6: FG) , STI3 (23) , (4)

가 (23b) (23a)가

(31) , 1 (23) 가

(31) , STI3

(4 (b)).

FG (6) (7) CG (8)
 (4 (b)) CG(8) 8 (4) CG1 8 FG
 8 1 , (9) D
 , SG2 S (4 (c)) .
 , 4 (c) , (10) D BL , 4 (a)
 D
 , 4 (b) , STI3 ,
 , 가 , ,
 , 4 (b) , NAND EEPROM
 5 12 , STI NAND EEPROM
 , P (1) () , ()
)
 , 5 (가 (1) (5) 가 (1
 : 61), (21) CVD (22)
 , 6 (22) (21), (61),
 (5) RIE (Reactive Ion Etching)
 (1) RIE (23) (22) 0.55μm (23) (23) 0.3μm
 , (1) 0.3μm
 , 7 (22) (21) 20nm
 , (22)
 , 8 가 (21) (61)
 가 (23) 23b 23a(가)가
 , 9 (23) (23) (TEOS(tetraethoxysilane) ()
 25). (31) CVD (31) 700 800 30
 가

(23) , (61) 가
 , (31) .
 , 900 1000 , 1 . , 700 800 30 .
 , CMP(chemical mechanical polishing) (31) (31)
 (21) (21) CMP 가 . ((

21) (10).

, 11 , (21) (2
 : 62) . , (61) (62) . ,
 (61) 가 , (61)
 , (31) CMP . (61)/ (62) ,
 (6) .

, 12 , (31) (etch back) , (6)
 : 7) . , (6) 31 , ONO (/ / 3
 (8) . , (8) .
 , RIE (8), ONO (7) (6)
 (23) . (FG: 6), (CG: 8) / (9)
 (4 (a), (c)) .

() 가 , 가 . , 가 ()
 31) .
 , , 가 , ,

, 62) , , 1 (61) 2 ()
 (6) , (31)
 (23) (6) (aspect ratio) , (23) (F
 G: 6) (CG: 8) , , (23)
 , 가 .

, 7 , (22) , (21)
 (22) , (21) .
 13 .

, STI , (104b, 23b)
 (101, 1) , (104a, 23a) (103, 6)

CMP

가

, STI

(57)

1.

1

1

1

1

1

1

가

1

1

2.

1

1

2

2

2

2

2

,
2 2 1

3.

,
1 1 ,
1 1 ,
1 , 1 , , ,

가

1 , ,
1 , ,
1 ,

1 가 2 1

1 2 ,

2 2 ,

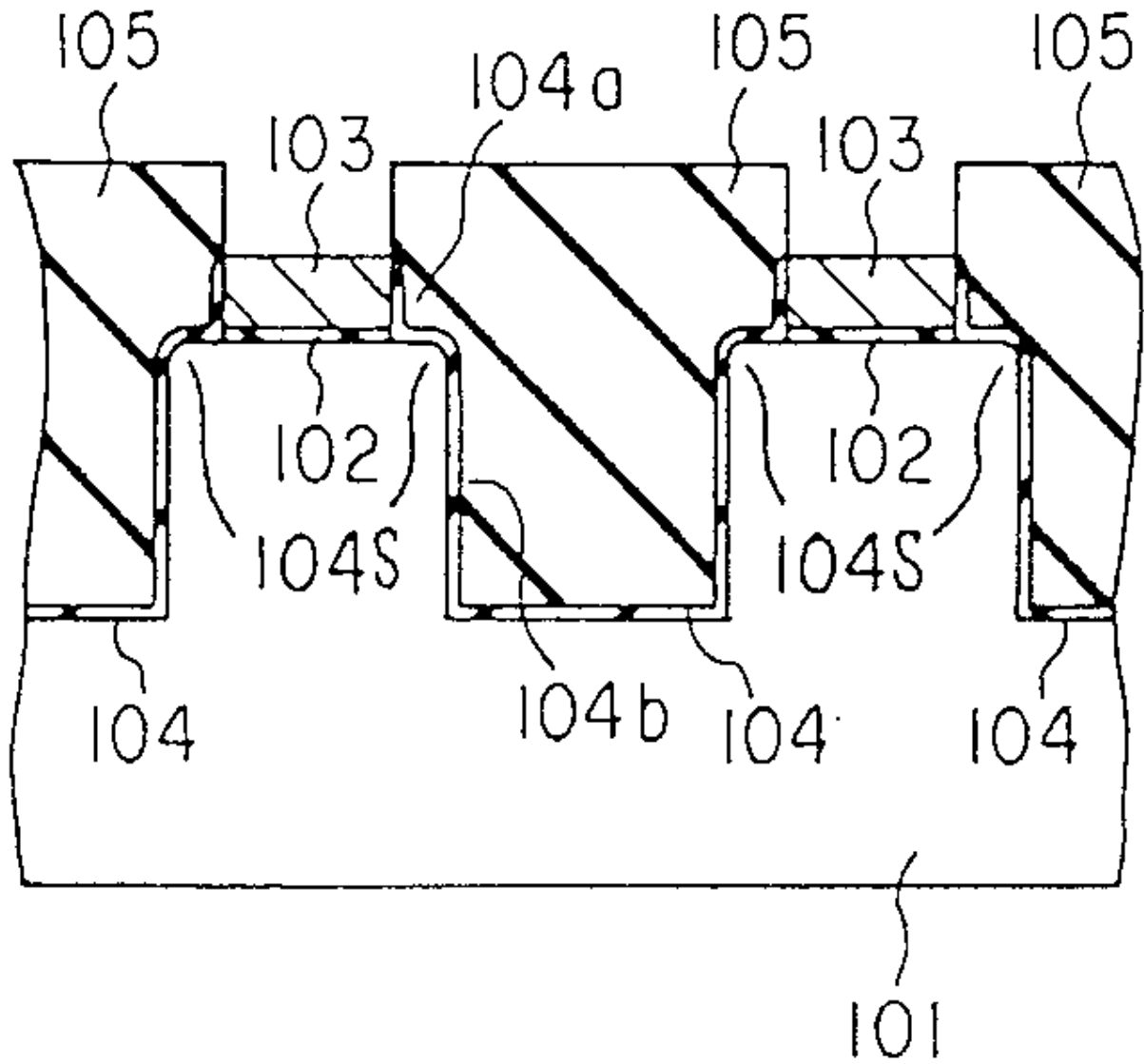
2 , 2 1 2
, 1 2

4.

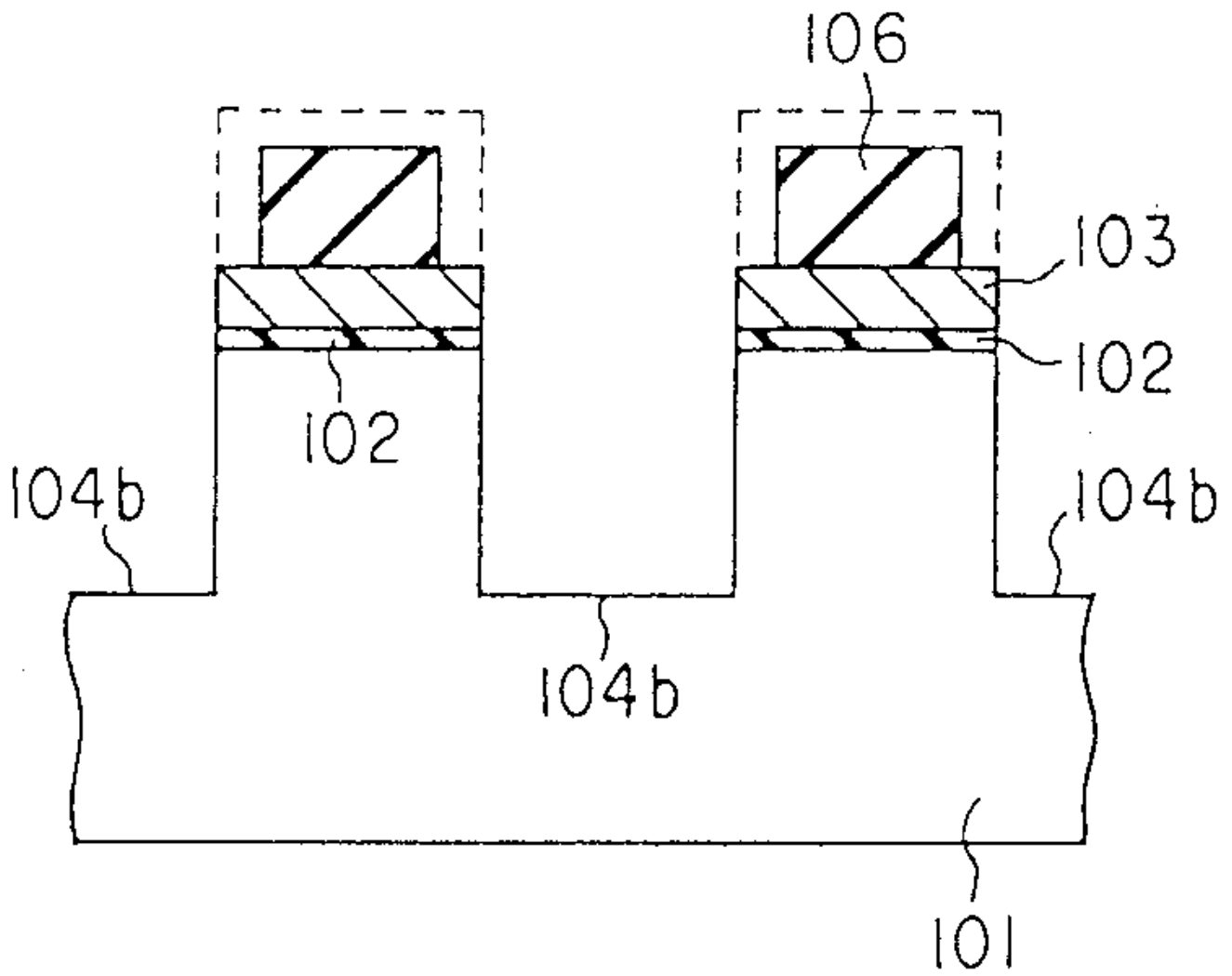
3 ,

1 ,
.

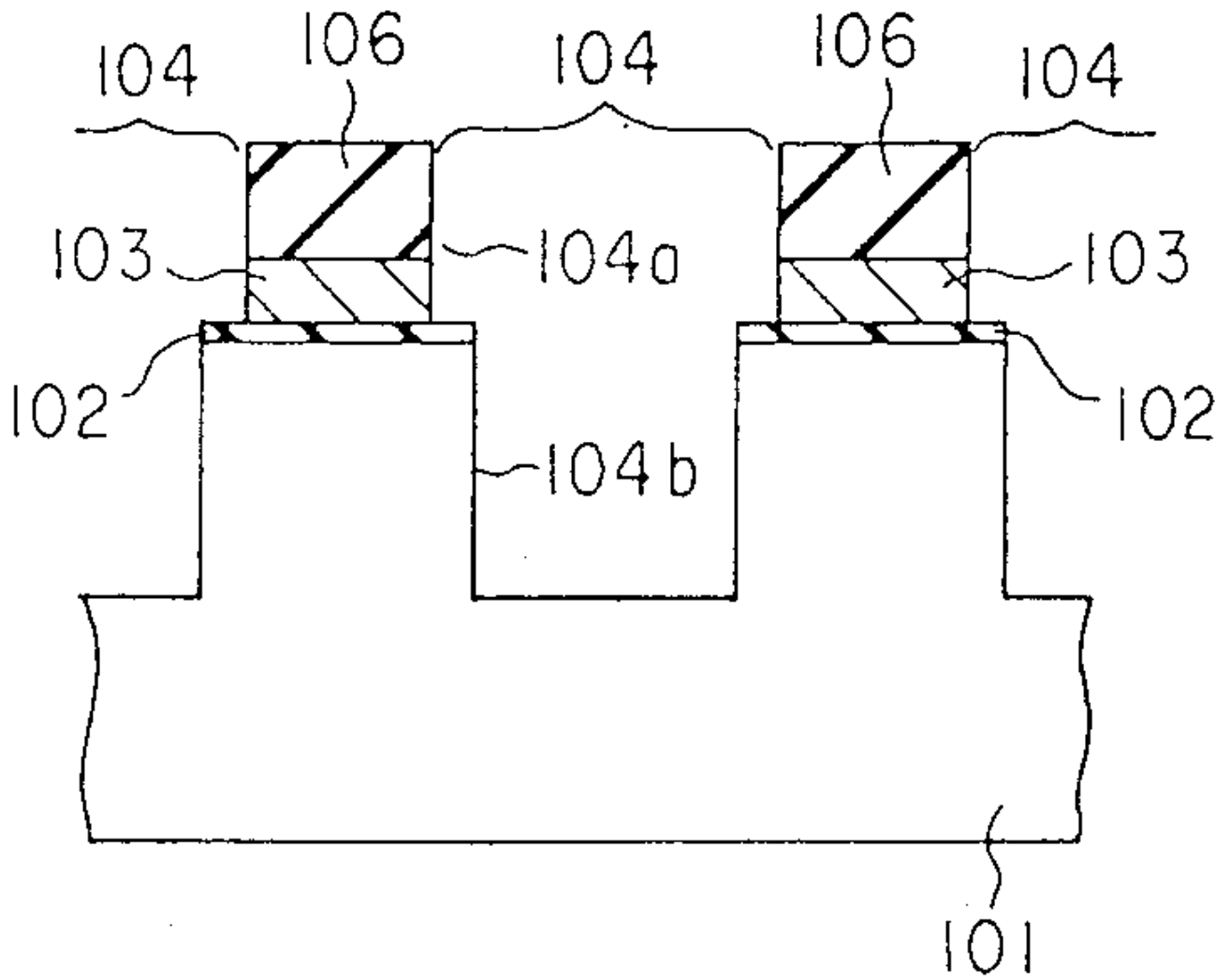
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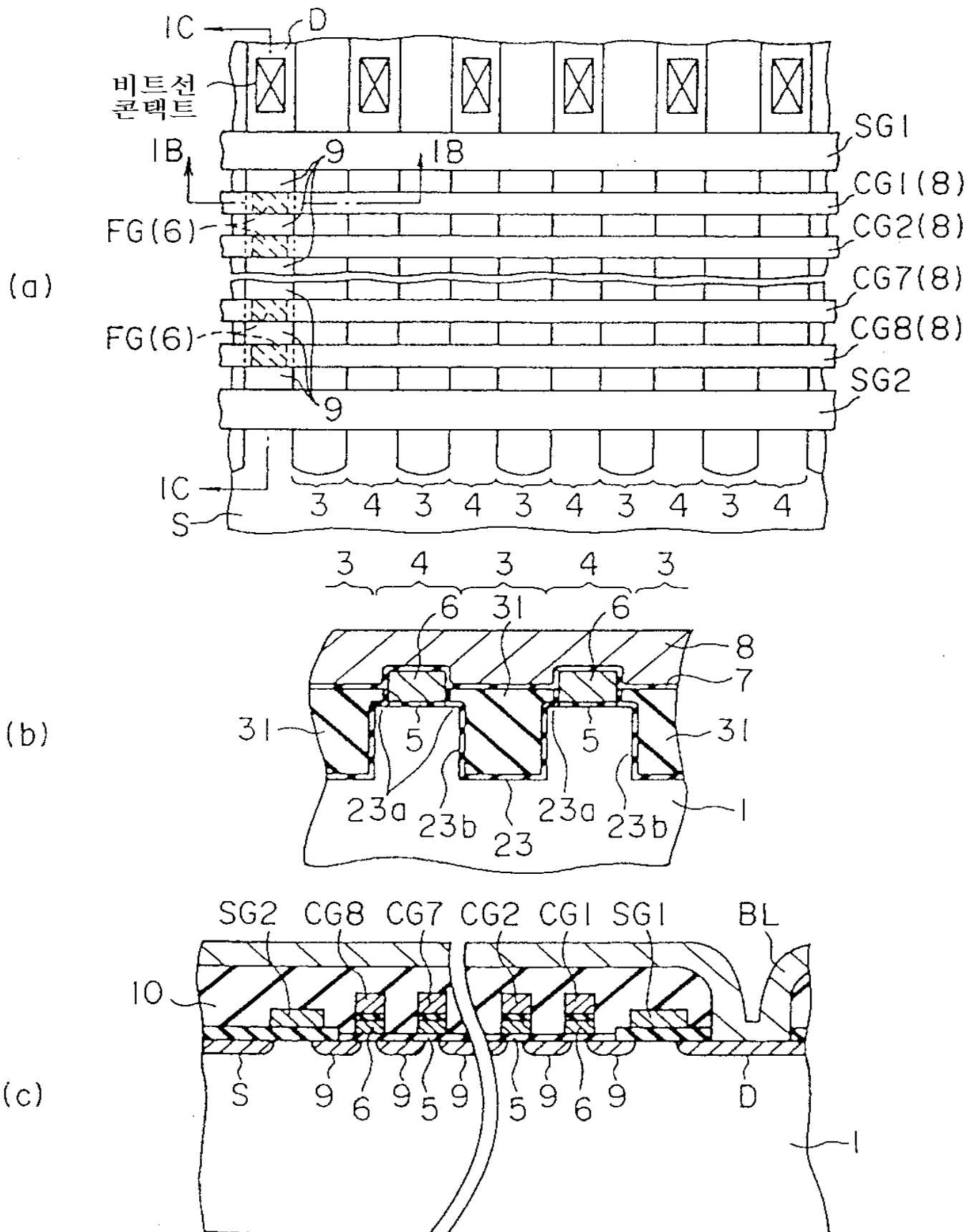


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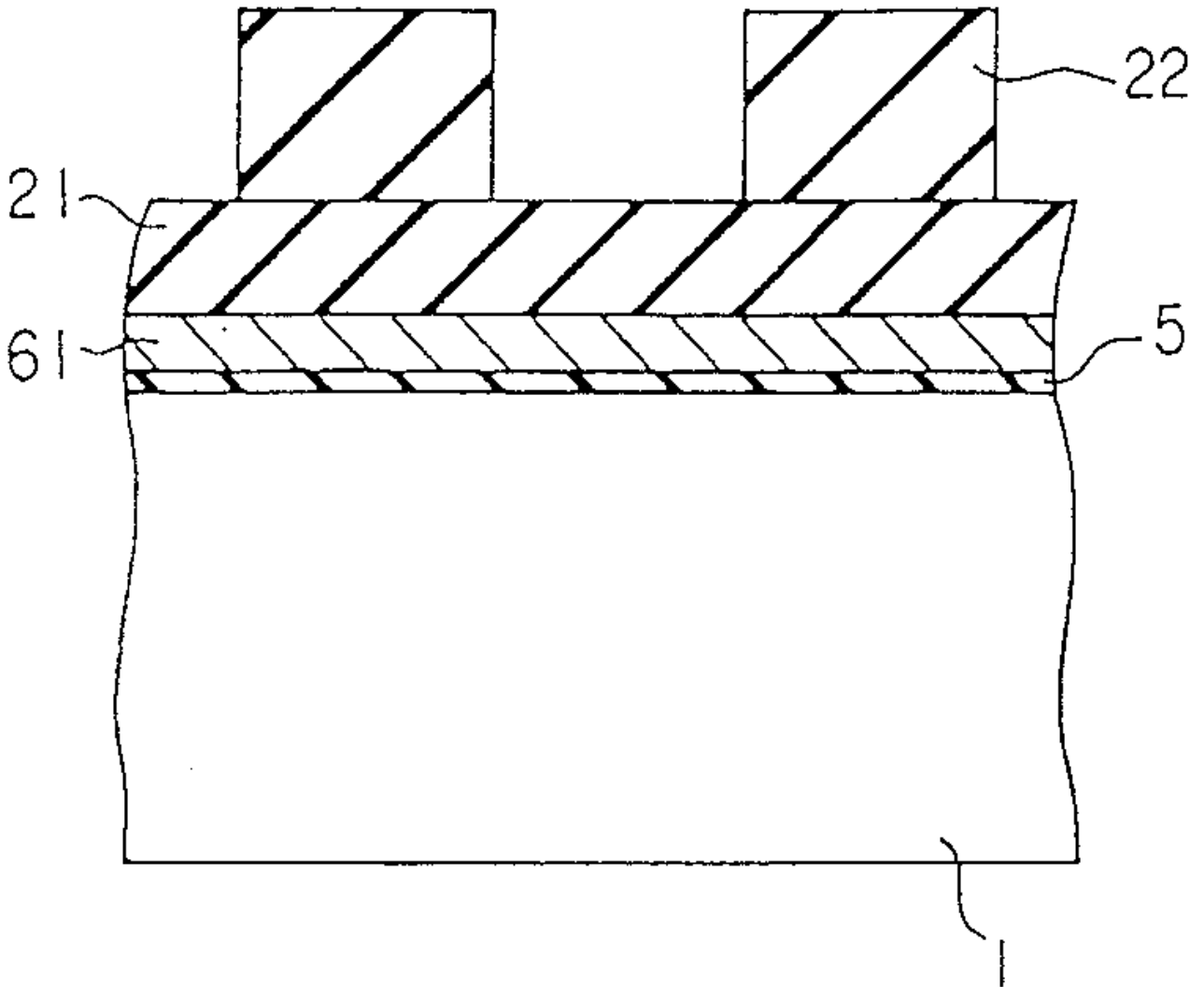


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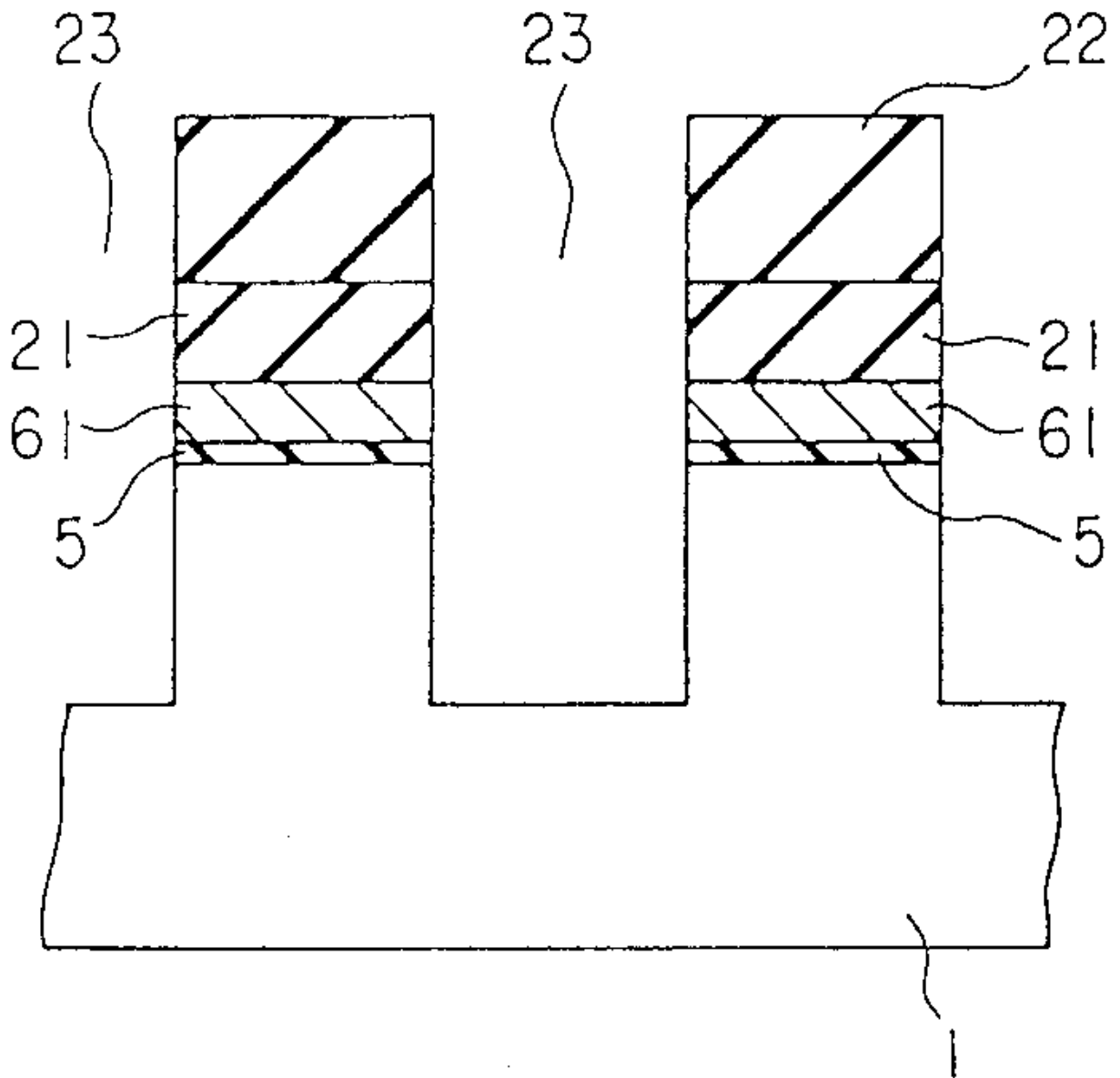




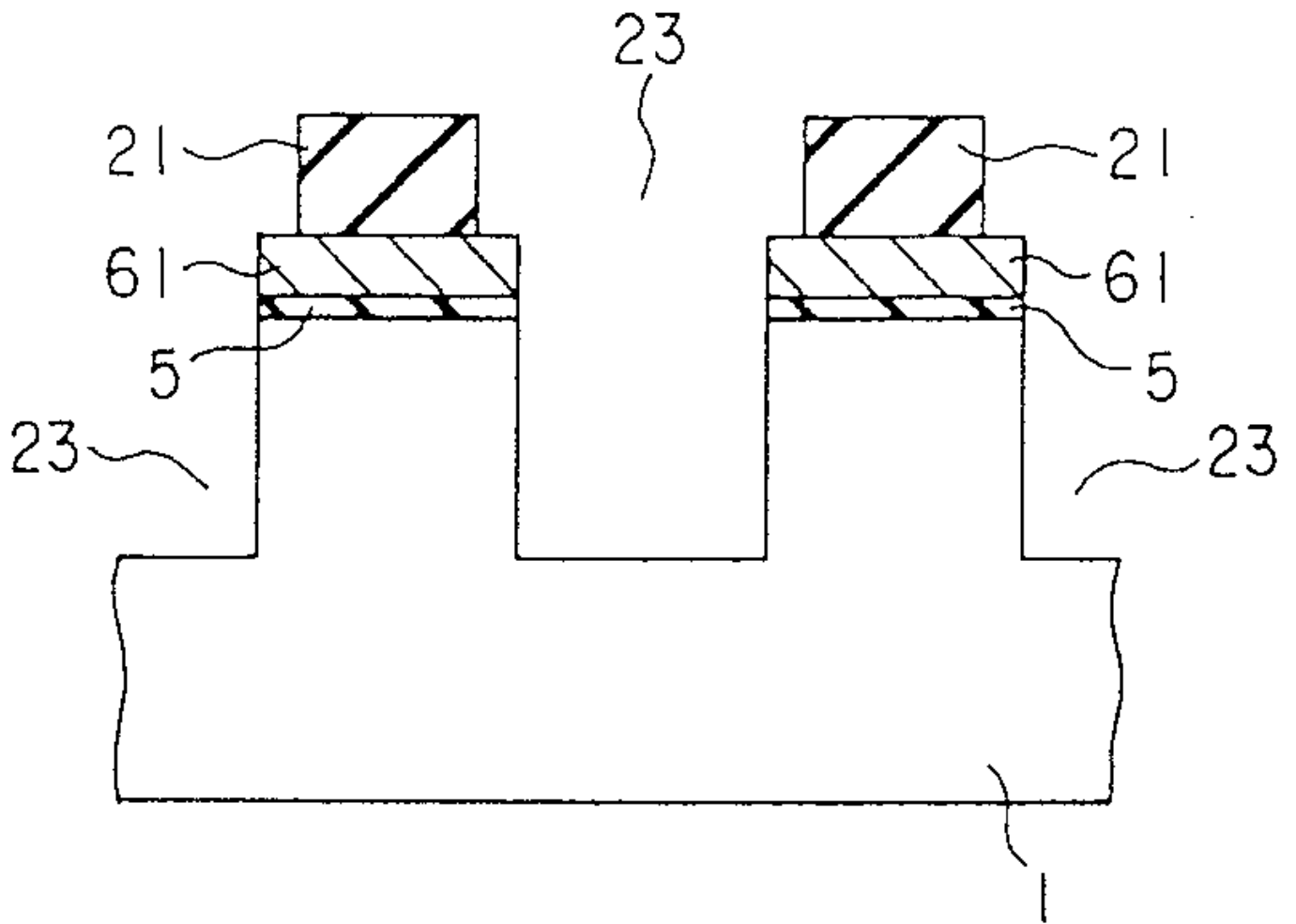
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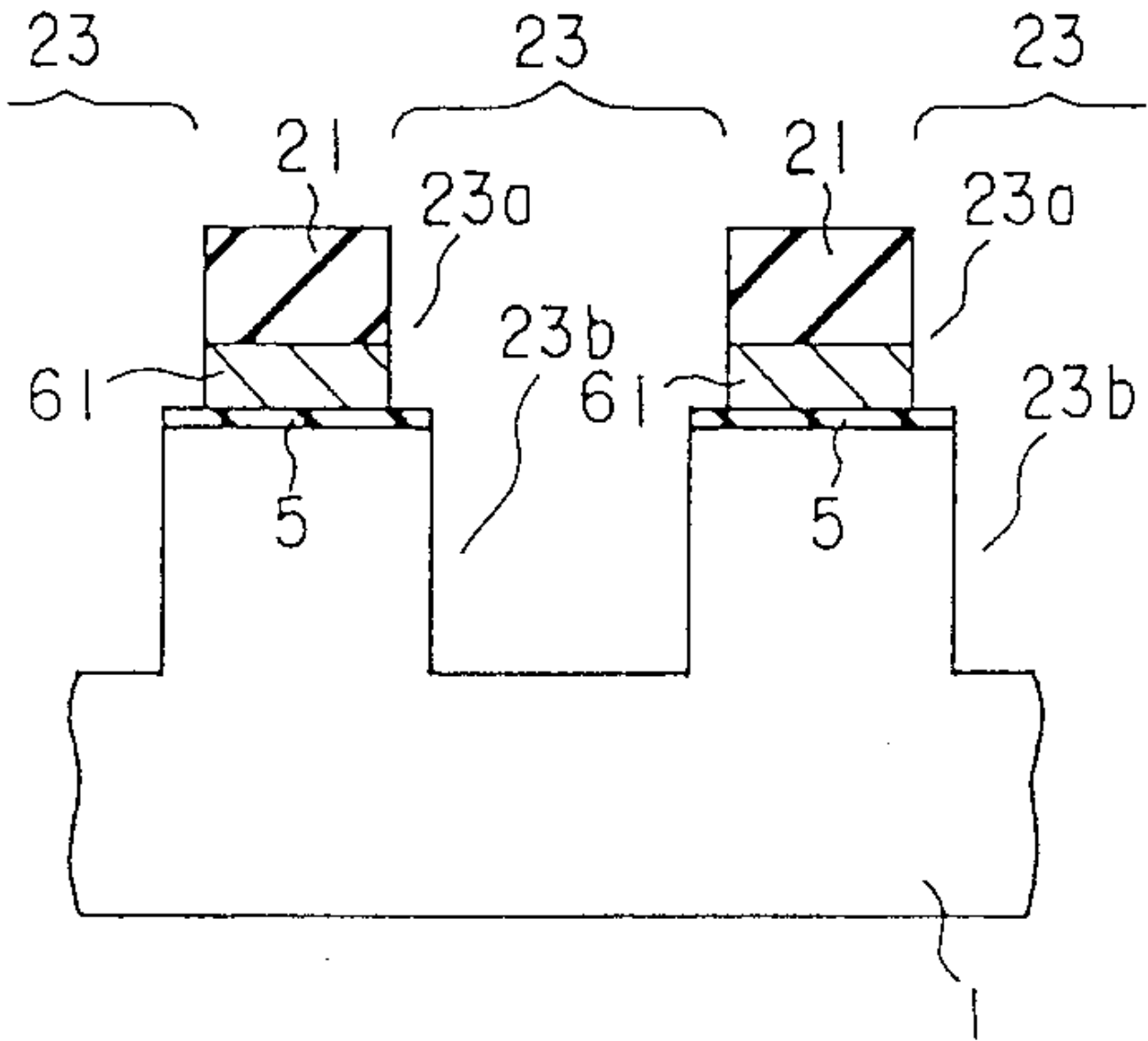


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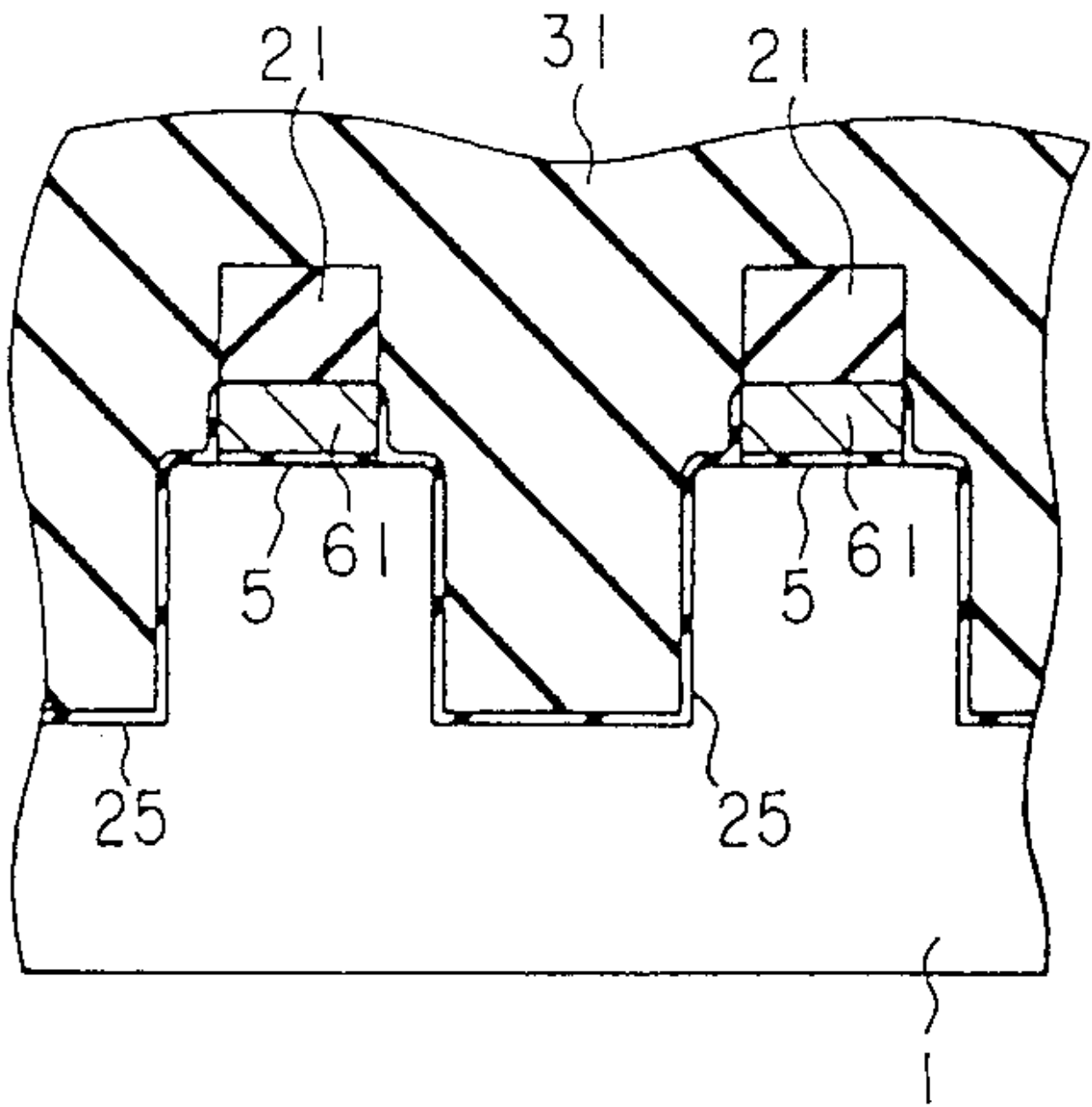


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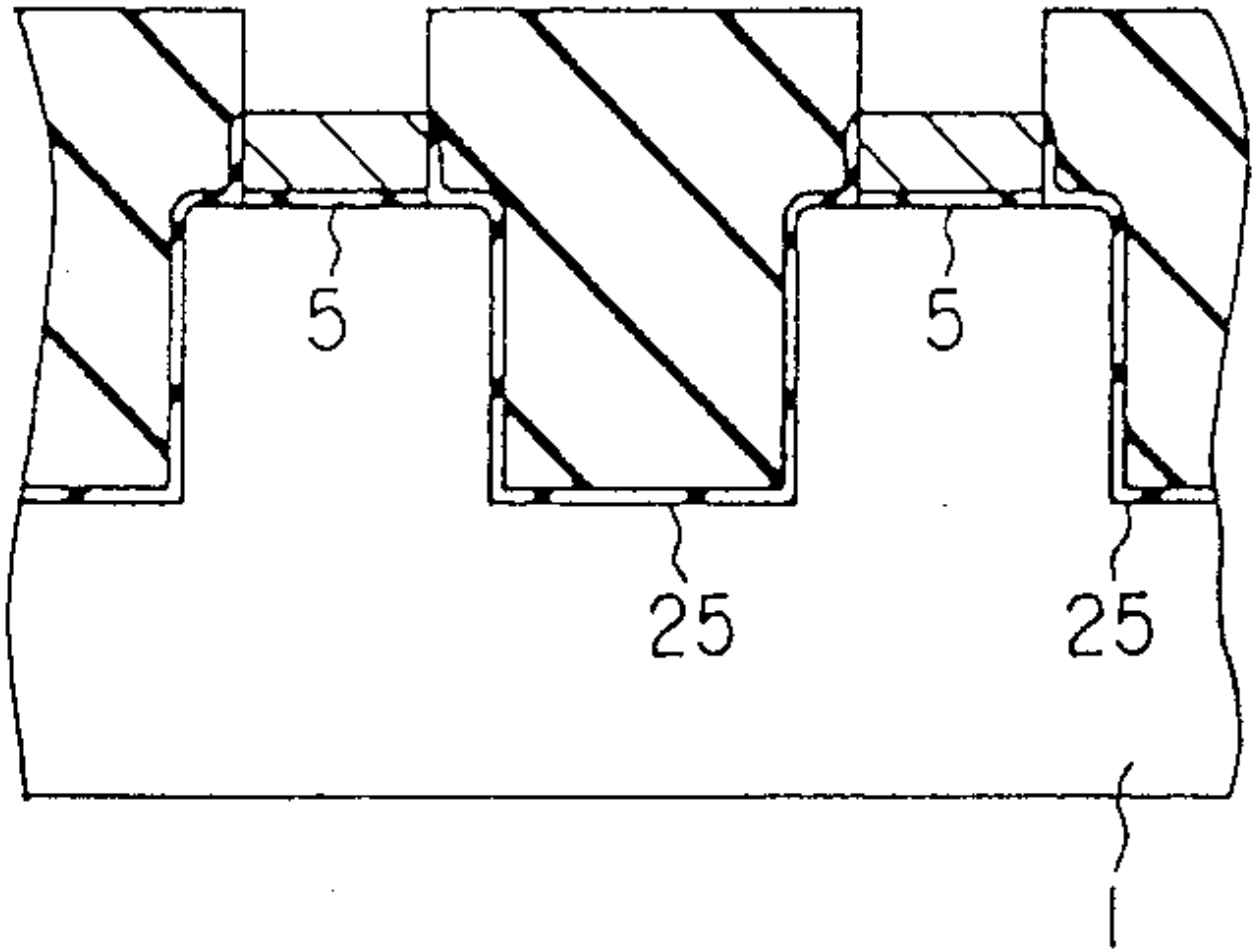


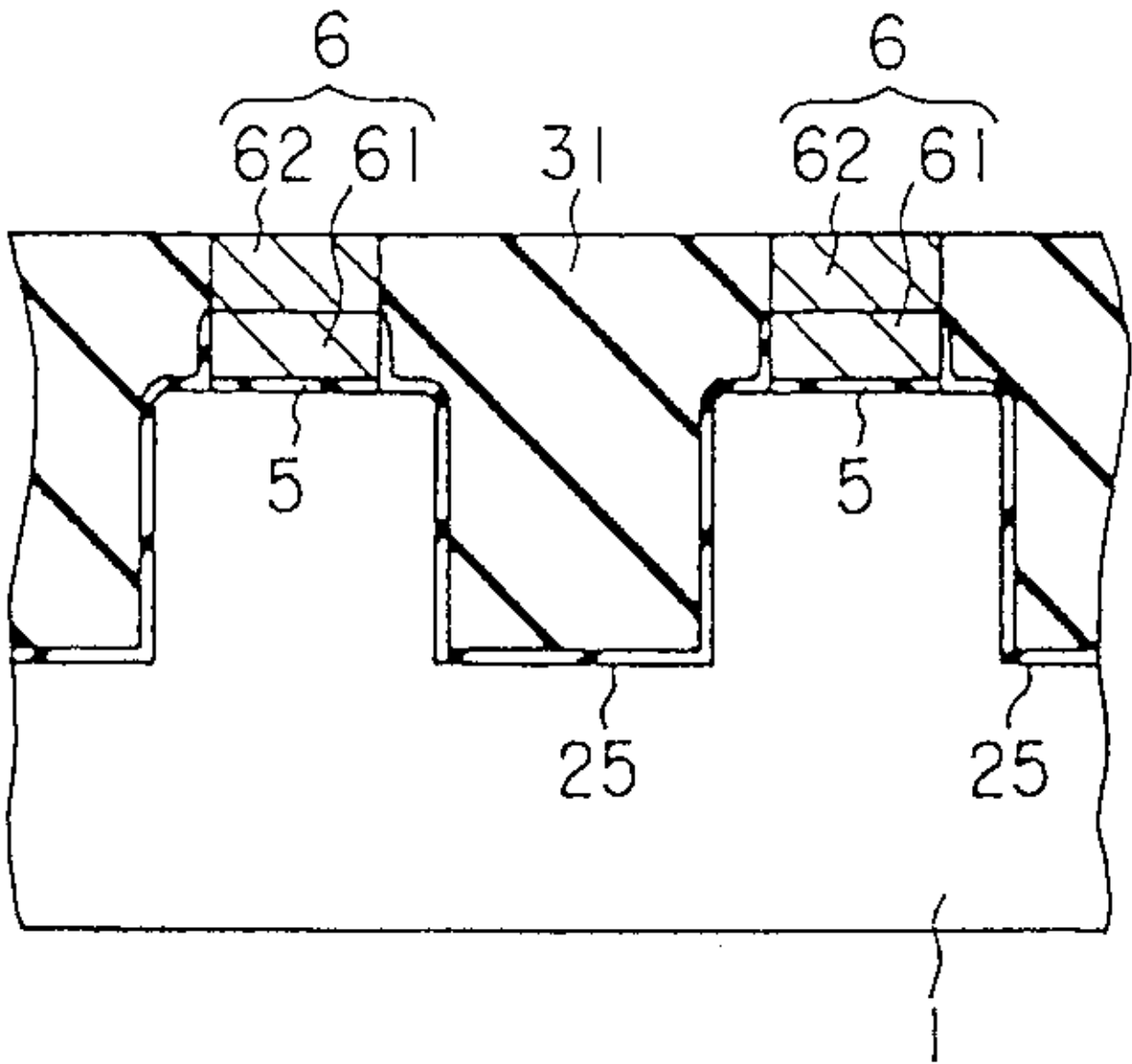


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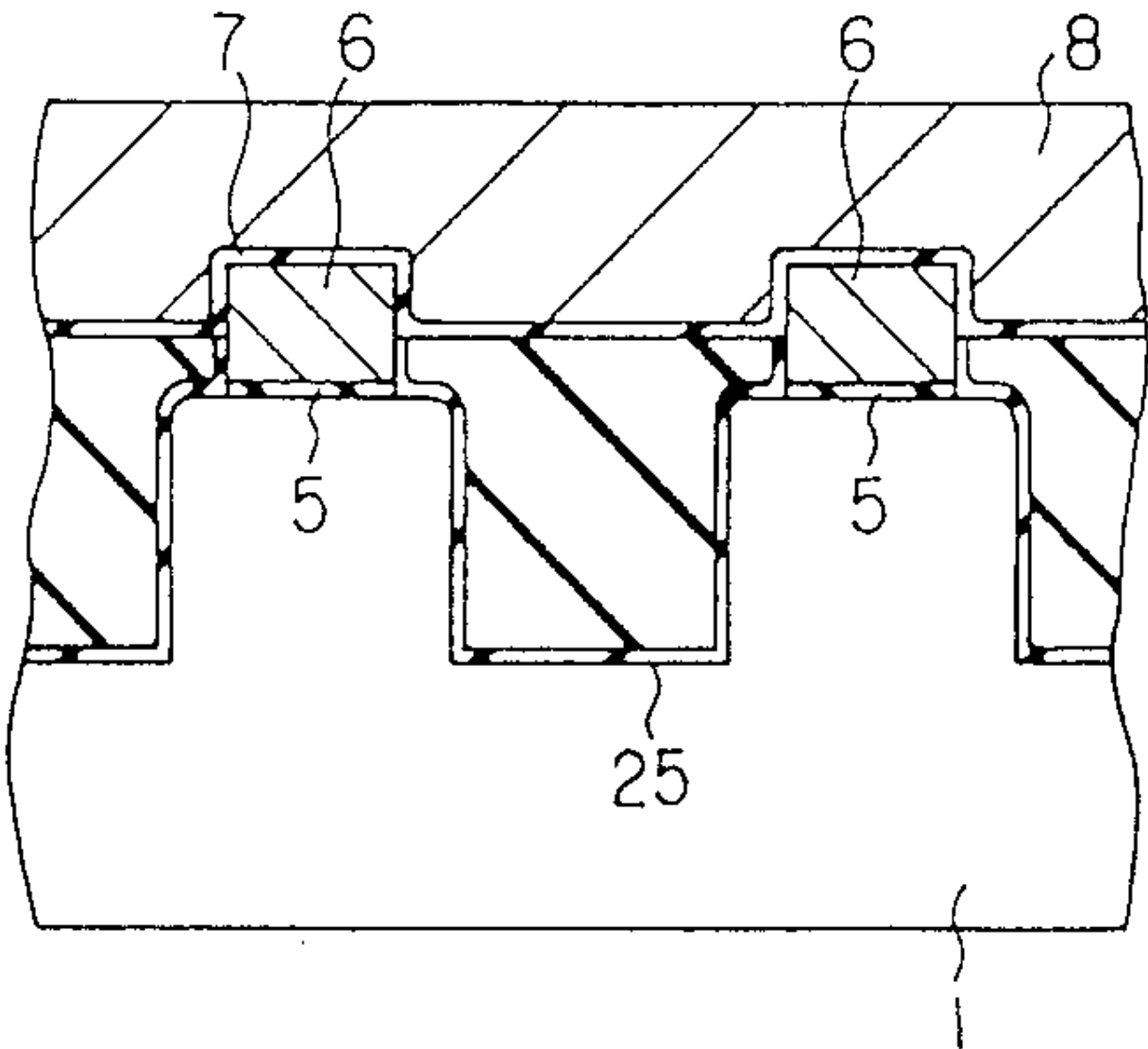


10





12



13

