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2004 10 06

(21) 10-2003-0018446
(22) 2003 03 25

(71) 416

(72) 897 202 1003

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2 1 2-2 .

3 4 가 .

4 1 .

5 16 1

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6 5 가 ,

7 6 7-7 ,

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9 8 ,

10 9 10-10 , 가 ,

11 ,

12a 12e ,

13 가 ,

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16 .

17 1 4 1

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18 2 .

19 21 2

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19 15 ,

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22 2 1 3 가 2

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23 3 .

24 3 4 3

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25 4 .

26 4 3 3 가 4

27 5 .

28 5 4 5

29 6 .

30 6 5 3 가 6

31 1 4 가 7

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30, 130 : 31, 131, 231 :

32 : 33 :

34, 134, 234, 334, 434, 534 :

36 : 37, 237 :

38 : 40, 140 :

42, 642 :

44, 144, 244, 344, 444, 544 :

45, 245, 445, 645 : 46, 146 :

47, 147, 247, 347, 447, 547, 647 :

50, 150, 250, 350, 450, 550, 650 :

52, 152 : 54, 154 :

72, 172, 272 : 76 :

80, 180, 280 :

60, 160, 260, 360, 460, 560, 660 :

90, 190, 290, 390, 490, 590, 690 :

174, 374, 574 : 178 :

452 : 644 :

가 가
 ()
 가 가
 JEDEC(Joint Electron Device Engineering Council), EIAJ(Electronic Industry Association of Japan)
 1.2 가

, DSP(digital signal processor), ASIC(application specific integrated circuit),
 (micro controller), DRAM(dynamic random access memory),
 (flash memory)
 50

가 가 가 가 가 가
 가 가 가 가 가 가
 (wafer level) 가
 (semiconductor wafer)가

가
 1 (20) 2 1 2-2
 1 (28) (23)
 1 2 (20) (12; silicon substrate) 가 (11; chip pad) (14; semiconductor chip) (21; metal trace layer)
 (11) (12) (23; ball pad) (28; solder ball)
 (14) (12) (11) (13; passivation layer) (11) ((11) (Al) (13)
 (13) (21) (13) (11)가 (22) (22; dielectric layer; middle) 1 (22) (23)
 (21) (11) 1 (22) (12) (23)
 (24; 2 (23) (23) (12) (13) 1 (22) (24) (23)
 (23) (28) (11) 1 (22) (28) (23) (21) (25)

(20)

가
가

가 가

6877 (2001.01.26)
(1) 4

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(10)

(10)

(2)

(1)

(10)

(1a)

(2)

(3)

(3a)가

(10)

(3)가

(4)

(5)

가

가

200 μ m

가 가
가 가
가

1

2

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가

가

가

가

가 , 가 , (a) ,
 ; (c) 가 ; (d) ; (b)
 ; (e)
 가 ; (f)
 ; (g) 가 ;

2

가 가 가 가

2

가 가 가 가 가

가

2

가

(80)

4

4 1 (34) (39) (44) (80;) 4 ,
 1 (50) (31) (44) (31) (37)
 (35) (50) 가

(34) (32) 가 (31)가 (35)
 (35) (39) (31) (37)가 (37)
 (38) (50) (37) (44) (31) (41)
 (39) (44) (45)가 (41)
 (43) (45) (47)가 (80) (39)
 (39) (34) (34) (80)
 (39) (44) (44) (47)

type) (34) (35) 가 (31)가 (edge)
 (31) (37)가 (31) 가 (35) (33)
 60μm 가 100μm×100μm(가 ×)

(50) (45) (39) (5)
 37) (52) (35) (37) (31) (5)
 2) (54) (52) (54)
 (52) (54) (35) (37) (35) (52)
 (38) (38) (32) (37) (37)
 (37) (52) (38) (54) (52)
 (54) (45) (stud) (54)

(44) (37) (49) (42)
 (39) (41) (43) (49) (49) (45) (45)
 47) (44) (43) (49) (45) (45)
 (47) 1 (80) 3
 (31) 가
 1 (41) (42)

(72) (39) (41) (7)
 2) 가
 5 16 1 5 16

(30) (40) 5
 (32) (34) (34) (34) (36; scri
 be line) (34) 가 6 16

(34)

6 7 , (34) (32) (31) 가 , ,
 (31) (32) (33) (31) (31) (Al) , ,
 (33) 가 , (31) 가 (31) (36) (,
 34) 가 (31) 가 (34) 가 (

8 10 , (42) (44) , (44)
 (40) (40) (46) (46) (44) ,
 (43) (46) (44) (41) ,
 (45) (52)가 (43)
 (47) (44)
 (42) , (41)
 (49) (45) (45) (41)
 (43) (49) (45) (47) (40)
 (52) (41) (45)
 (stud) (52) ,

(40) , (45), (52) (47) (Au)
 , / (Ni/Au)

11 , (34) (37) 가 , ,
 (31) (37) (37) (31) (37) (,
 39) (39) (37)가 (37) (37) ()
 (39) (40) , (39)
 (30) (37)

12a 12e , (37) (38) 가 , ,
 (38) (37) (37) (37) (38) ,
 (38) (37) (37) (32) (32) ,
 (37) (32) (37) (32) (32)
 (37) (31) (37) (38) (32)

) (37) (38) , 12a (35) (35)
 (31) (33) (38a) (38a) (35) (38a)
 가

12b , (38) (71) 가 , ,
 (71)가 (38) (35) (71) (71) 가 , ,

12c , (71) 가 , (35) (35)
 (38a) (71) (71) (37) (71)가
 (37) (71) (38a) (71)가
 (etching mask)

12d (38a) (38) (37) (37) (71) (71) (37) (35)

38) 12e (37) (37) (

13 (39) (37) 가 (76) (39) 8
 0μm 720μm 가 8
 80um 200μm 가 100μm 가

(39) (76) (Chemical Mechanical Polishing; CMP), (Chemical Mec

14 (41) (52)가 (72) (40) (30) (41) (39) (40)
 가 (30) (37) (30) (40) 130μm

(72) 가

15 (54) (37)가 가 (31) (37) (52) (ball placement), (plating)
 (stencil printing) (metaljet) (54) (31) (37) (3)
 7) (52) (52) (54)가 (50) (31) (54) (37) (52)

(37) (52)가 (37) (54) (52) (37) (52) (45)

2) (52) (54) (35) (35) (37) (5) (37)

(37) 가 (37) (52)가 (54) (54) (37)
 (50) (37) (54)

16 (78) (80)가 (36) (30)가 (80) (40) 가

17 1 (90) (80) 4 가 3 17 (80) 4 1 (90) 1
 (54) (47) (47)가 (60)가 (60) 가
 (60) 가 (44)

(44)

(44)

(60)가

1 (90) 1 (80) 4 가
 , 1 (80) 2
 가 1 1
 (180) 18 2 18 2 (180) (154)
) (160)가 (135) 1 (174) (147)
 9 21 2 2 19 21 1
 , 2 (154) 1 5 15 가
 , (154) (154)
 19 (174) (154) (174) (174)
 (135) (transfer molding) (injecting molding) (screen printing)
 (dispensing)
 20 (160) (160) (160) 가 (147)
 가 (160) (ball placement), (plating), (stencil printing)
 (metaljet)
 21 (178) (146) (180) 가 (140)
 (130)가 (180)가
 , 2 (160) (160)
 , (160) 가 2
 22 2 (180) 1 (80) 3 가
 2 (190) (190) 22 2 (80) 2 (60)가
 (190) 1 가 , 1 (47) (54) 2 (147)
 180)가 가 , 1 (80) (147)
 가 (147)가 , 2 (147)
 가 (180)가 , 1 2
 2 (190) 1 (80) 2 (180)
 (180) , 2 , 2
 1 (147)가 (80) , 1 , 2 (54)가
 2 (147) , 1 , 1 (80)
 1 (47) (60)가 1

2 , (190) (174)가 2 2 (180)가
 , 2 (80) 3 가 (190) 2 (180) 1 (180)가
 144) 2 , (131) (180) (154) (134) (147)가 (180) (가
 23 3 (280) (280) 23 , 3 (239) (2
 44) , (244) (231) (237) (250) (2
 31) (250) (237) (231) (250) (250)가 (250) ((가
 237) 가 (231) (231) (250) (250) (250) (250) (가
 1 (231) (247) (250) 3 (244) (280) (245) (가
 (231) 가 (247) (247) (231) (272) (239) (241) .
 24 3 (280) 4 3 (290) 3 (290) 3
 (290) (280) 4 가 3 24 , 3 (247)가 ,
 (250) (247) (260)가 .
 3 (290) 1
 3 , 3 (290) 3 (280) 4 가
 25 4 (380) (350) (380) 25 , 4 (374)
 , (347) (360)가 (335) 3 (가
 가 , 2
 26 4 (380) 3 (280) 3 가 4 (390)
 3 (390) 26 4 , 4 (380)가 (24
 7) (260)가 3 4
 4 (390) 2 ,

27 5 (480) (480) 27 ,
 5 (452) (480) (439) (445) (441) 3
 (450) (445)가 (452) (439)

28 5 (480) 4 5 5
 (490) (480) 4 가 3 28 , 5 (490) 5
 5 (490) 3 ,

29 6 (580) (580) 29 , 6
 (560)가 (535) (574) (547)
 , 2 가 5 ,

30 6 (580) 5 (480) 3 가 6
 (590) 6 30 , 6 (590)
 5 5 6 (580)가 (460)
 가 (447)

6 (590) 2 ,

31 1 (80) 4 가 (640) 7 1
 (690) (80) 4 가 3 (640) 7 (690) 1
 가 (47) (640) (54) (644) (54)
 (643) (660)가 가 7 1 (690)
) (44)

(640) (642) , (641) (643) (648)
 (648) (54) (641) (645)
 (647) (643) (645) (641) (645) (31) (

642) (a) (641) (643) (

b) (645) (647) (641) (643) (

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8 9. ,

9 10. ,

10 11. (stud) ,

2 12. ,

2 13. ,

1 14. , ;

1 15. ,

1 16. , , ,

1 17. , 가 ,

17 18. , ;

17 19.
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1 20.
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20 21.
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20 22.
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23 23.
13 2 ,
가 ,
가 가 .

23 24.
, 가 가 .

25 25.
13 2 ,
가 ,
가 ,
가 가 .

25 26.
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, 가 ;
가 , 가 ;

19 27.
19 2 ,
가 ,

가 가

27 28. 가 가

29 29. 19 2

가 가

가 가

29 30. 가 ;

가 가 ;

31. 22 2

가 가

31 32. 가 가

33. 22 2

가 가

가 가

33 34. 가 ;

가 , 가 ;

35.

(a) , 가 , 가 ,
, 가 ;

(b) ;

(c) ;

(d) ;

(e) 가

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(f) ;

(g) 가 ;

36.

35 (a) , ,
, 가 , ,
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37.

35 (a) , ,
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38.

36 37 ,

36 39. 37 ,

35 40. (b) ,

35 41. (b) ,

35 42. ,

42 43. ,

43 44. ,

35 45. (e) ,

35 46. (f)

35 47. (g) 가

35 48. (f) (g) ;

48 49. , ;

49 50. , ,

49 51. (g) 가

35 52. 2

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가

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53.

52

, 가

가

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가

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가

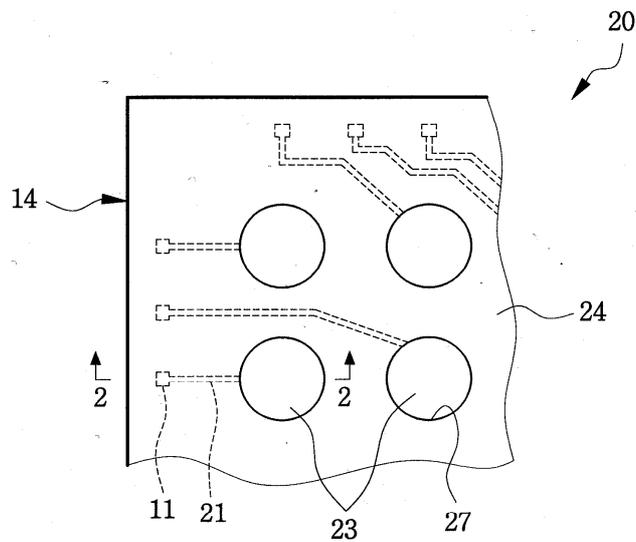
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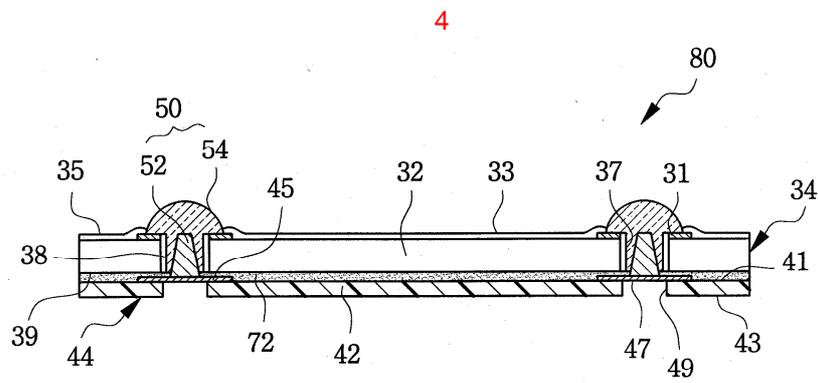
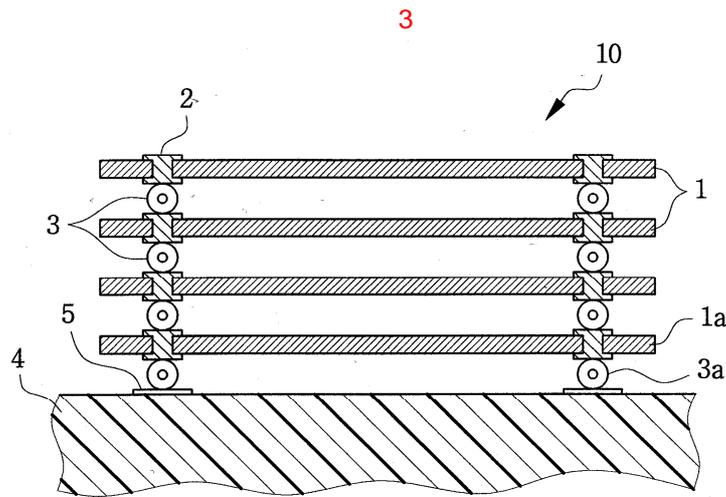
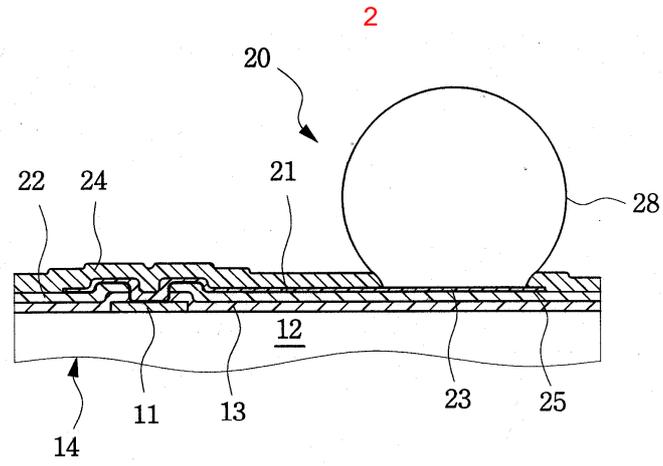
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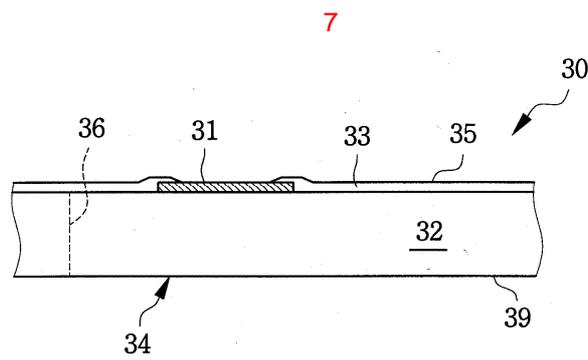
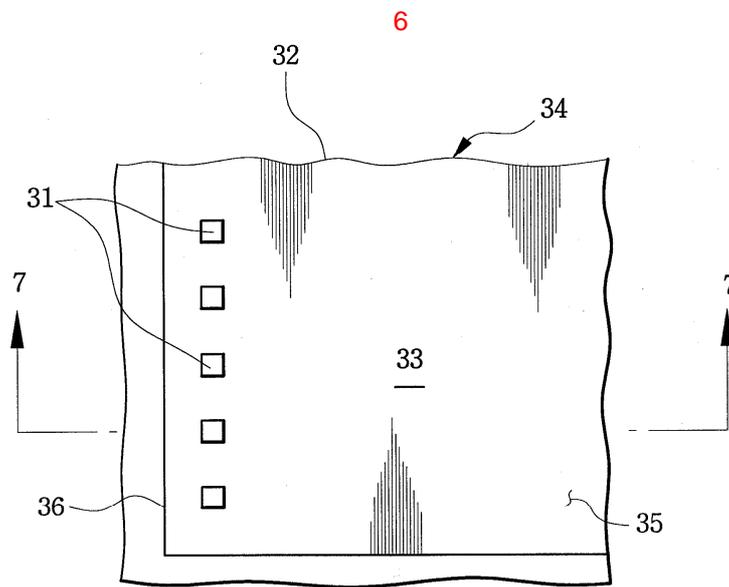
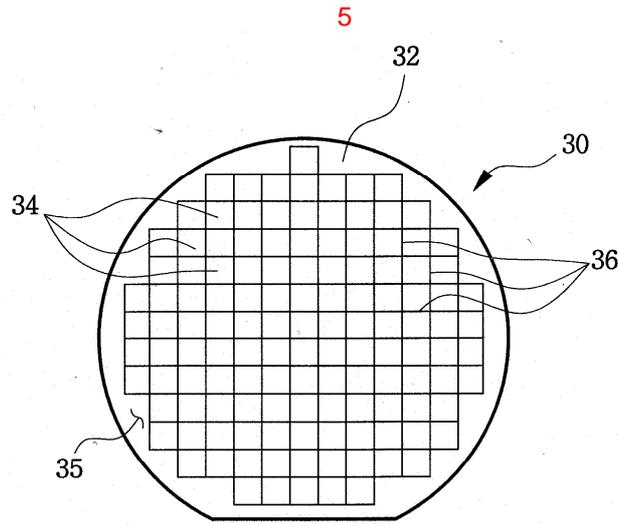
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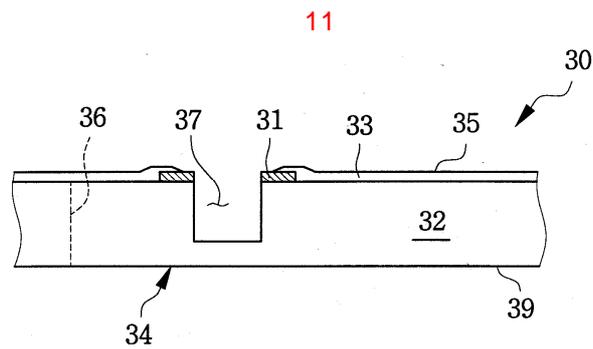
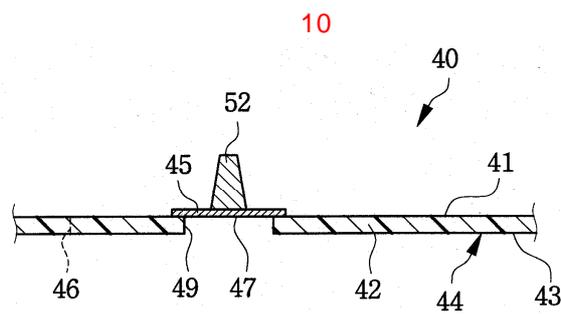
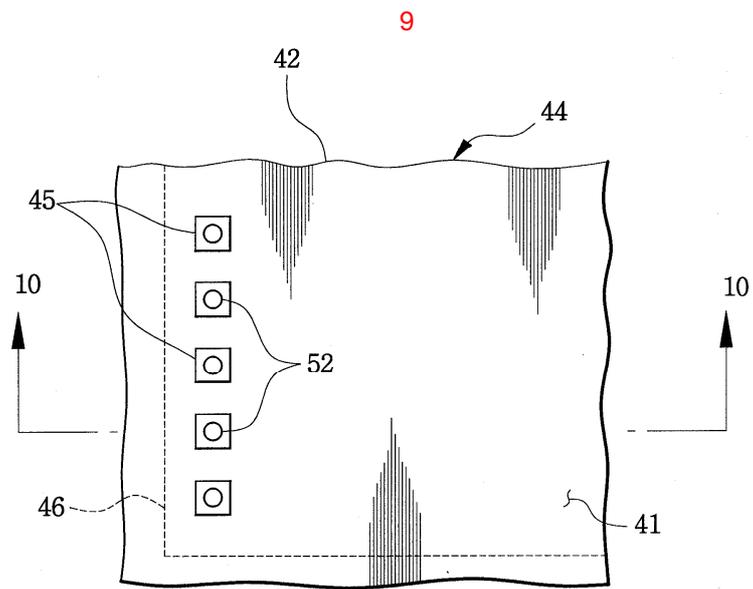
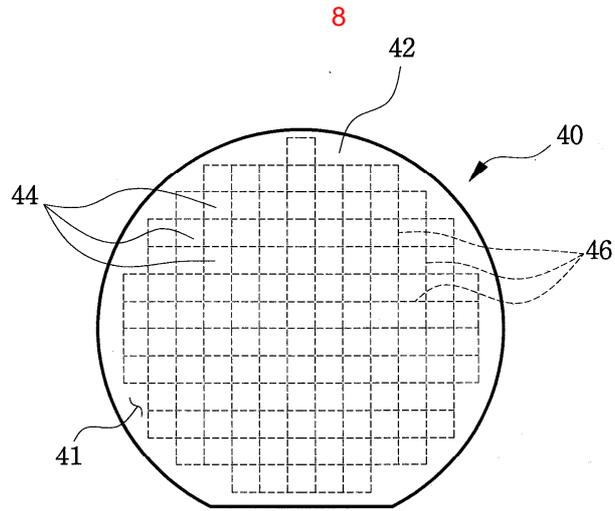
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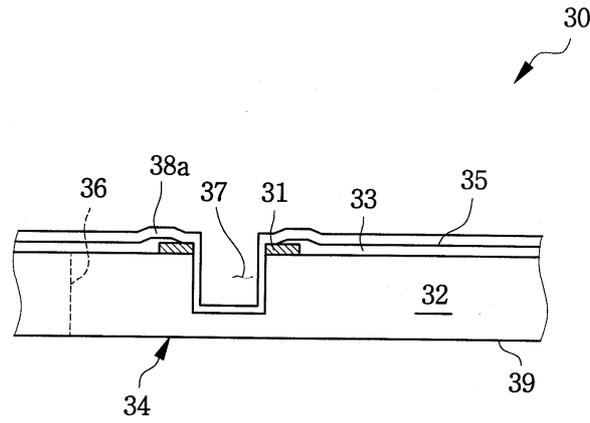




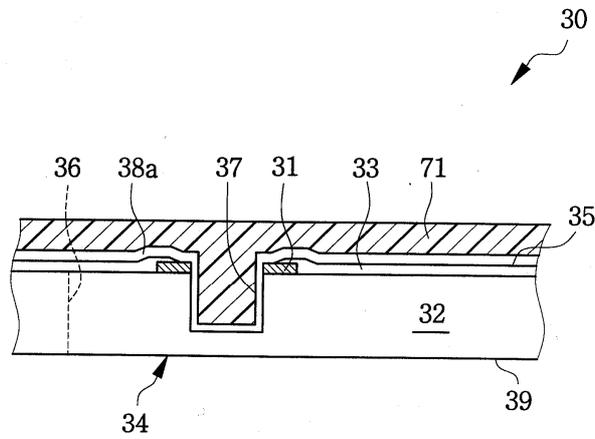




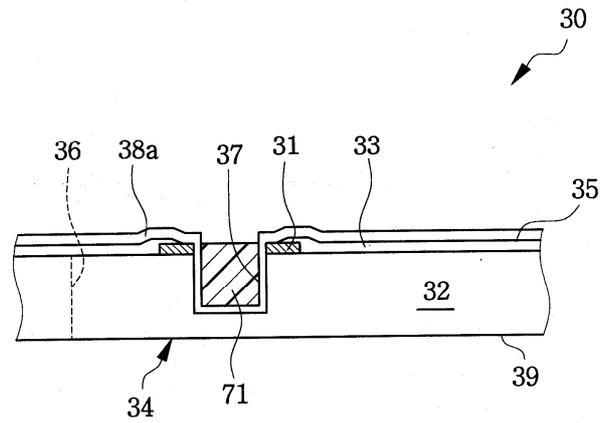
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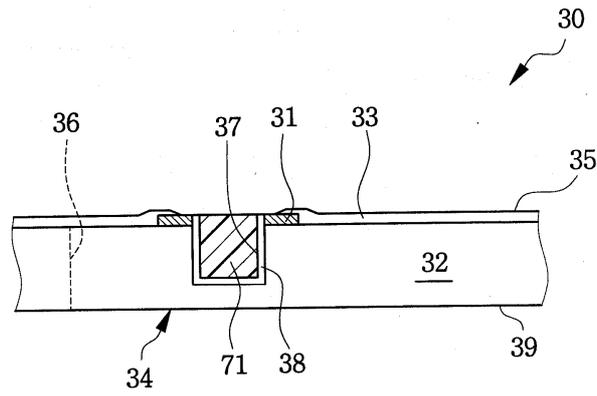
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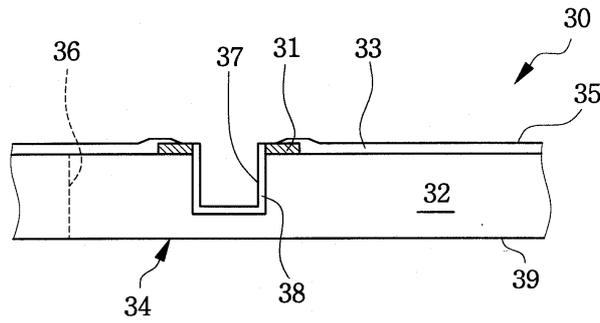
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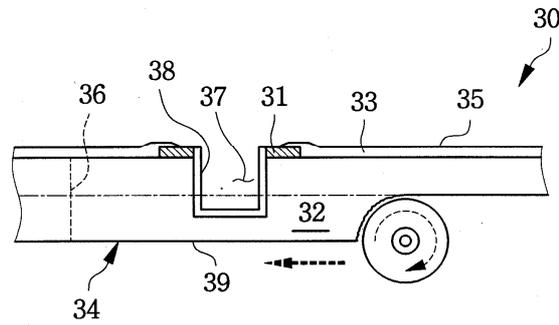
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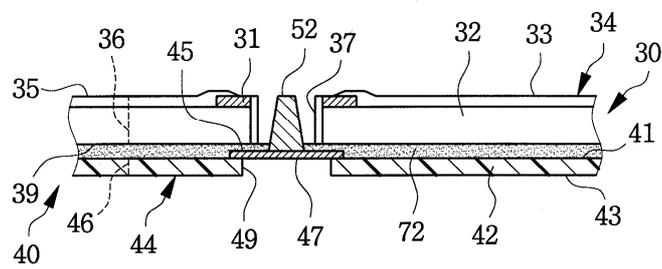
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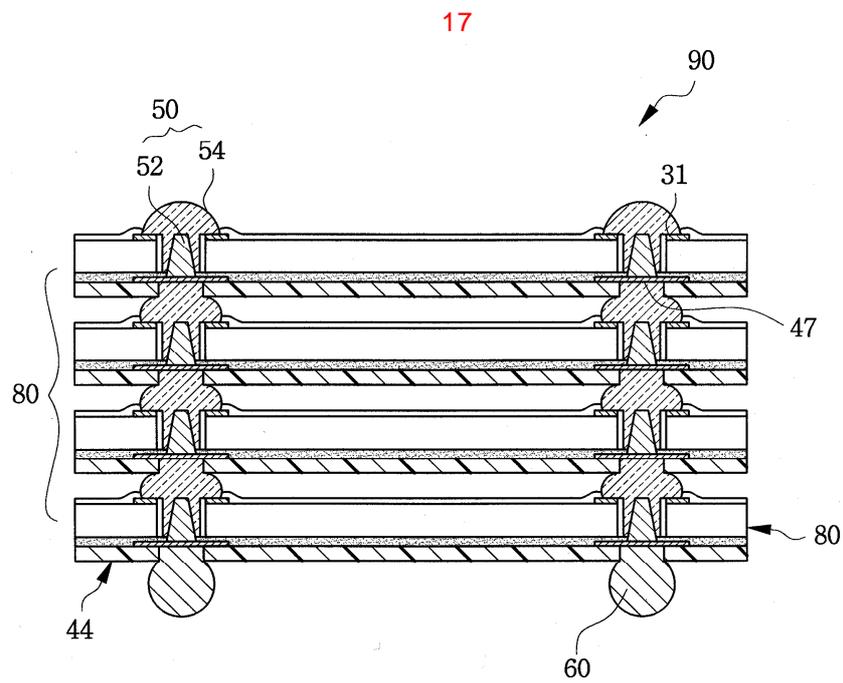
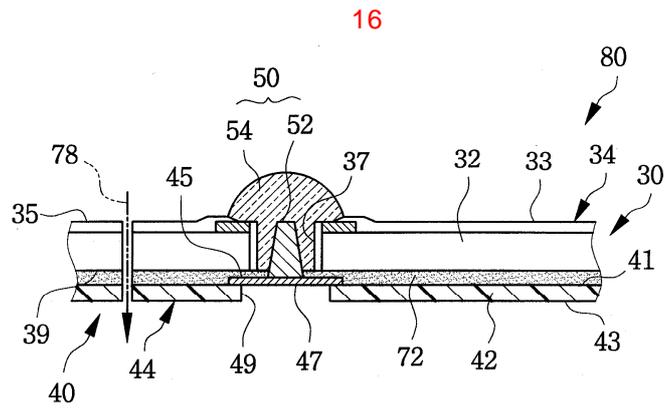
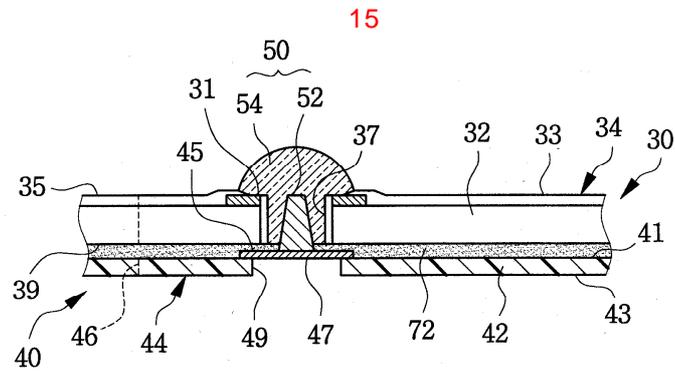


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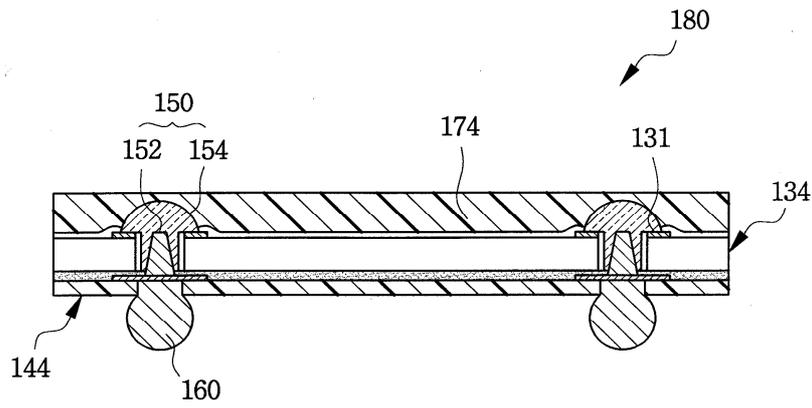


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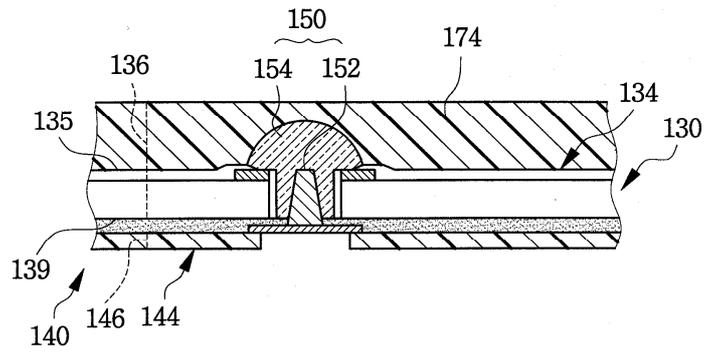




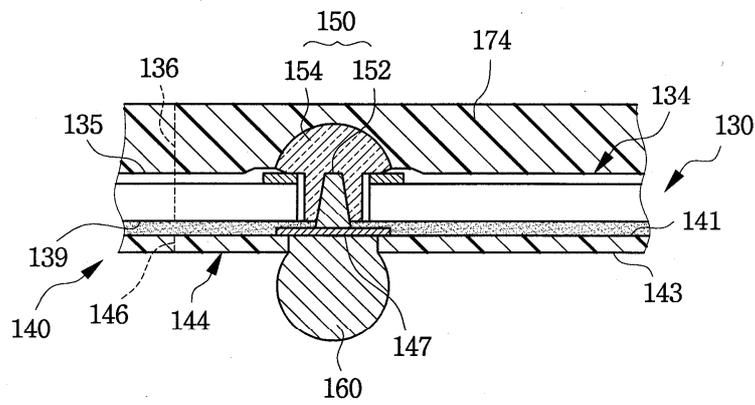
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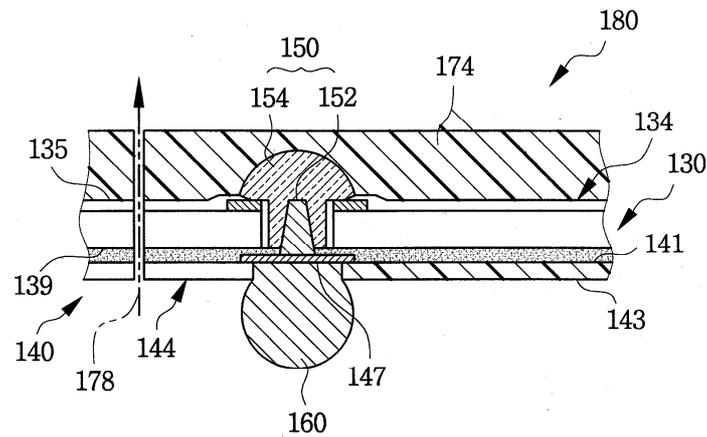
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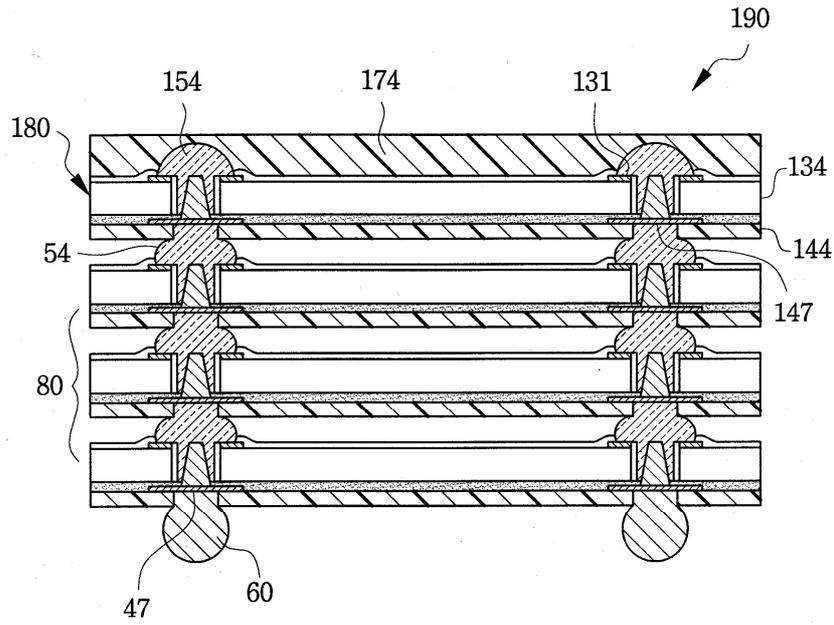
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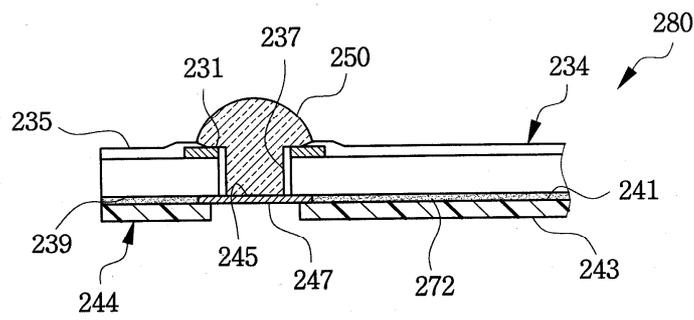
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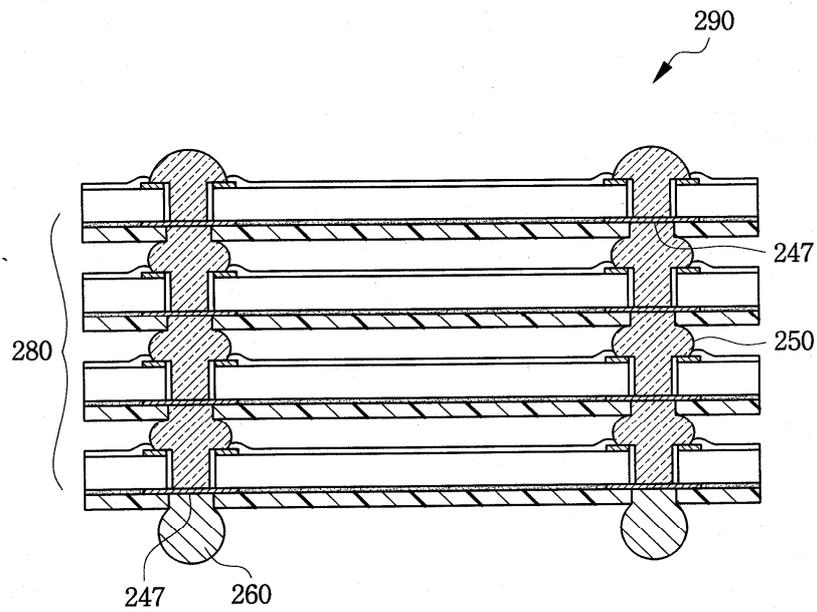
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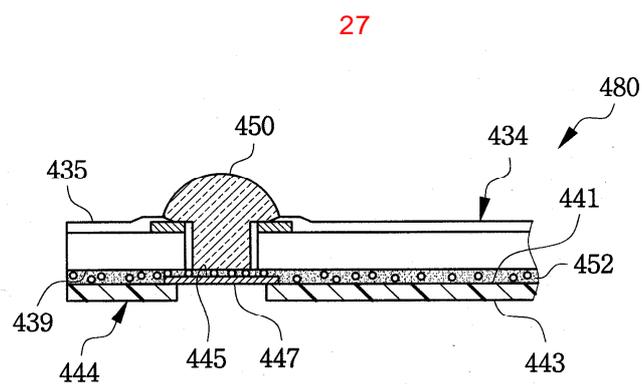
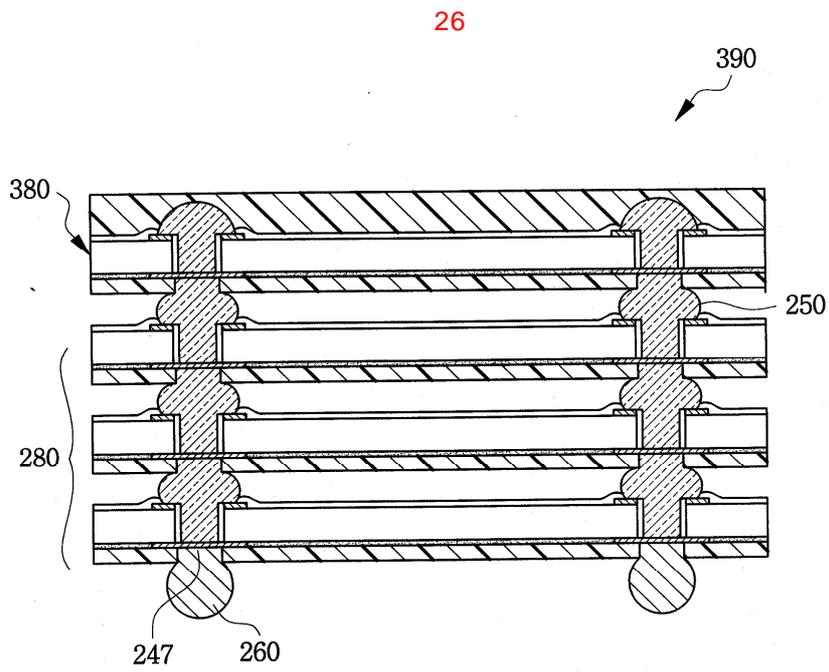
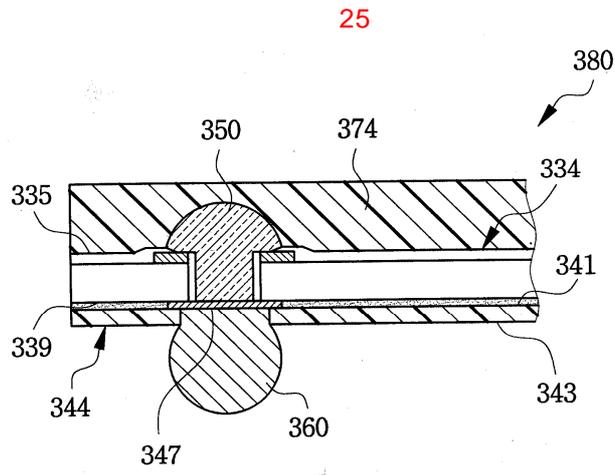


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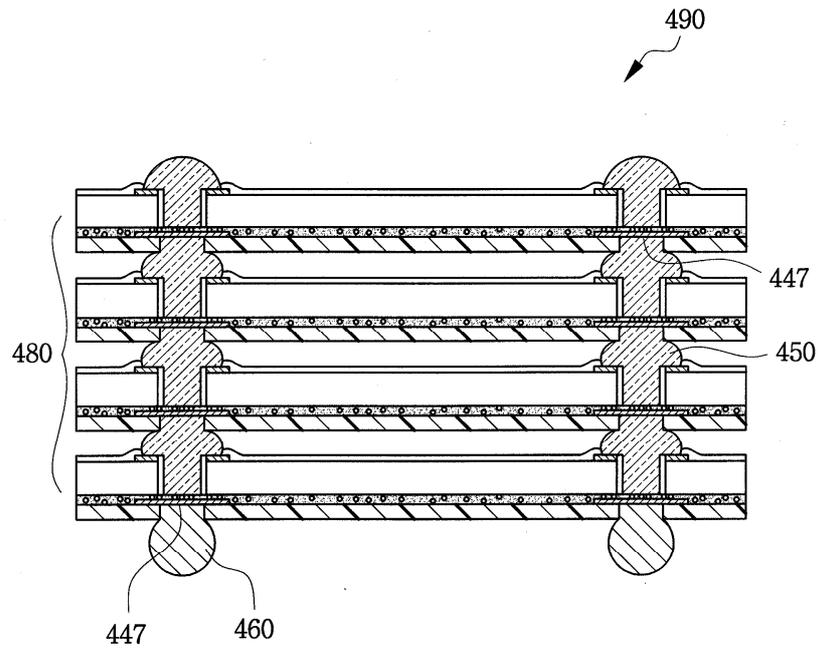


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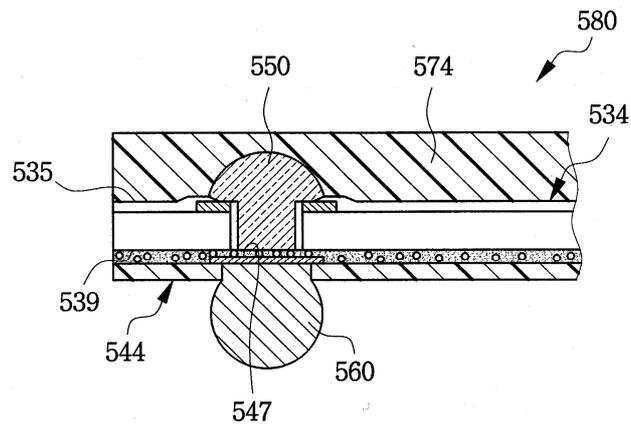




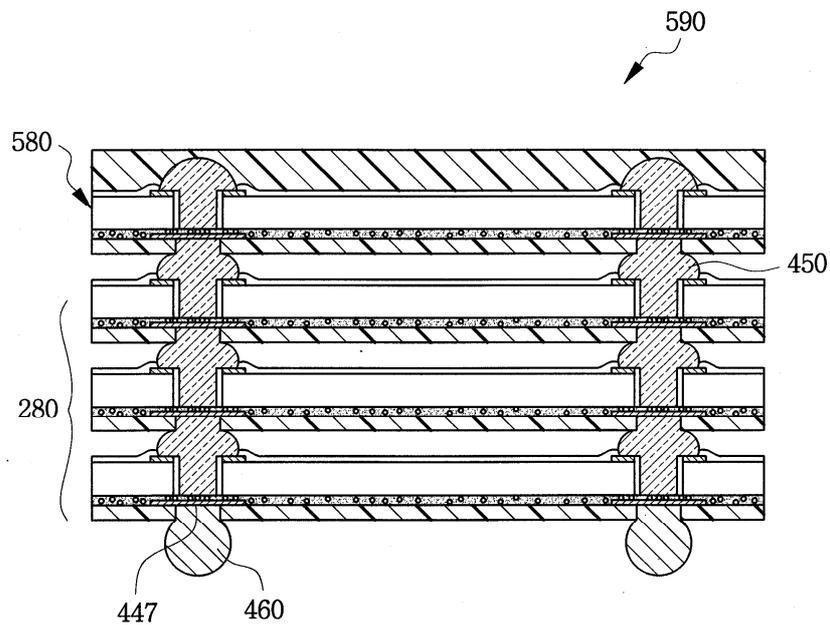
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