

(19)
(12)

(KR)
(B1)

(21) 10 - 1999 - 0042216 (65) 2001 - 0035578
(22) 1999 10 01 (43) 2001 05 07

(73) 3 416

(72) 4 5 201
1 629 - 1

(74)

(54)

4c

, PVA, , , , ,

- 1 ,
2 ,
3a 3b 1 2 ,
4a, 5a, 6a, 7a, 8a, 9a, 10a 3 9 ,
4b, 5b, 6b, 7b, 8b, 9b, 10b 3 9 ,
4c, 5c, 6c, 7c, 8c, 9c, 10c 3 9 ,
11 ,
12a ,
12b B ,
13 ,
14 B, C, D ,
15 B, C, D ,
16 C, D 가 ,
17a ,
17b ,
18 가 ,
19 20 11 B J 가 ,
21 11 B, I, J ,
1 11 9가 ,
2 11 9가 .

가

,

, 가

, (vertically aligned; VA)

가 가
가 가

가

, (normally black mode)

(off) .
가 가

가

가

(texture)

가

가

1

(1)

(2)

(3)
가

(3) 가

1a

(1, 2)
(1, 2)

(fringe field) 가
(A) 가,

(B) 2

(nematic)

가

가

1 1 가 , 1
 2 1 가 , 1 2
 , 1 2 .
 1 2 1 2 1 2
 1 2 .
 1 2 , 2 1 2
 1 2 , 1 2
 1 2 .

1 , 2 1 2
 2 3 , 1 2
 2 1 2 , 1 2
 1 2 , 1 2
 1 2 .
 1 2 , 1 2
 1 2 .

1 2 45° 1 2 , 1 2
 1 2 .

, 1 2 1 2 , 1 2
 1 2 , 1 2 , 1 2
 1 2 .
 1 2 , 1 2 , 1 2
 1 2 .

, 2 90° 1 1 1 1 1 2
 2 .

1 1 가 , 1 2 , 1 2
 2 가 , 1 2 가 1 2
 2 .
 2 , 1 2 , 1 2
 2 .

4

1 2 10μm 16μm

2

(10) (10, 20) (20) (30) (10) (20)

(12) (11) (10) ITO(indium tin oxide) IZO(indium tin oxide)
 가 ,) 가 . , (12) (11)
 (10) (14) . , (12) (on) (off) . ,
 , , , (14)

, , (20) (21)
 가 (22) ITO IZO (21) (22) (10)
 . , (23) . , (24) .
 , (14) (24) (normally black mode)
 , (normally white mode)

3a 3b 1 2

, 3a , (1, 2) (3) 가
 가 . 1

3a (1, 2) (texture) 가
 () .

, 3b , (1, 2) 가
 1 .

4a, 5a, 6a, 7a, 8a, 9a, 10a 3 9
 , 4b, 5b, 6b, 7b, 8b, 9b, 10b 3 9
 , 4c, 5c, 6c, 7c, 8c, 9c, 10c
 3 9

3

4a , , (12) 가 1 (121) 가 (121) 가
 , 1 (121) 가 (121) 가 1 (121) 가
 1 (121) (12) 가 2 3 (122, 123) 가
 (122, 123) 가 . 2 3 (122, 123) 1 (121) 가
 , . 2 3 (122, 123) 1 (121) 가
 , 가 1 (121) .

4b	,	(23)	가		(211),	(211)		
	가	1	2 가	(212, 214),	1	2 가	(212, 214)	
	가	1	2 가	(213, 215)		4	가	.
1 가	(212)				(221),	(221)	가	(23)
가	(222),	(221)			(223)		5	4
	5		6	가	.		4,	5
	(23)		.				6	

4c , (12) 1 3 (121, 122, 123) (23) 4 6 가
 (12) . , (12) (121, 122, 123)
 (23) . 1 6 (12) 1 (12)
 1) 4 (211), (12) 4 가 (213, 215) 2 3
 가 (222, 232) (223, 233)

, 4c , 가 (14, 24)
 가
 1
 ,
 90°
 4
 4

4

5a , (12) 1 (121) 1 (121)
 (12) 2 (122) 1 (121) 2 (122) 가
 (12) . . , 1 (121) 2 (122) 가

5b , (23) (211) (211) 가

가 가 가 (212) 2 가 . , 2 (211) 가 가 (212) 가 (211) 가
 가 (212) 가 . (23) 1 2 가 (222, 223) (221) 3 (221)
 . , 3 2 .

5c , (12) 1 (23) 2 3 가 . , 1 (12)
 (12) 1 가 가 (212) (12) (12) (211) 2

, (14, 24) 1 가 가 .
 , 3 .

5 .

6a , (12) 1/3 2 (122) 가 , (122) 가 (12) 1 (121) . (121,
 1/3 122)

6b , (23) 1 (211) 1 (211) 3 (213)
 2 (212) 2 (212) 3 가 .

6c , 1 2 3 (12) 3 1 (12) 3 가 2

, (14, 24) 1 가 가 .

6 .

7a , (12) 1/3 1/3 1 (121) 2
 (122) 가 (12) 3 .

7b , X 3 5 (210, 220, 230) 가
 . (210, 220, 230) .

7c 3 , 1 2 (121, 122) 3 (12)
 5 (210, 220, 230) 가 4 .

, (14, 24) 가 (0°) , 45° 135° 가 .

7 .

8a	,	(12)			(111)	(111)		
			(112)		1	(12)		
			2	(120)가			(12)	
8b	,				3	4	(210, 220)	3
220)	가				5	6	(230, 240)가	4
.	,	5	6	(230, 240)				(210,
8c	,	(12)	1	(120)	(23)	3	(210, 220)가	(12)
	4		, 2		5	6	(230, 240)가	가
4	.						(12)	
,		(14, 24)		6		가	가	.
,					,			45°
		가			.			
,		90°			.			
		4			.			
8	.				.			
9a	,	(12)	1/3		가		1	(110)가
.								
9b	,	1	2 가	(212, 213)	(211),	(211)		
		(214)		2		(211)		
가		(23)		.	1	가		
3		(220)		,	2	가	(212, 213)	
.								,
9c	,	2	,	(110)	(12)		,	(211)
			1		3	(220)		3
,		(14, 24)			4		가	가
,					.			.
7	.				.			
9	.				.			
10a	,	(12)	4	가			.	
10b	,	(23)	2	3	1	(210) 4	가	,
(210)					(220, 230)가			1
1		(210)	,			.	2	
,				1		3	(220, 230)	
10c	,	(12)			1	(210)가	,	
0, 230)		(12)	.	.	2	(220, 230)	2	
(12)			.	.	3		3	(22

, (14, 24) 0 ° 90 ° 가

3 9 가

, 가 4

, (texture) (disclination)
가 가
가

가
가
가

, 90 ° 가 45 ° 가
가 (director) 가
가

가 가

11 9가

11

B, C, D E, F, G , I J
. A B, C, D 1

12a (test cell) (%) , 12b B

12a 12b , G 13% 가 , E, I, B, D, A, C, F, J

13 110 64

13 , B, C, D J
가 A I
가 2 (texture) , E, F, G

2 11 9가

4

, J 가 (). J 가 B 가 75%
B 90%

C, I, J . C 가 I J

B, D, E, I , B, D, I , , D, J

D . B, C,

14 B, C, D

20 40 D B C

40 C B

60 D 가 (가) . , 가

15 C, B, D

(가) , B . C 가 , D

16 C D 가

C 3.5V 가 D
5V 가
가

17

18

가 180° 가
가 ,
가 .

가 가 가

가 ,
 $13 \pm 3\mu\text{m}$ 가 . , (cell gap) $4\mu\text{m}$ $6\mu\text{m}$

() 가 ().

가 . , 가 . , 가 . ,
가 . , 가 . , 가 . , |

가 가 가

19 20 B J 가

19 4c . (12) 2 3 (122, 123)가 4c . , . 2 3 (122, 123)가
 (122, 123) (12)

가

가

가

20

8c

가

가

가

가

가

가

가

가

(a)

가

(b)

(c)

가

a

b

가 b

c

21

21

(57)

1.

() 1 ,

1 1 , 가 ,

1 2 ,

2 2 , 가 ,

1 2 , , 2 ,

1 2 , 가 , 1 2 ,

2.

1 ,

1 1 1 1 ,

2 2 1 1 ,

3.

2 ,

1 ,

4.

3 ,

2 2 1 가 ,

1 , 3

1 2

5.

4 ,

2 가

6.

2 ,

1

7.

6 ,

1 2 가

8.

6 ,

2

9.

6 ,

1

10.

2 ,

1

1 2

2

2

1 2 45°

11.

2 ,

1 2 가

12.

1 ,

1 2 $10\mu m$ $16\mu m$

13.

1 ,

1 2 ,

1 2 ,

2 2 ,

1 2 ,

1 2 ,
가 2 ,

14.

13 ,

1 2 90° 1 1 2 2 ,

15.

14 ,

1

16.

14 ,

1

17.

13 ,

1 2

 $10\mu\text{m}$ $16\mu\text{m}$

18.

1 ,

1 1 , 가 ,

1 2 ,

2 2 , 가 ,

1 2 ,
1 2 ,가
가

19.

18 ,

4

20.

18 ,

1 2

 $10\mu\text{m}$ $16\mu\text{m}$

21.

1 ,

1 1 가

¹ ²,

2 2 가 ,

1 2

1 1 가 1
1 1 2 3 , 1 2

1 2

22.

21 ,

1 2 가 2 2

23.

21 22 ,

1 1 2 2

1 2 가 가

24.

21 22 ,

1 6 10 μ m 16 μ m

25.

1 2 ,

2 2 가 ,

1 2

1 1 1 2
1 1 1 2
1 . . .

가 2 가 2
가 1 2 가 2 3

2

26

25

1

1 2 가 가

27.

25

1 6

38

1

25

2

2 2 가 ,

1
 2 1 1 2 2 ,
 2 2 1 1 1
 2 2 ,
 3
 3 1 2 3 2

30.

29 ,
 1 1 2 2 2 ,
 1 2 가 0 ° 45 ° 135 ° 135 ° 45 °

31.

29 30 ,
 1 6 $10\mu\text{m}$ $16\mu\text{m}$

32.

29 30 ,
 1 2 3 가

33.

1 ,
 1 1 가 ,
 1 2 ,
 2 2 가 ,
 1 2 ,
 1 1 가
 ,
 2 X ,
 1 2 4

34.

33 ,

1

1

2

2

1 2

가

0 °

45 ° 135 °

135 ° 45 °

35.

33 34 ,

1 6

10 μm 16 μm

36.

1 ,

1

가

,

1

2

,

2

2

가

,

1

2

,

1

가

2

,

1

2

4

3

3

가

1

3

2

4

가

37.

36 ,

4

가

38.

36 ,

4

가

39.

36 ,

1

40.

36 ,

1

1

2

2

,

1 2

가

0 °

45 °

135 °

135 ° 45 °

41.

36 ,

1 4

10 μm 16 μm

42.

1 ,

1

1

가

,

1

2

,

2

2

가

,

1

2

가

1

,

2

2

,

가

3

,

2

2

,

1

3

43.

42 ,

2

3

가

44.

42 ,

3 가

45.

42 ,

1	1	2	2				
1	2	가	0°	45°	135°	135°	45°

46.

42 ,

1	3	$10\mu\text{m}$	$16\mu\text{m}$
---	---	-----------------	-----------------

47.

1 ,

1

1	2	,
---	---	---

2	가	,
---	---	---

1	2	,
---	---	---

1	1	1
1	3	,

3	1	가	,	2
---	---	---	---	---

48.

47 ,

1	1	2	2	,
1	2	가	가	,

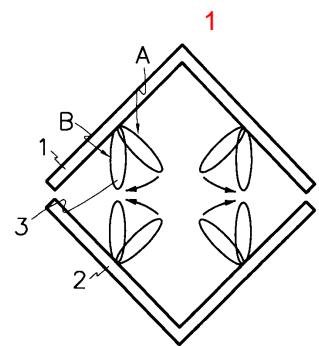
49.

47 ,

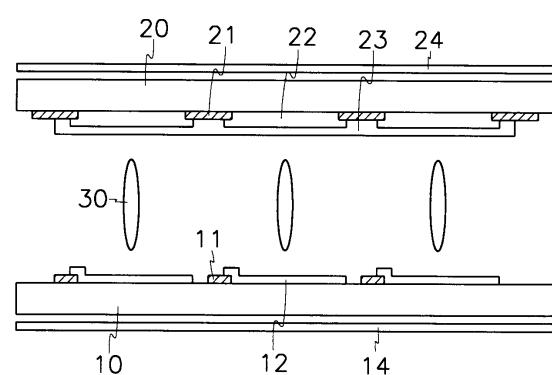
2 3
6 μ m, 10 μ m 1

	패턴 폭 (m)	패턴간 간격 (m)
A	10	33.5
B	10	22.5
C	7	25.5
D	13	19.6
E		24
F		21
G		27
I	10	좁은 간격:29 넓은 간격:32
J	10	좁은 간격:10 넓은 간격:16

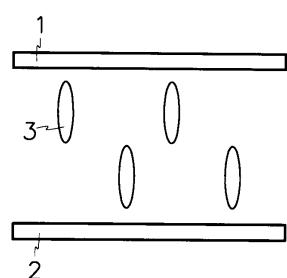
PTN	T(%)	Ton(ms)	Toff(ms)	Ttotal(ms)	백잔상	T(%)	Ton(ms)	Toff(ms)	Ttotal(ms)	백잔상
A	5.50	21.53	20.38	41.73	증	5.12	18.56	13.99	32.55	약
	5.44	19.14	20.18	39.32	강	4.27	14.69	15.15	29.84	약
B	5.23	18.16	20.28	38.44	미약	4.79	12.36	14.5	26.86	X
	4.88	18.79	20.42	39.21	미약	4.56	12.64	15.48	28.12	X
C	4.96	18.8	21.6	40.4	강	4.07	9.6	14.8	24.4	강
D	4.88	24.36	21.2	40.0	X	4.75	12.8	14.8	23.28	강
E	5.52	22.2	21.69	46.05	미약	5.34	44.11	14.28	58.39	X
F	5.58	23.67	20.0	42.2	미약					
G	4.79	20.8	21.63	45.2	X	4.34	70.79	14.89	85.68	X
H	5.51	15.0	21.6	42.4	약	4.99	10.4	13.0	23.4	미약
I										
J	4.76		20.8	35.8	약	4.49	7.6	12.4	20.0	약
K										
L										
M										
N										
O										
P										
Q										
R										
S										
T										
U										
V										
W										
X										
Y										
Z										



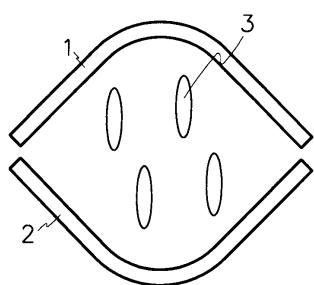
2



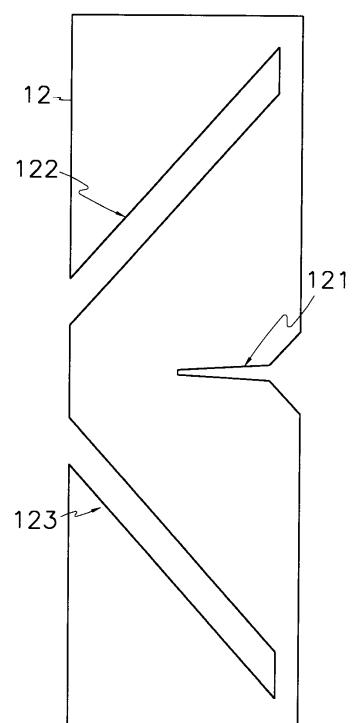
3a

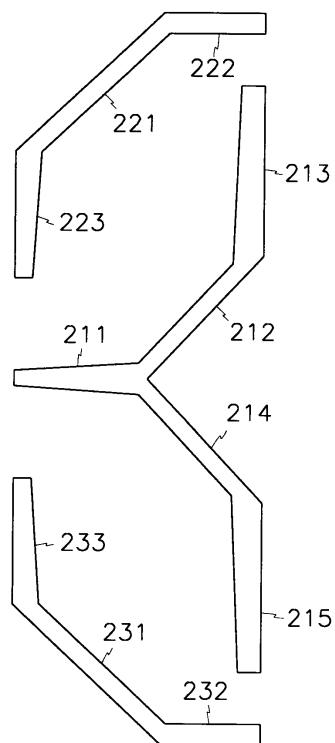
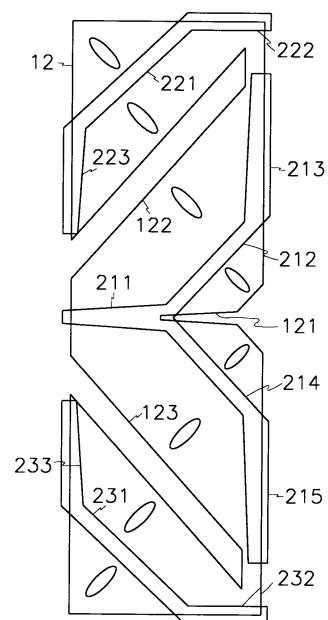


3b

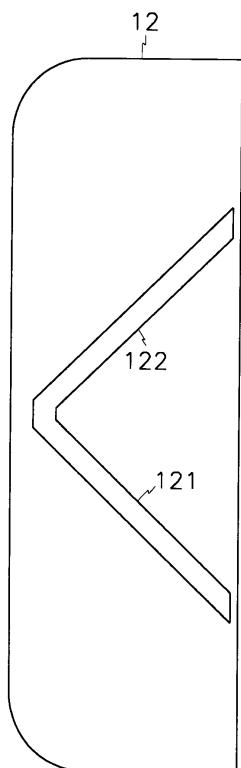


4a

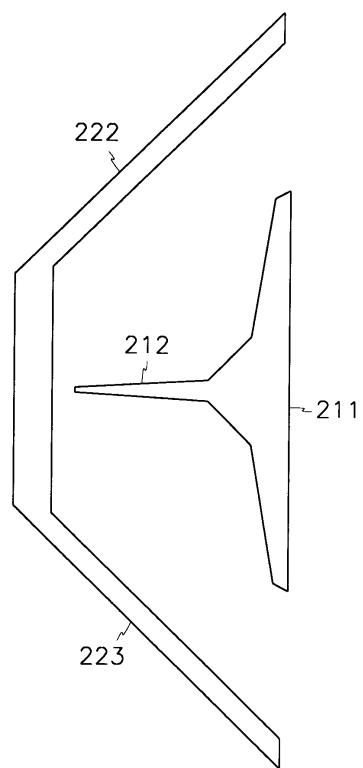


4b**4c**

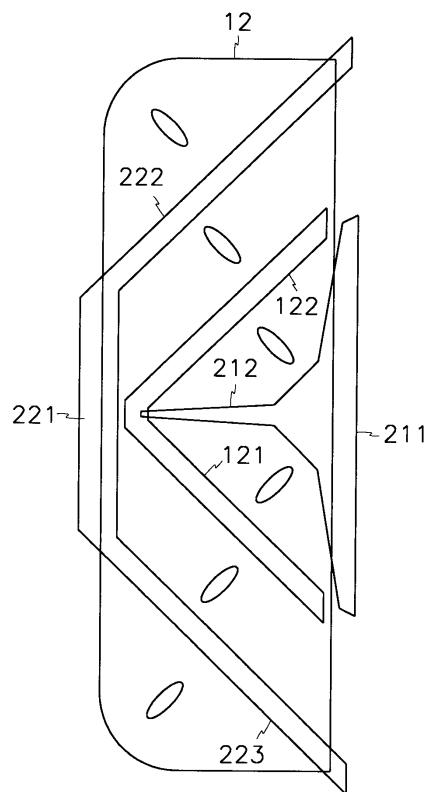
5a



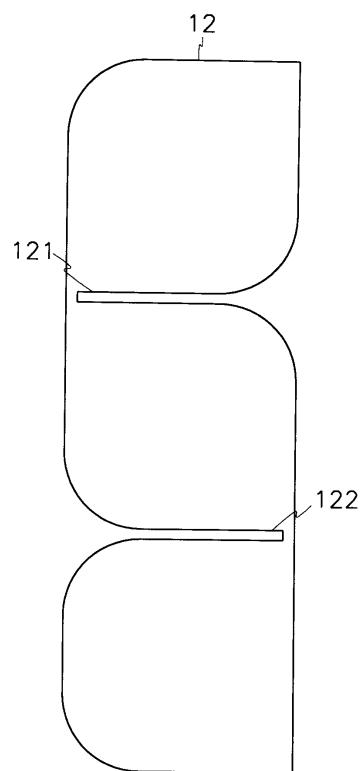
5b



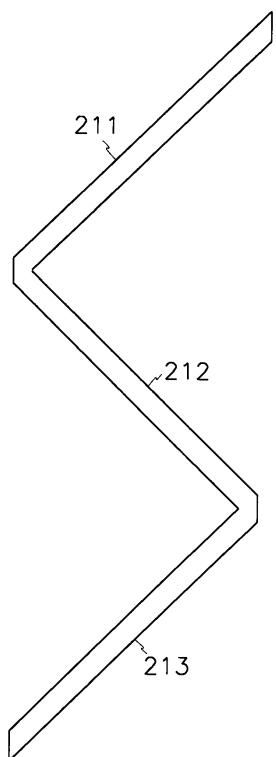
5c



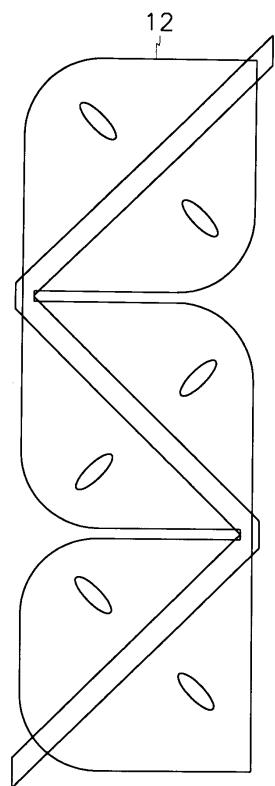
6a



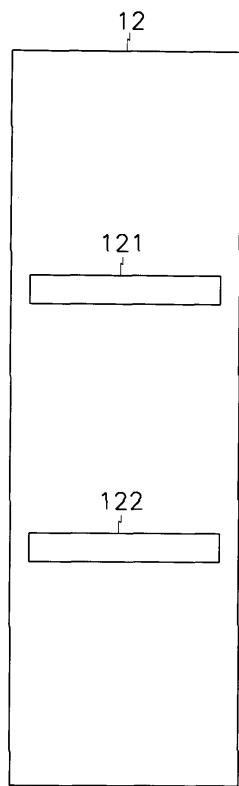
6b



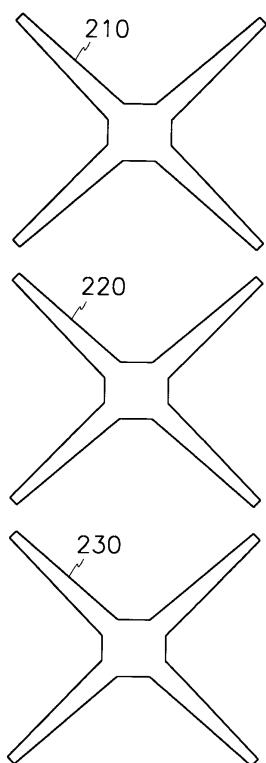
6c



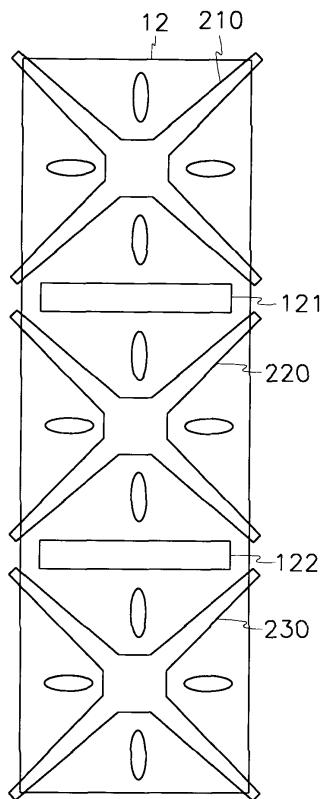
7a



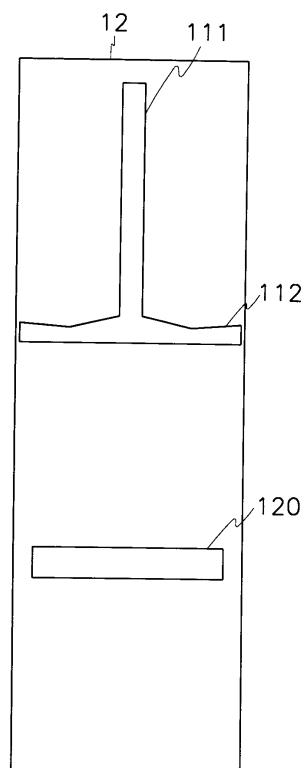
7b



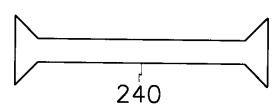
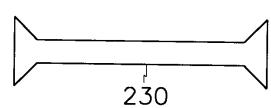
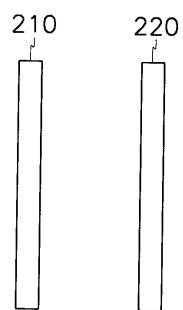
7c



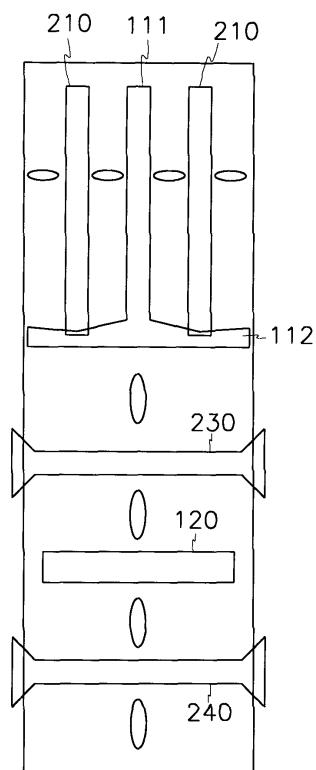
8a



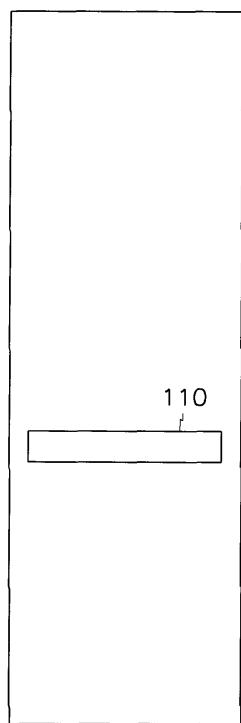
8b



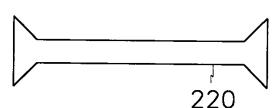
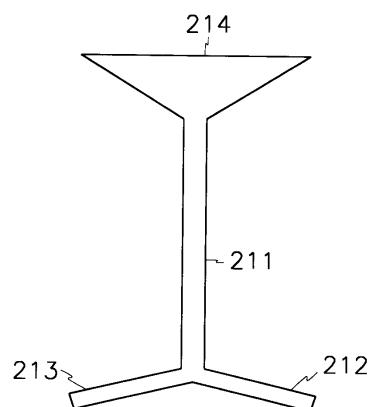
8c



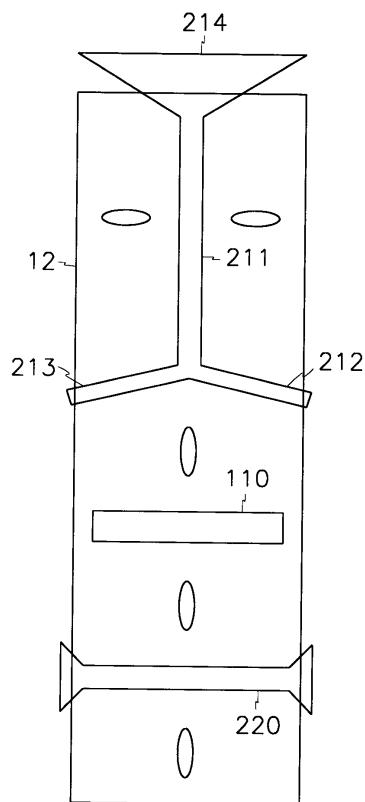
9a



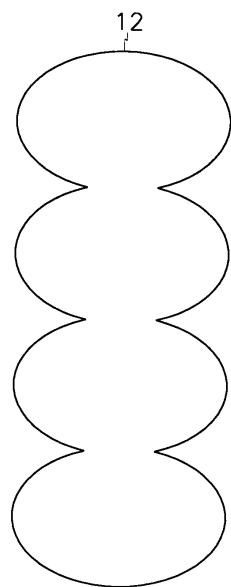
9b



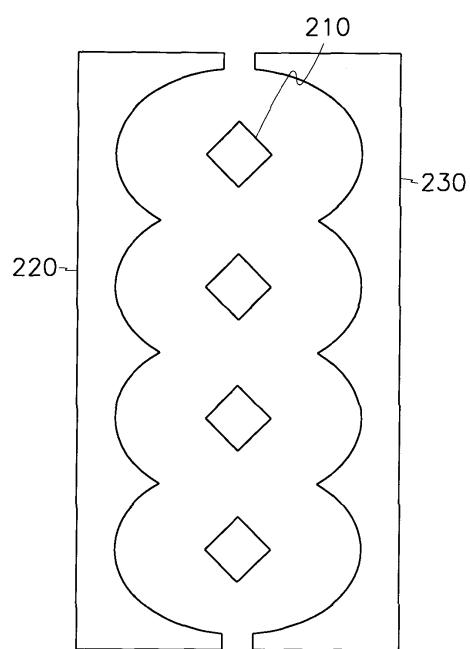
9c

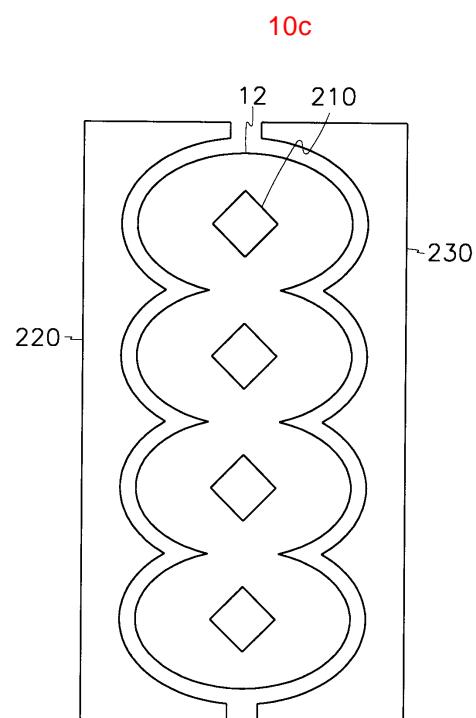


10a

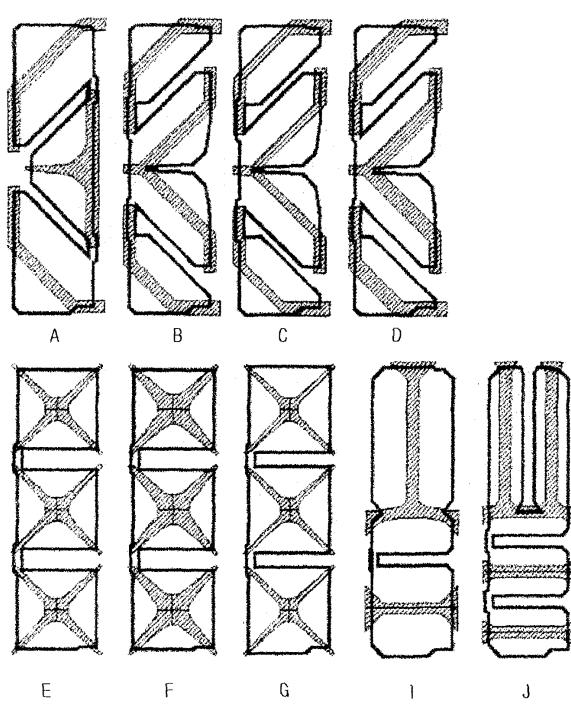


10b

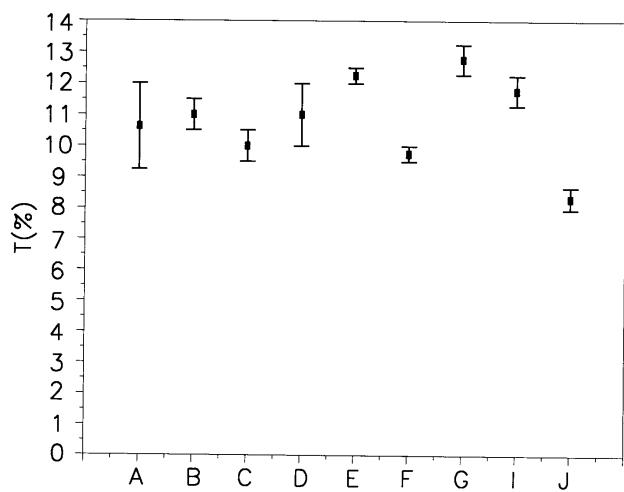




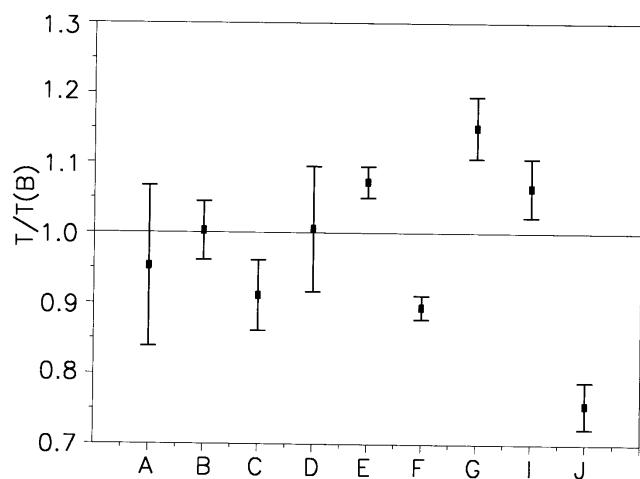
11



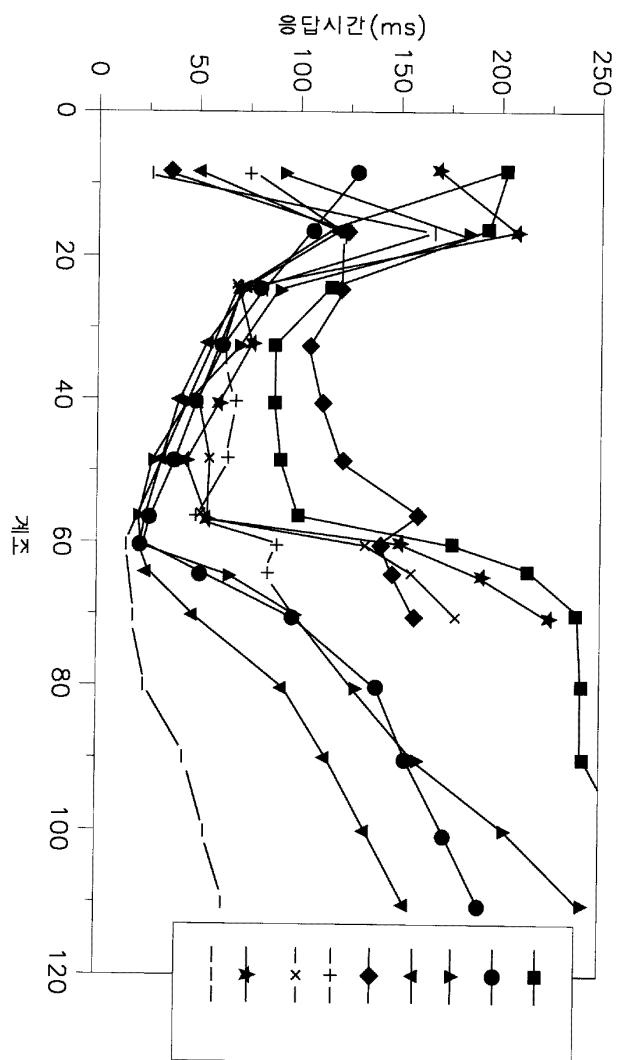
12a



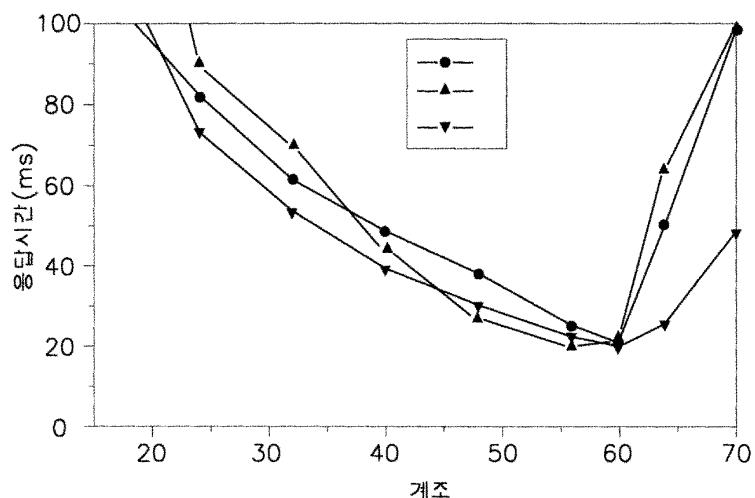
12b



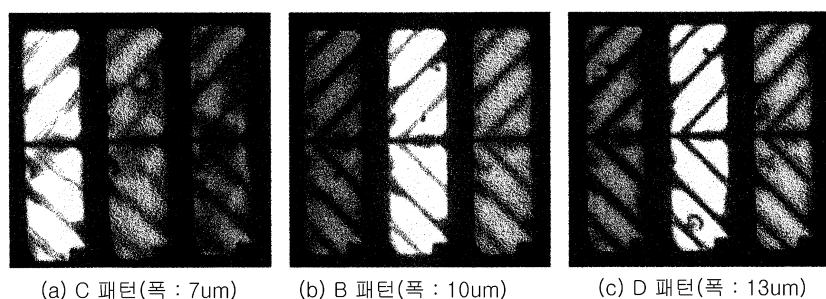
13



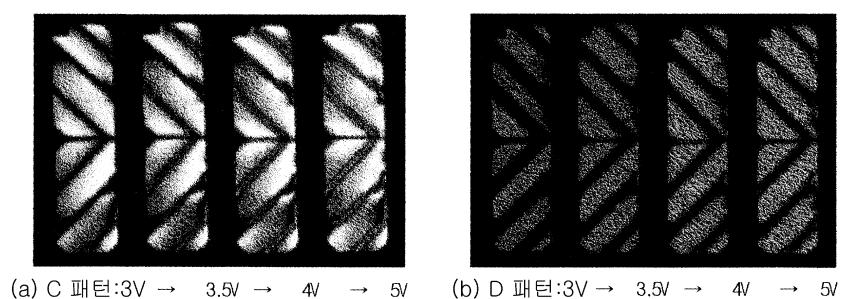
14



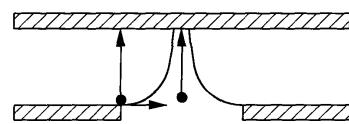
15



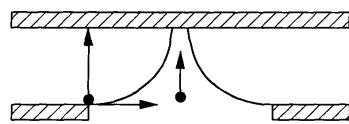
16



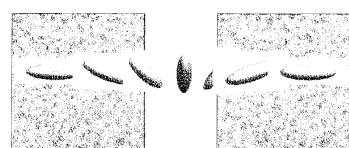
17a



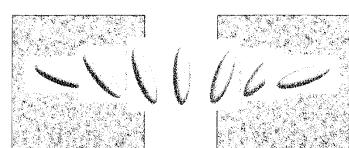
17b



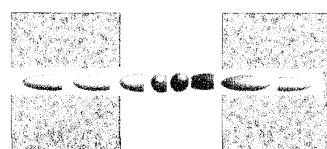
18



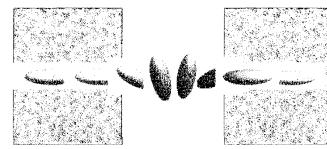
(a) 좁은 폭, 낮은 전압



(b) 좁은 폭, 높은 전압

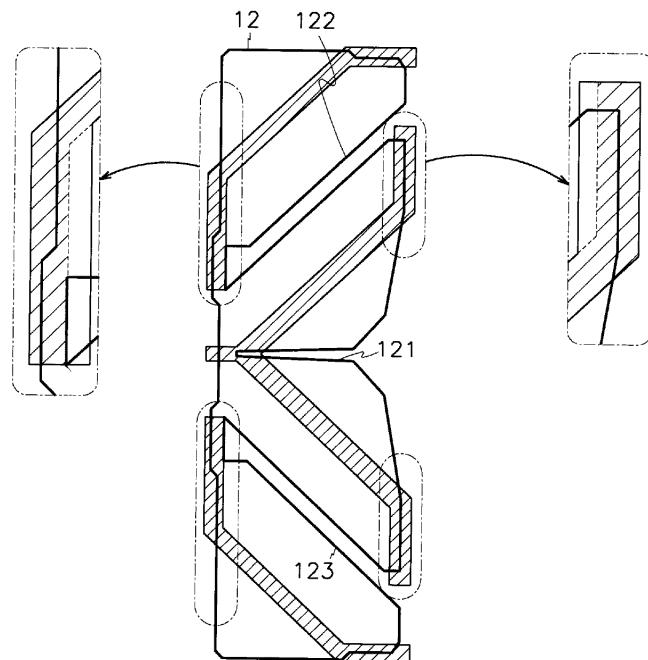


(c) 넓은 폭, 낮은 전압

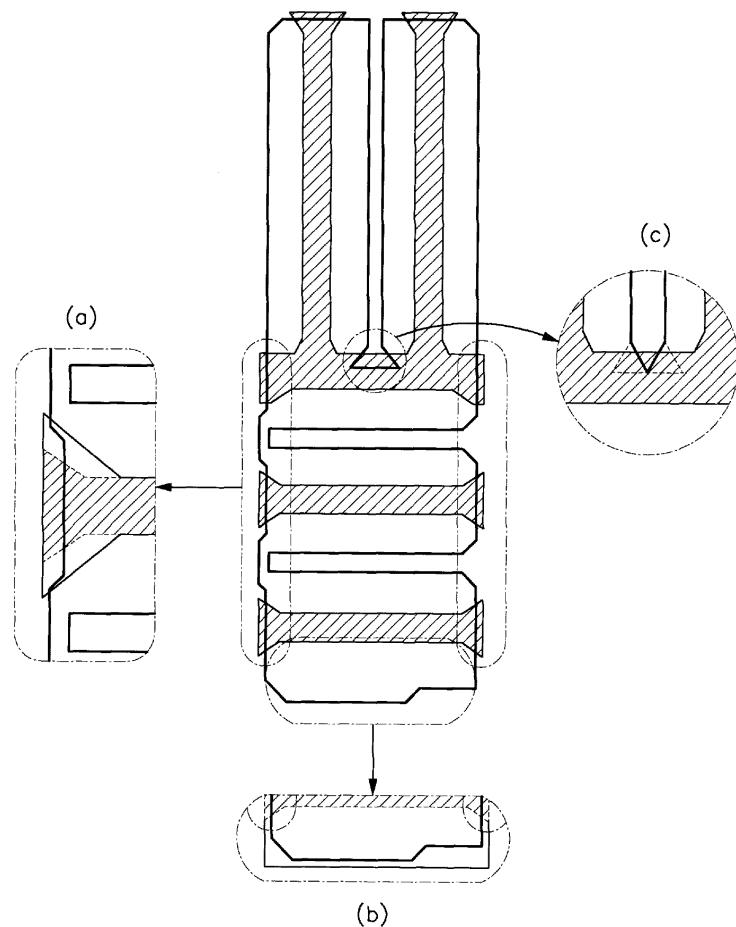


(d) 넓은 폭, 높은 전압

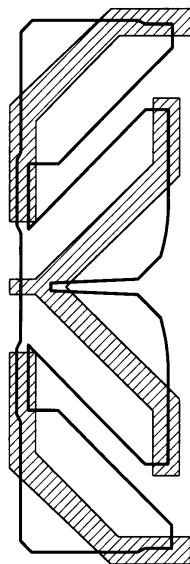
19



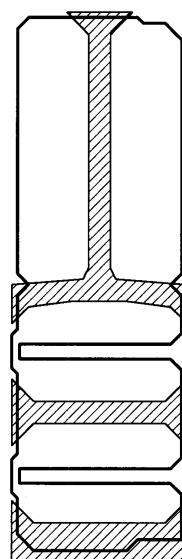
20



21a



21b



21c

