

(19) (KR)
(12) (A)

(51) 。 Int. Cl.7
H01M 4/00
H01M 14/00

(11)
(43)

10-2004-0094710
2004 11 10

(21) 10-2004-7012981

(22) 2004 08 20
2004 08 20

(86) PCT/US2003/005295

(87)

WO 2003/071620

(86) 2003 02 20

(87)

2003 08 28

(30) 60/358,229 2002 02 20 (US)

(71) , .
10523, , 85

(72) ,
10514, , 312

, , -
10523, , 102

,
12566, , 601

, -
10520, , 23-

,
10710, , 2108

(74)

:

(54)

가 . , 가

가 .

가

60/312,516

(Metal Air Cell System)

2001 8 15

가

가

가

가

가

(W*hr/Liter),

(W*hr/kg) 가
가

가

가

가

가

000
3Volts)

(<0.8V)

150

1
(1.5

가

가

가

가

가

가

가

가

가

가

가

가

가

가

가 가 가 가

가

가

가

1 2 ;

3A 6D ;

7A 11 ;

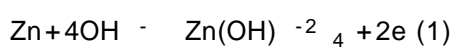
12 12B

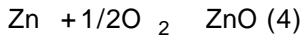
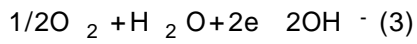
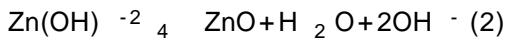
가

가

1 (14) (12) (10)가 (12) (14) (10) (U)

(14) (10) 가
((12) (12))





) ² 가 (1) (4) 가 (12) (12')
 (12') (14) (12') (12) (14)
 (12')
 3A 3C (12) (12) 2
 (18) (18) (16), (20), (22) (24)
 (18) (12)(3A 3C) (16) (20) 4A 4C
 (12') (19)
 (26) (20) (12)
 (16)가 (1) (4) 가 (16)가
 (20)
 가 가 (26)
 (16)
 가 (16)
 78
 % 0.8mm 가
 (20) (20)
 (16) 가 () (16)
 (16) (18) () (16)
 (20)
 (16) / (22) (16) / 가
 가 (16) (formulation)

(22)

(10)

(22)가

mpany Corp.

(PVP),

Teflon

Teflon T-30),

E.I. dU Point Nemours and Co (PVA), (PEO),

가

가

가

, EDTA,

, Teflon X-400(CT),

, Danbury

Union Carbide Chemical amp; Plastics Technology Corp.

가

(Zinc Anode for Electrochemical Cell)'

200

2 6 17

PCT

PCT/US02/19282 (

)

(10)

(bath)

(28)

(KOH),

(NaOH),

(LiOH)

5%

55%

30%

45%

10%

50%

가

(16)

(16)

, 2002

2 11

mical Cells And Method Of Manufacture Thereof)'

(Anode Structure For Metal Air Electroche

10/074,873

(Fibrous Electrode For a Metal Air Electrochemical Cell)'

10/083,717

5

가

(

(12)

30

(28)

(

32

).

(

가

가

(

(18,19)

5

(20)

(26)

(18,19)

(12)

(12)

6A

6D

가

(12)

(34)가

(36)가

(3

4)

(38)

(36)

(36)

(16)

(36)

가 (,) 가

6B (12) (38) (36) (16)

9) (18)가 (18,19) (20) (36') (12) (18,1)

(12) (36) (12) 가 (6D)

6C (16)(6D) (6

B)

4A (20) (12) (18) 가

(14) (12) ()

가 가 (bimodal)' (, 45% KOH

) 가 가 가

(, ,), - , WI, Milwaukee Aldrich Chemical Co.,

Inc.

(16) 가

NC, Charlotte BF Goodrich Company C

carbopol , (West Yorkshire) Allied Colloids Limited Alcoso

rb G1, (PAA); WI, Milwaukee Aldrich

Chemical Co., Inc. (CMC);

; ; (PVA); () (PEO); (PBVA);

; 가 가

(12) 가 (

) 0.1% 50%, 2% 10%, 2.5%

6.5% 2% 10%, 2.5% 4.5% 0.1% 50%, 3

% () , 1% CMC 250K CMC(Spectrum

)(가)

(16) 가

), ' 가 가 (,

/ 10Pa · s 가 가 (,

0.1Pa · s 50,000Pa · s, 100P

a · s 2,000Pa · s

7A 7D (14) 가 (14) (40)

((14)) (42)

(14) (40) 가

(40) (44) 가 , 7B , 가 (

44) (46) 가 (48) , (50) (14) (

가 (7C) . (52)

가

6,368,751

, Wayne Yao and Tsepin Tsai 2002 4 9
(Electrochemical Electrode For Fuel Cell)'

(10)

가

가

가

가

가

(PVA),

(,)

(,)

),

Nafion

Gelgard),

가

가 /

(,);

;

(,)

; 1993 10 5 Sadeg M. Faris 'Variable Area Dynamic Battery'
5,250,370 ; 2001 10 2 Sadeg M. Faris, Yuen-Ming Chang, Tsepin Tsai
Wayne Yao 'System and Method for Producing Electrical Power Using Metal Air Fuel Cell Battery Technology'
6,296,960 ; 2002 10 10 Sadeg M. Faris Tsepin Tsai
'Metal-Air Fuel Cell Battery System Having A Metal-Fuel Card Storage Cartridge, Insertable Within A Fuel Cartridge Insertion Port, Containing A Supply Of Substantially Planar Discrete Metal-Fuel Cards, And Fuel Card Transport Mechanisms Therein'
6,472,093 ; 2001 10 9
Sadeg M. Faris, Tsepin Tsai, Thomas Legbandt, Wenbin Yao Muguo Chen
'Ionically-Conductive Belt Structure for Use in a Metal-Air Fuel Cell Battery System and Method of Fabricating the Same'
6,299,997 ; 2001 2 20 Sadeg M. Faris, Tsepin Tsai, Thomas Legbandt, Wenbin Yao Muguo Chen
'Ionically-Conductive Belt Structure for Use in a Metal-Air Fuel Cell Battery System and Method of Fabricating the Same'
6,190,792 ;
2001 10 23 Sadeg M. Faris, Tsepin Tsai, Wenbin Yao Muguo Chen 'Metal-Air Fuel Cell Battery System Employing Means for Discharging and Recharging Metal-Fuel Cards'
6,306,534 ; 2001 10 9 Tsepin Tsai William Morris 'Movable Anode Fuel Cell Battery'
6,299,998 ; 2002 10 1 Tsepin Tsai William Morris
'Movable Anode Fuel Cell Battery' 6,458,480 ;

(evoluti

on)

/

(CsOH)

(KOH),

(NaOH),

(LiOH),

(RbOH),

10%

50%

5%

55%

30%

40%

BF Goodrich Company (West Yorkshire) Allied Colloids Limited (PAA); WI, Milwaukee (CMC); WI, Milwaukee (CMC); (PBVA); (PVA); (PEO); (MA, Burlington A), Gelgard (PV

NC, Charlotte Carbopol, Alcosorb G1, Aldrich Chemical Co., Inc. Aldrich Chemical Co., Inc.

0.1% 50%,

2% 10%

가 /

(pvc) (formulation) (PEO) (THF) (PVA) PVA PVA

60M \emptyset 40M \emptyset PEO가 PVC가 PVA가 PVA

0.2 0.5mm

; 1999 2 26 Muguo Chen, Tsepin Tsai, Wayne Yao, Yuen-Ming Chang, Lin-Feng Li, Tom Kar en 'Solid Gel Membrane' 09/259,068 ; 2002 3 19 Muguo Chen, Tsepin Tsai, Lin-Feng Li 'Solid Gel Membrane Separator in R echargeable Electrochemical Cells' 6,358,651 ; 2001 8 30 Robert Callahan, M ark Stevens Muguo Chen 'Polymer Matrix Material' Muguo Chen 'Electrochemic al Cell Incorporating Polymer Matrix Material' 09/943,053 ; 2001 8 30 Robert Callahan, Mark Stevens Muguo Chen 09/942,887

가 (), (4-),
 (- -), 가
), N,N'- ()
 , X- , - ,
 가 가 가
), 가 가 (가 ,
 , X- , - , () 가 가
 130 가 75 100 가
 가 , - , X- ,

(PET)

1mm 0.6mm 가 가 (backbone) 0.
 ; 4가
 ; I ; II ; /
 ; ;

ai, Yuen-Ming Chang Muguo Chen Wayne Yao, Tsepin Ts
 nes' 6,183,914 'Polymer Based Hydroxide Conducting Membra
 ; (b) ; (c) (a) 4가

가
 10 가 (42)
 (66) (66) (66) (20)
 (68)가 (66) (66)
 (40a,40b) 가 가 11 (70)
 (40a,40b) (72)

12A 12B , (19)((12)) 가 (42)((14))
 가 (19) (42)
 가 (PAA / Carbopol)
 0.1% 50%, 2% 10%, 1.5% 6.5%
 가 / 가
 가 가 가 8A
 8C

가

(57)

1.

가

2.

1

3.

1

4.

3

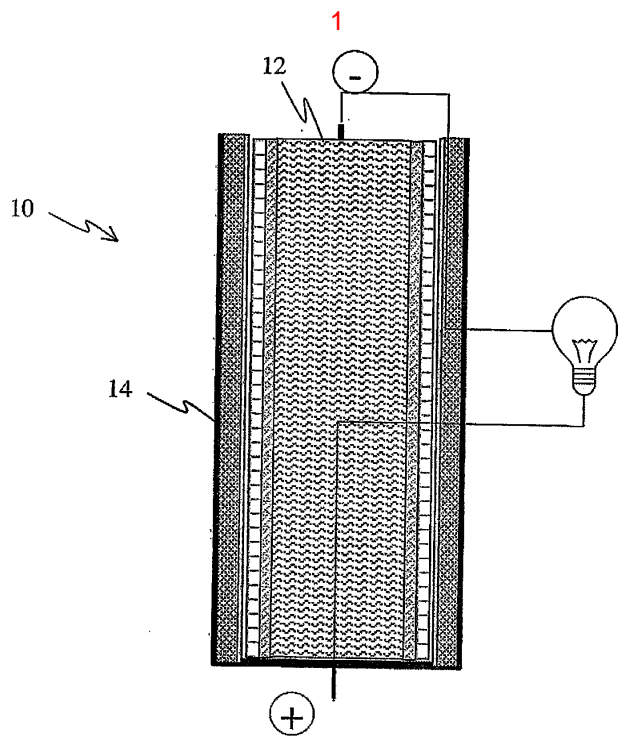
(water based gel)

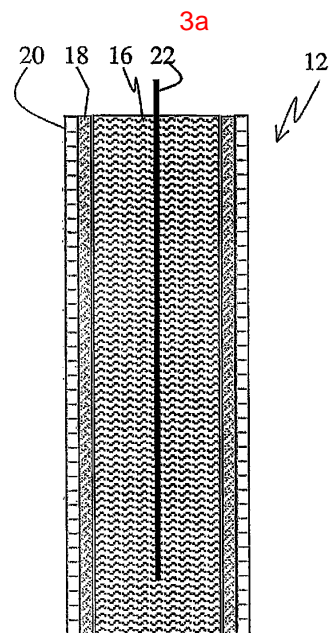
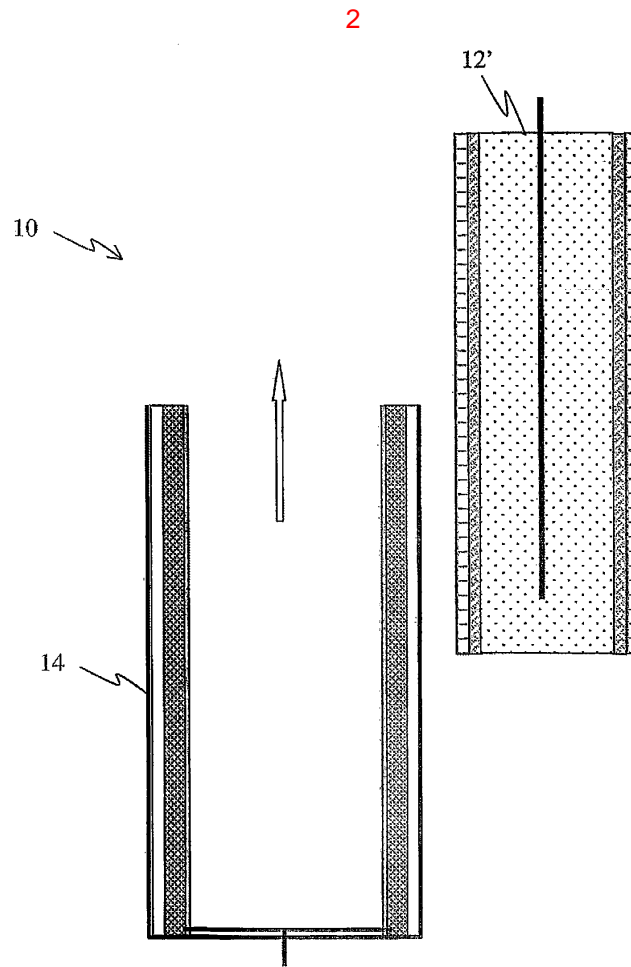
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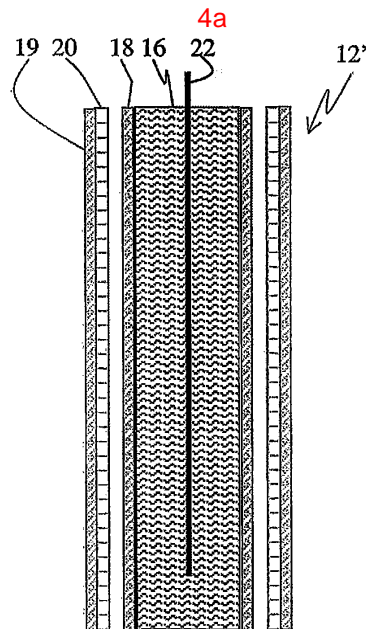
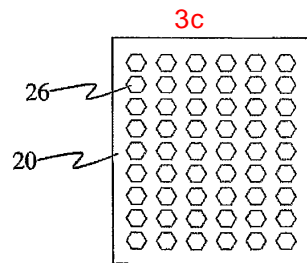
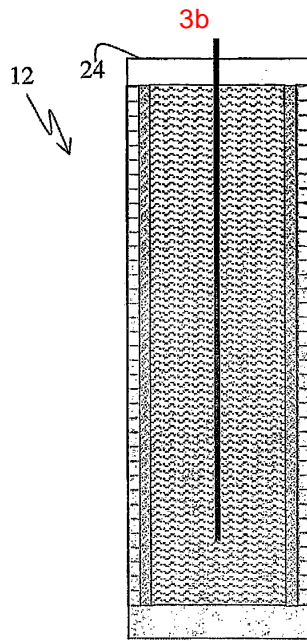
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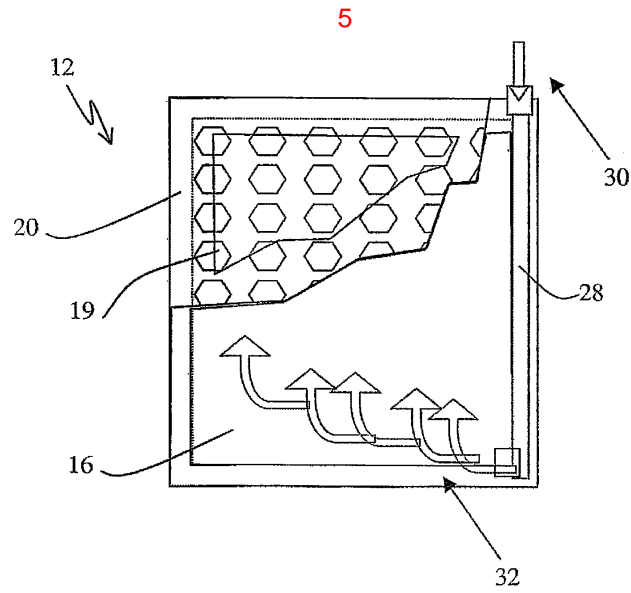
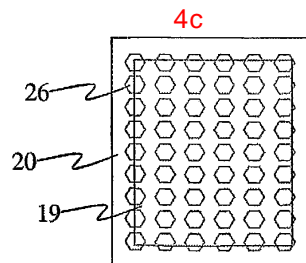
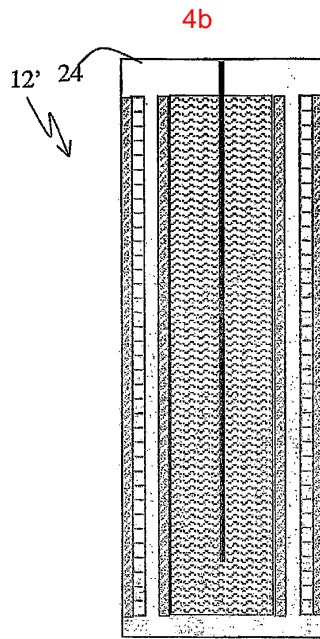
- 1 , 가 .
21. 1 , 가 가
22. 21 , 가 , 가
23. 22 , , (, ,), - ,
24. 22 , 가 , ; ; (PAA); (PEO); (CMC); (PBVA); (PVA); (
25. 22 , (,), 0.1% 50%
26. 22 , (,), 2% 10%
27. 22 , (,), 2.5% 6.5%
28. 22 , (,), 0.1% 50%
29. 22 , (,), 2% 10%
30. 22 , (,), 2.5% 4.5%
31. 22 , 3% CMC (,), 1% CMC 250K,
32. 1 , , 가
- 33.

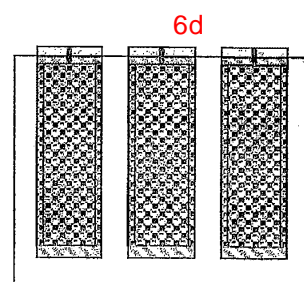
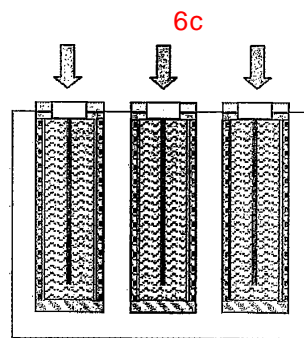
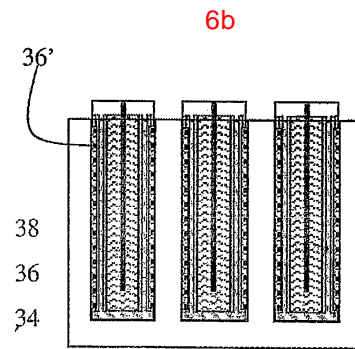
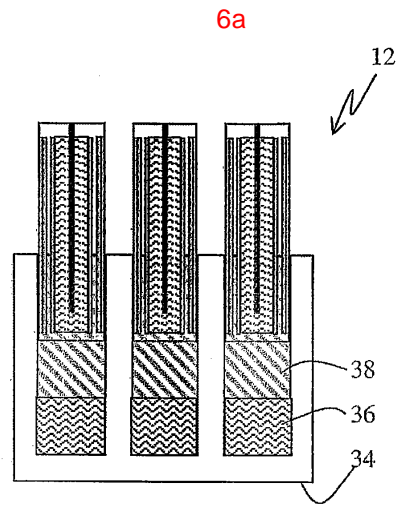
1
34.
32
35.
32
36.
가
가
37.
35
가
38.
39.
37
가
가

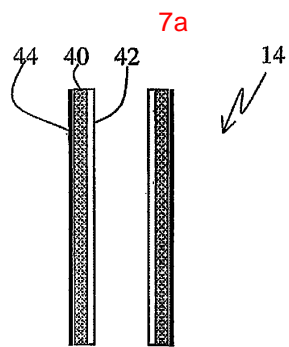




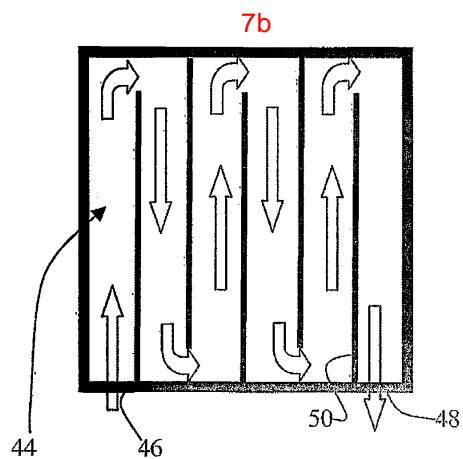




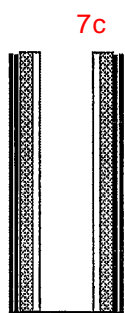




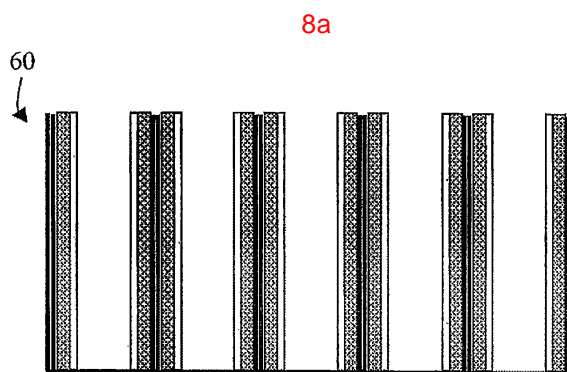
결합전 단면



결합된 상태의 정면

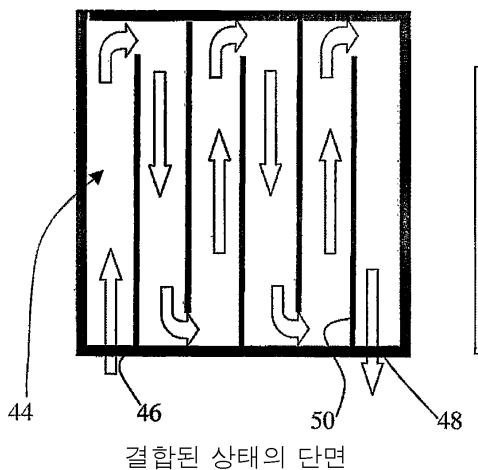


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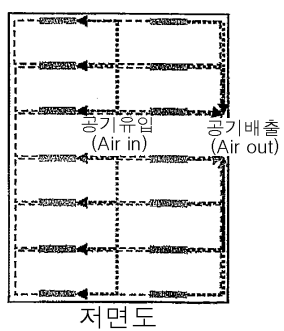


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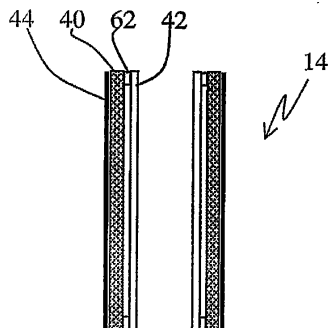
8b



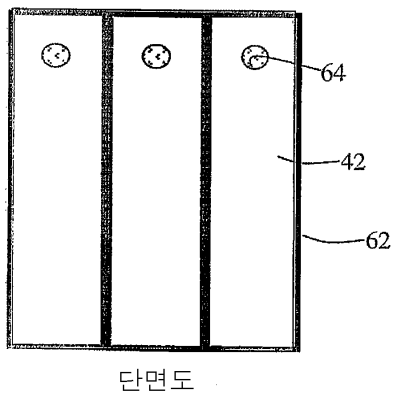
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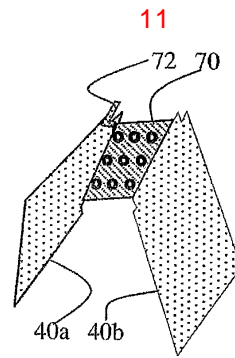
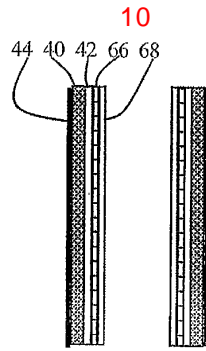


9a

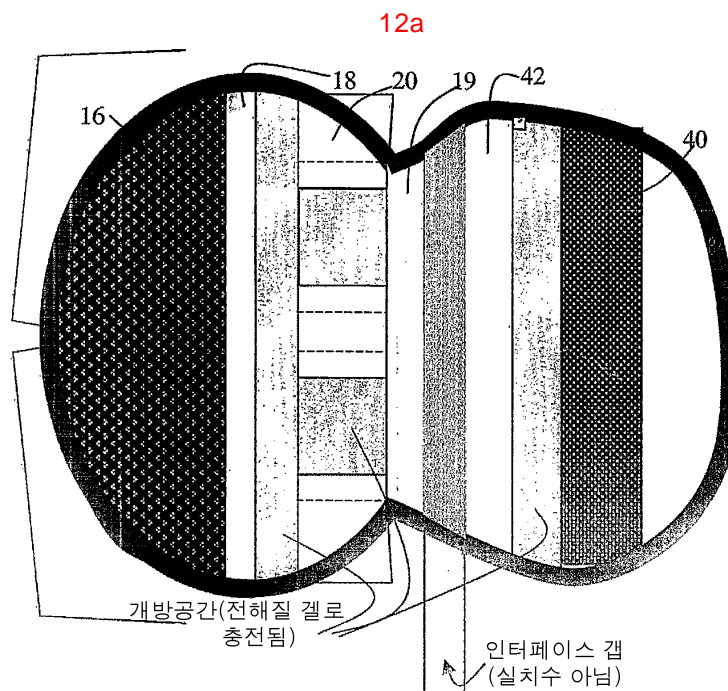


9b





11
 커렌트 콜렉터
 (Current Collector)



12b

