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(21) 10 - 1994 - 0005398 (65) 1994 - 0022932
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(73) 95131 - 1008 370

(72) . 95131 1372
. 95030 가 17963
. 94303 7086
. 94306 665
. 94303 1043

(74)

:

(54)

(LED) LED ((temporary growth substrate) , (lattice matching) , LED , LED , 2 , 2 , 2 , 2 , LED , (passiv ation) ,)

1

1			LED	,	
2			LED	,	
3			LED	,	
4			LED	,	
5	4		LED	,	
6			5	LED	,
7		6	LED	,	
8			LED	,	
9		4		3	,
10			5	LED	,
11			(mirror)	5	LED
12			LED	,	
13	17		LED	,	
18				,	
19	18			,	
20				,	
21	22	20			

32, 34, 36, 38 : LED 40 : LED

44, 46, 154, 156 : 56, 58 :

60 : 74 :

76 : 126 :

142 : 84, 86, 96, 98, 116, 118 :

90, 100 : 92 :

94 : 102 :

(light emitting diode; LED)

LED , LED

, LED

LED LED

(energy gap)

(optically absorbing substrate)

, LED

(single heterojunction type)

(aluminium gallium arsenide; AlGaAs) LED 가 1

(epitaxial layer) (10) n - AlGaAs (12) p - GaAs (14)

(10) (12)

p -

GaAs (14)

(14)

(14)

2 (16)

AlGaAs LED

n - AlGaAs (18)

p - AlGaAs (20 22) (16)

(18 - 22) (ba

ndgap)

(active layer) (20)

(18 22)

(16)

LED

adhesive)

(reflecting cup)

(chip)

(metal

LED

LED

가

p - n

LED

가

가

(lattice matching)

LED

, 3

n -

(24) p -

(26 28)

" " (24)

75 μm

(26 28)

" " (24)

, " (24)" (26 28) .

LED
 " " " ,
 , 가 , 가 , " " ,
 , LED , LED , 3 - 6
 mil , 가 , 가 (silver - loaded
 epoky) LED , 가
 LED , 가
 LED가 10mil
 1 2 " " LED
 , 가

LED (tradeoff)
 LED가 LED 가
 LED 가 , 가
 , 가 , " " " " (lattice mismatch)

LED (Bragg reflector)

LED 가 , 100

LED 8mil " " LED

LED

LED (transparent member) LED

(liquid phase epitaxy), (vapor phase epitaxy), LED (metalorganic chemica
 | vapor deposition) / (molecular beam epitaxy)
 . LED (confining layer),
 (current spreading) (light extracting layer)

LED , LED 가
 ishing), (reactive ion etching), (ion milling) / (lapping/pol

, 2 LED , 2 LED
 , LED LED p-n LED
 (indium) (interface) (resistivity)
 (surface mobility) , (ohmic) (diffusivity) / (mass tra
 nsport) (Hg - bearing) , (Cd - bearing) (Z
 n - bearing))

가 LED 가
 , 10 μm LED , 2 LED , 2 LED , 2 LED
 2 , , 8mil 가 /
 LED 2 , 2
 2

가
 LED

(heterointerface)

(Burgers vector)

" (misfit dislocation)
 (edge dislocation)" , ,
 (threading dislocation)" , ,

III - V , 1 가 (hydrolysis) LED
 (28) , 3 III - V AIGaAs LED
 (24) 가 (passivation) , GaP
 (mirror) LED LED LED
 III - V SiC / II - VI LED
 LED (depression) LED , 가
 (spot emitter)
 (van der Waal 's force)
 가 가 가 , ,
 LED , 가 8mil
 4 (30) LED LED (30)
 LED LED LED

LED (32, 34, 36 (30) 250 μm 500 μm GaAs (30) 4
 38) . (32 - 38) , , LED
 , n - LED (32) n -
 AlGaN (34) 800nm .

AlGaN (36) 500nm , p - AlGaN
 4 가 800nm (34, 36, 38)
 (window) (38) 가
 (Fletcher) 5,008,718

(32 - 38) ,

(32 - 38) (30) LED 가 5 , / ,
 (32) .

LED (40) 5 LED (40) (32) (38)
 가 , (32 - 38) /
 LED

6 , (42) (32) .

(42) 8mil 가 , . 8mil LED (40) (32 - 38)
 , LED
 가 , 가 p - n 가 , 가
 가

7 , LED (44) (evaporation)
 (38) . - 2 (46)
 (42) , .

8 , 2 (48) 4 . , 2

(30) 2 (48) 6mil " " (30) 2 (48) (30) (32 - 38) (32)

8 , 4 (48) (30) (32 - 38) 5,008,718 / (48) (30) 가

4 (30) 가 LED LE D 가

가 LED 가

9 III - V 4 6 가 LED (38) (30 - 38) (50) G aP

6 (42) LED (40) (42) LED (32) . 1000 (contact)가 LED (42) 가 (annealing) (32)

가
 - SiO₂ 가
 , SiO₂ - SiO₂ -
 (52) LED (54) 10
 (56) (52)
 가 / (58) LED (40) (32)
 (52) (32)
 11 LED (40) (60) 가 (60) (62)
 (60) (62) , LED (40) , GaAs
 (62) , Si
 가
 LED 가 12 LED (40) LED (64)
 / LED (40) (34 38)
 LED (64) (70 66) , LED (40 64) , LED
 (tunnel junction)(72) , LED
 LED
 12 LED (40 64)가 (74) (76)
 가 (78) 가
 , LED (40 60)
 LED (38 68) , LED (78) L
 ED
 LED
 1mil , Si, Ge, AlP, AlSb, GaN, AlN, GaP,
 GaAs, GaSb, InP, InAs, InSb, ZnS, ZnSe, CdSe, CdTe, SiC가
 가 가
 가

1mil
2 μ m

가
가

13 (128) (126)가 (130), (132) (134) LED
(136) (136)
(126) 8
(126) (138) (140)
가 LED

14 (126) LED (128) (130) ()
142 144 (126) (136)
(140) (cavity) (142) 가 LED (128) 가
14

14

LED

(display) LED LED
15 (146) (144) (148 150)
(152) LED (154 156)
(148) (150)
(142) ()
148 (150) (inside diameter) (single annu
lar cavity)

LED

LED (156) (158) (160) (162) (164) 16
(172) (166, 168 170) 가 가
가

(172) LED (156) (166, 168 170)
, LED (166 - 170)

1 H₃ 가 1 가 H₂ P
가 가 가

18 , (80) (degreasing technique)
 $\text{In}_x\text{Ga}_{1-x}\text{P}$ GaP NH_4OH (methanol)

(80)가 LED 18
 가

[(100) (110) 2° 10°] GaP
 $\text{S}(n \ 5 \times 10^{17} \text{ cm}^{-3})$ (GaPs 2mil GaP GaP) GaP:Zn(p
 $2 \times 10^{18} \text{ cm}^{-3}$) " (pseudo-substrate)" , GaAS:Te($n \ 5 \times 10^{17} \text{ cm}^{-3}$)
 (MOCVD) $1 \mu\text{m}$ $\text{In}_{0.5}\text{Ga}_{0.5}\text{P}$:Te($n \ 1 \times 10^{18} \text{ cm}^{-3}$) MOCVD
 GaAs $\text{In}_{0.5}(\text{Al}_x\text{Ga}_{1-x})_{0.5}\text{P}$ LED GaAs (100)
 (110) 2° HCl:HNO₃:H₂O(1:1:1)
 AuZn n- AuGe / p-

(80)
 가 NH_4OH (80)
 가

HF: (deionized water)(1:10)
 N_2 n
 - GaP (GaAs:Te) n- $\text{In}_{0.5}\text{Ga}_{0.5}\text{P}$
 18 1000 1
 NH_4OH - (resistance ohmic bon
 d) HF: " (barrier)"

NH_4OH , n- InGaP 가 n- GaP
 NH_2H , N_2
 n- $\text{In}_{0.5}\text{Ga}_{0.5}\text{P}$ (GaAS:Te)
 (n- GaAS:Te) n- $\text{In}_{0.5}\text{Ga}_{0.5}\text{P}$
 GaP $\text{In}_{0.5}\text{Ga}_{0.5}\text{P}$
 가 In
 (a) n- $\text{In}_{0.5}\text{Ga}_{0.5}\text{P}$ n- $\text{In}_{0.5}\text{Ga}_{0.5}\text{P}$ (b) n- GaP u-
 $\text{In}_{0.5}\text{Ga}_{0.5}\text{P}$ (set)
 , (a) n- $\text{In}_{0.5}\text{Ga}_{0.5}\text{P}/\text{In}_{0.5}\text{Ga}_{0.5}\text{P}$ (b) n- $\text{In}_{0.5}\text{Ga}_{0.5}\text{P}/\text{In}_{0.5}\text{Ga}_{0.5}\text{P}$
 $5 \text{ Ga}_{0.5}\text{P}/\text{GaP}$, (a) 1.5 ,
 (b) 5 (20 × 20mil (die)) $\text{In}_{0.5}\text{Ga}_{0.5}\text{P}/\text{In}_{0.5}\text{Ga}_{0.5}\text{P}$
 1000 $\text{In}_{0.5}\text{Ga}_{0.5}\text{P}/\text{GaP}$ 975

condensation) Ga In LED (shear stress), (evaporation - c
 가 , In 가 In In_{0.5} Ga_{0.5} P
 , In , AlGaAs - GaAs - InGaAs GaP In_x Ga_{1-x} P (x <
 0.5)
 In II - VI / , Hg - , Cd - Zn - III - V

(80)

1000 (slow)"

" 가 (fast)"

19

, 1000

18

1000

1

(decomposition)

(thermal oxide desorption)

n -

n -

, p -

p -

n - GaP p - GaP 1000 1

p -

, n - GaP n - GaP

가 가 . p 1

12 x 12mil (0.9)

GaP/GaP n - p -

(5)

GaP/GaP p

n - (dopant)

p -

가

GaAs

GaAs

In_{0.5} (Al_x Ga_{1-x})_{0.5} P LED

LED

GaP

, 2

18

가

가 , 20

가

21

가 , 20

(94)

가

(98)

(notch)

(96 98)

(96)

(100)

(96 98) (furnace tube)(102) (96)
 (arcuate opening)(108)가 (shaft)(106) (102)
 (98) (air piston) (98) (112)
 (104) (110) 가
 가 (pneumatically control)

21 (112 114) 22
 (120)가 1 (116) 2 (118) 22
 가 (120) (cracking)
 가 가

(112 114)가 21 21

가 , As - (caP) P -
 , 500 가 , 가

가 (carrier) 가 20 (102)
 , H₂Se, H₂S, DETe DMZn p -
 n -

20 (94) 18 가 LED
 p - n

LED ,
 III - V, IV IV - IV II - VI LED , II - VI
 III - V SiC LED /

(57)

1.

(light emitting diode; LED)

1 LED LED (wafer bonding) LED

2. LED (lattice constant) (epitaxially growing)

3. LED (low resistanc (softening)

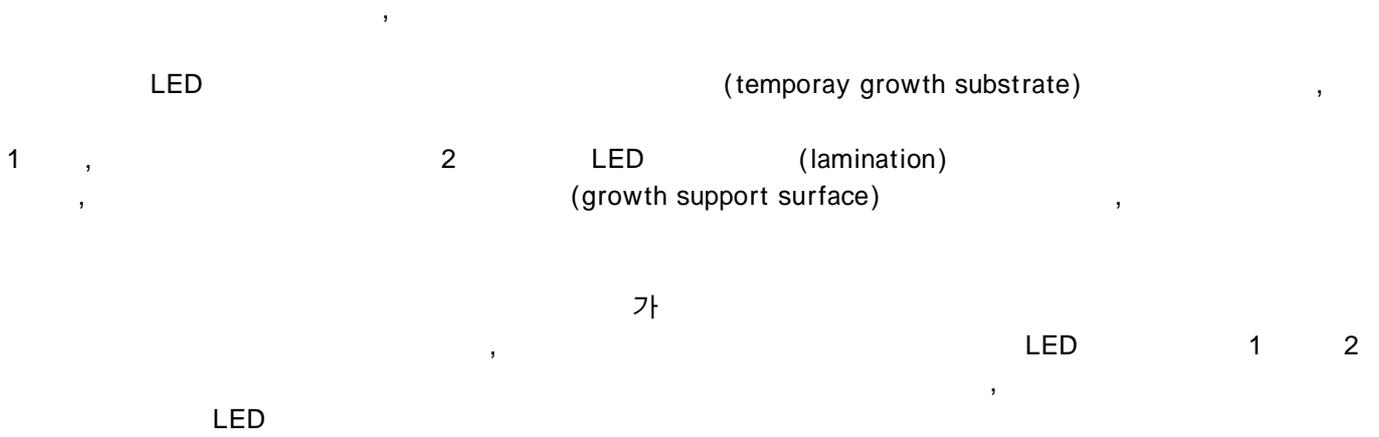
4. LED (conformity)

5. LED (interface) In , Hg , Cd Zn

6. LED (electrical connection)

7. LED

8.



9.



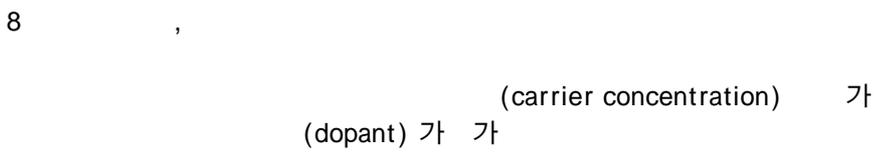
10.



11.



12.



13.



(cap)

(applying)

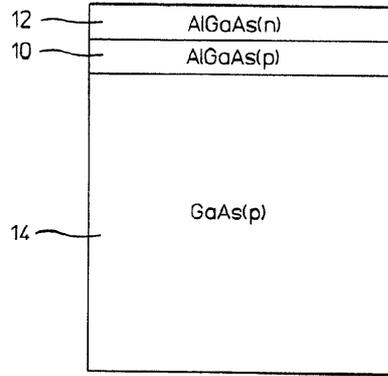
LED

, LED
가

LES
가

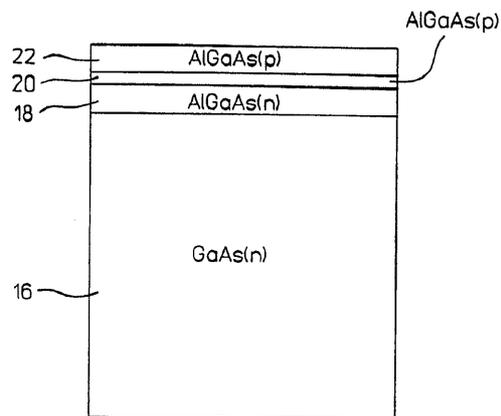
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(종래기술)



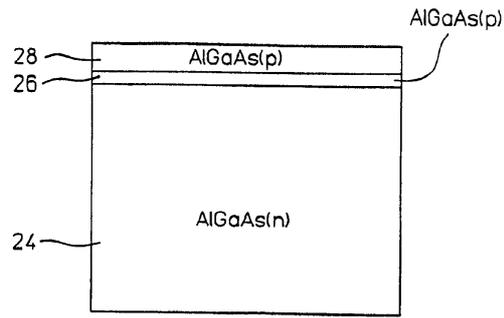
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(종래기술)

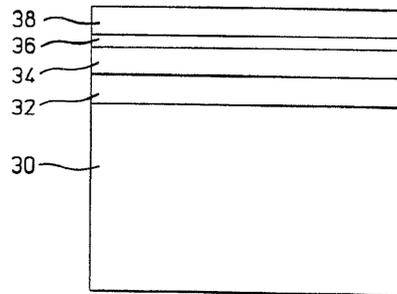


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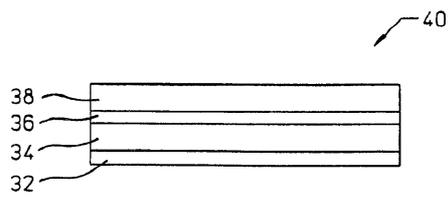
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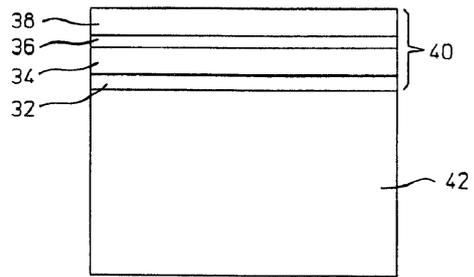
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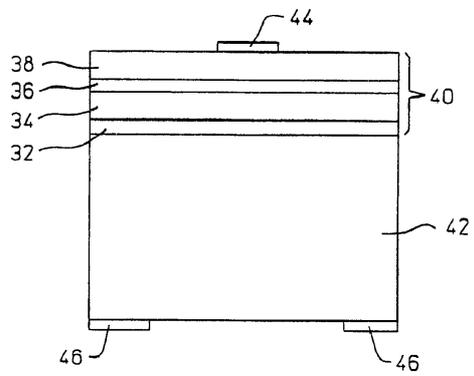
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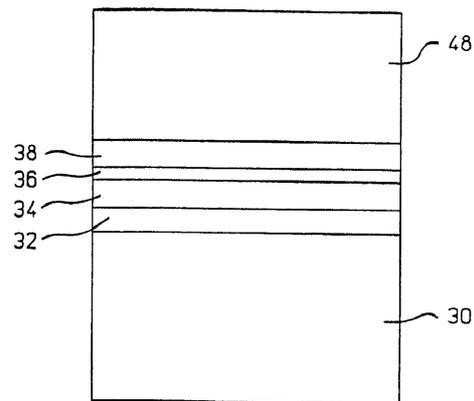
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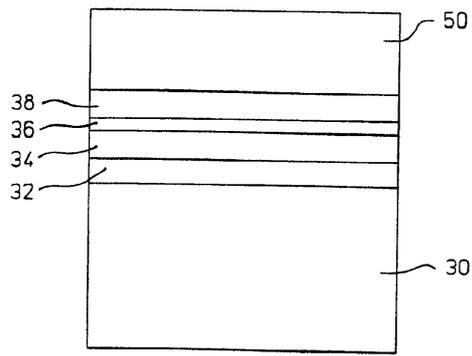
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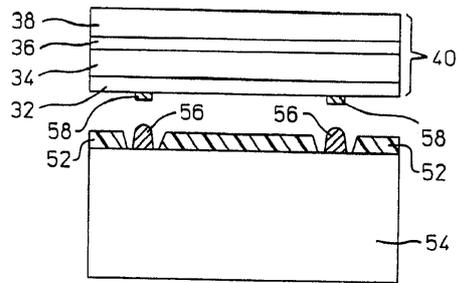
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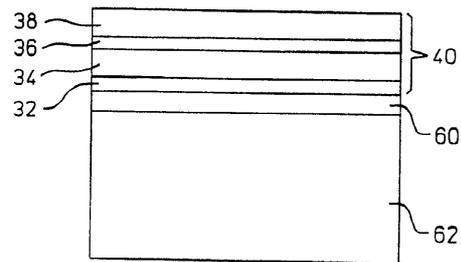
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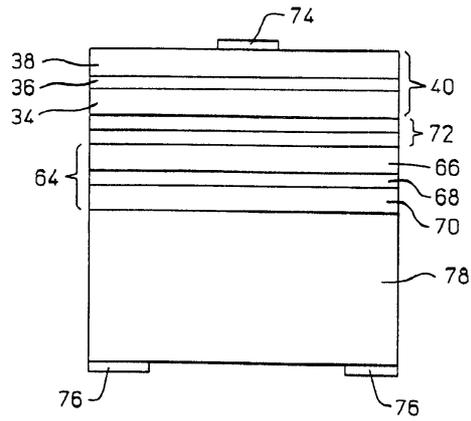
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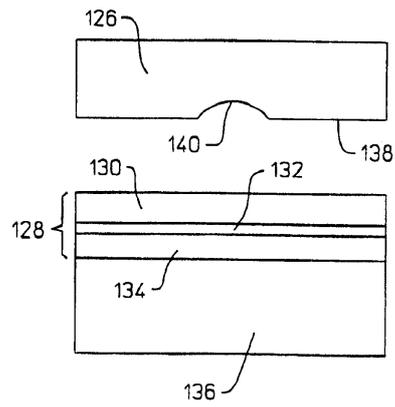
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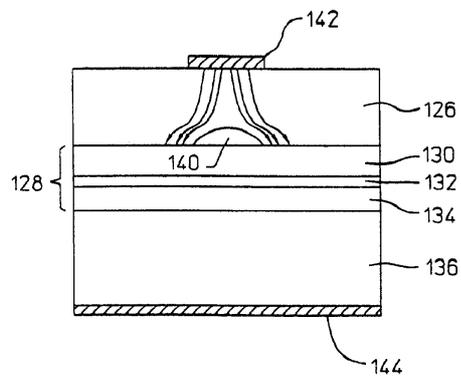
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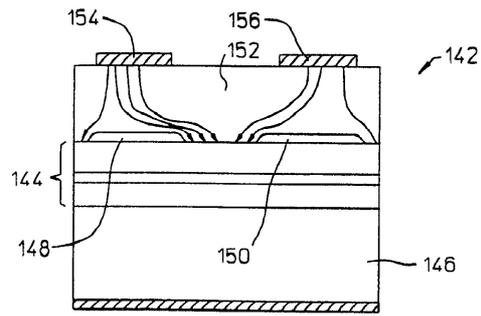
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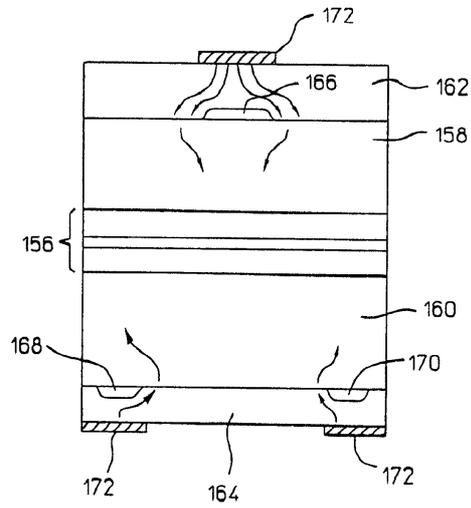
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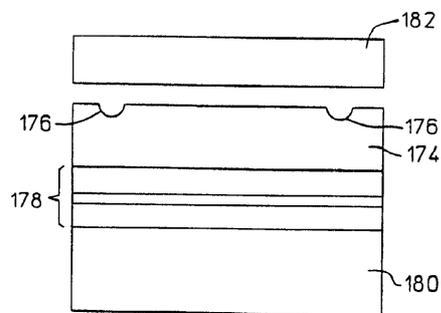
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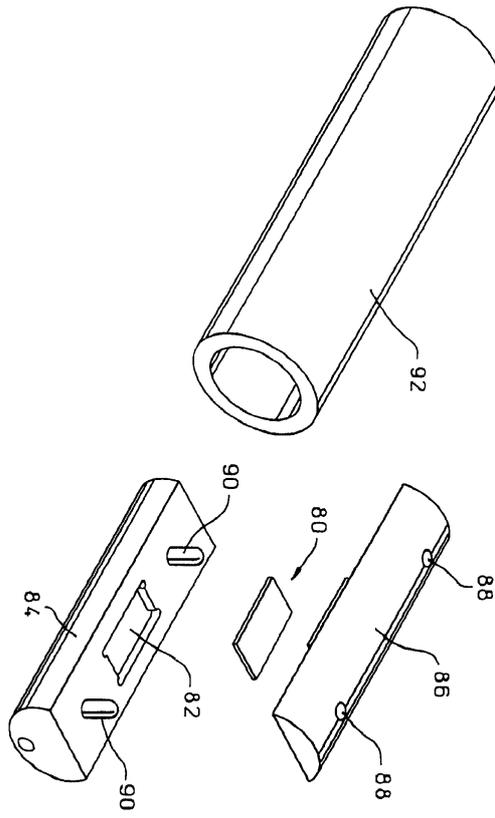
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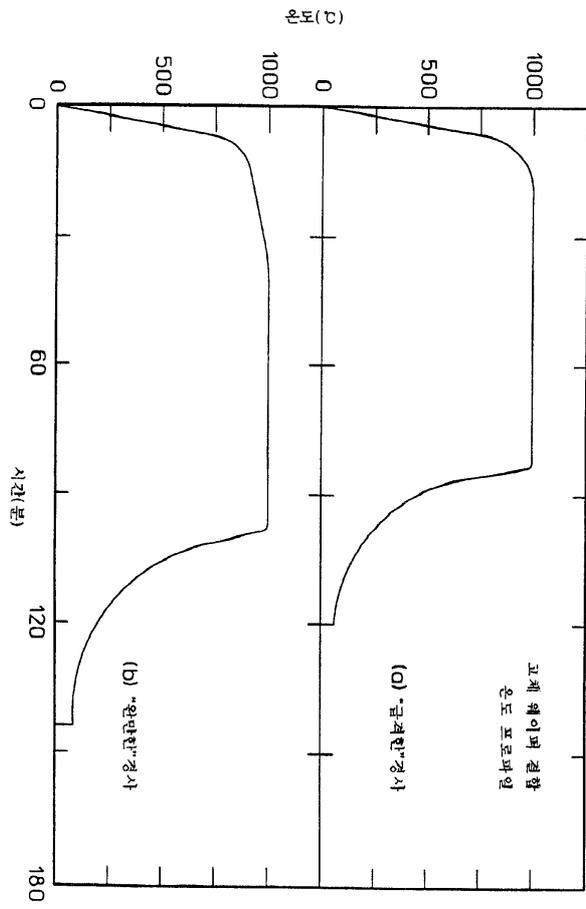


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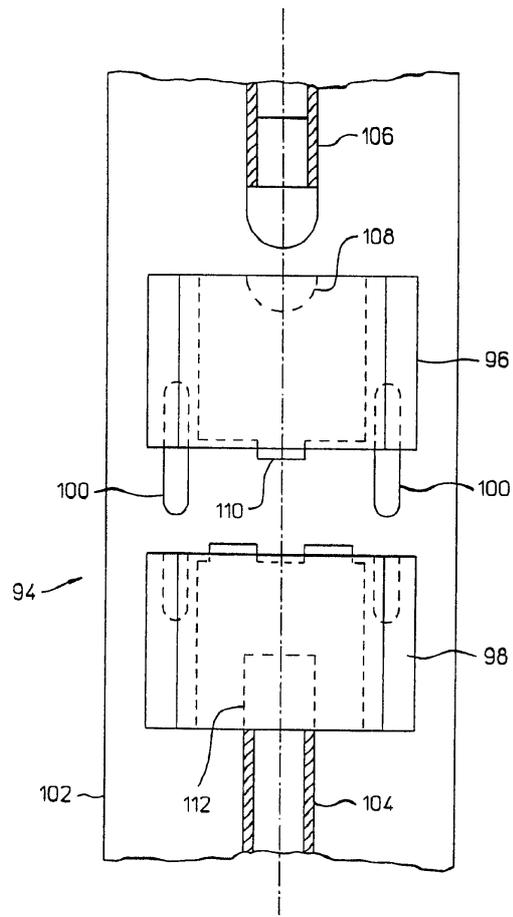


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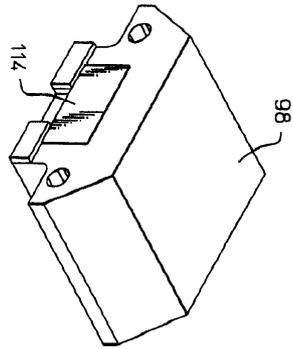
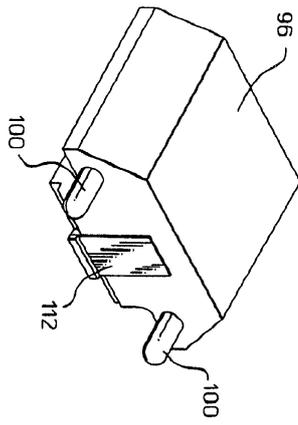




20



21



22

