

(19)
(12)(KR)
(A)(51) 。 Int. Cl. ⁷
H01L 21/20(11)
(43)2001 - 0062031
2001 07 07(21) 10 - 2000 - 0072227
(22) 2000 12 01

(30) 11 - 341962 1999 12 01 (JP)

(71) 가 가

11 - 1

(72) 가 11 1 ,가 가
11 1 ,가 가

(74)

(54)

2 ;

3 가 ;

4 가 ;

5 가 ;

6 가 ;

7 가 .

SiO_2 Ta_2O_5 , ABO_3 ,
 BaTiO_3 , $\text{Ba}(\text{Ti}, \text{Hf}, \text{Zr})\text{O}_3$, SrTiO_3 , $(\text{Ba}, \text{Sr})\text{TiO}_3$, $(\text{Ba}, \text{Sr}, \text{Ca})\text{TiO}_3$, PbTiO_3 , PbZrO_3 , $\text{Pb}(\text{Nb}, \text{Ti})\text{O}_3$, $\text{Pb}(\text{Zr}, \text{Ti})\text{O}_3$, PLZT , YMnO_3 , $(\text{La}, \text{Sr})\text{MnO}_3$, SrB
 $\text{i}_2\text{Ta}_2\text{O}_9$, $\text{SrBi}_2(\text{Ta}, \text{Nb})_2\text{O}_9$, $\text{Sr}_2(\text{Ta}, \text{Nb})\text{O}_7$, $(\text{Sr}, \text{Ba})\text{Nb}_2\text{O}_6$, SrTa_2O_6 , $\text{Bi}_4\text{Ti}_3\text{O}_{12}$, Bi_2SiO_5
 RuO_2 , RuO_4 , SrRuO_3 , IrO_2 , MFIS-FET , MFMIS-FET
 Y_2O_3 , CeO_2 , ZrO_2 , $(\text{Ce}, \text{Zr})\text{O}_2$

$\text{CaGa}_2\text{S}_4 + \text{Ce}$, $\text{ZnS} + \text{Tm}$, $\text{SrS} + \text{Ce} + \text{Zn}$,
 $\text{S} + \text{Tb}$, $\text{CaS} + \text{Ce}$, $\text{ZnS} + \text{Mn} + \text{SrS} + \text{Sm}$, $\text{CaS} + \text{Eu}$,
 $\text{ZnS} + \text{Mn} + \text{ZnS}$, EL
 SiN SiON , TaN TiN , TaN , TaSi
 N , TiN , TiSiN , WN , WSiN , $(\text{Ti}, \text{Al})\text{N}$

CVD , 10^{-2} Pa, CVD ,
 CVD

CVD , CVD , (evacua
ting) 가 . 가, ,
, ,

가

가 가

SiO_2 , Ta_2O_5 , BaTiO_3 , $\text{Ba}(\text{Ti, Hf, Zr})\text{O}_3$, SrTiO_3 , $(\text{Ba, Sr})\text{TiO}_3$, $(\text{Ba, Sr, Ca})\text{TiO}_3$, PbTiO_3 , PbZrO_3 , $\text{Pb}(\text{Nb, Ti})\text{O}_3$, $\text{Pb}(\text{Zr, Ti})\text{O}_3$, PLZT, YMnO_3 , $(\text{La, Sr})\text{MnO}_3$, $\text{SrBi}_2\text{Ta}_2\text{O}_9$, $\text{SrBi}_2(\text{Ta, Nb})_2\text{O}_9$, $\text{Sr}_2(\text{Ta, Nb})\text{O}_7$, $(\text{Sr, Ba})\text{Nb}_2\text{O}_6$, SrTa_2O_6 , $\text{Bi}_4\text{Ti}_3\text{O}_{12}$, Bi_2SiO_5 , RuO_2 , RuO_4 , SrRuO_3 , IrO_2 , MFIS - FET, Y_2O_3 , CeO_2 , ZrO_2 , $(\text{Ce, Zr})\text{O}_2$.

가

$\text{CaGa}_2\text{S}_4 + \text{Ce}$, $\text{ZnS} + \text{Tm}$, $\text{SrS} + \text{Ce}$, $\text{SrS} + \text{Cu}$, $\text{ZnS} + \text{Tb}$, $\text{CaS} + \text{Ce}$, $\text{ZnS} + \text{Mn}$, $\text{SrGa}_2\text{S}_4 + \text{Eu}$, $\text{SrS} + \text{Sm}$, $\text{CaS} + \text{Eu}$, $\text{ZnS} + \text{Mn}$, ZnS

Si, Ta, Ca, Sr, Ba, Ti, Bi, Pb, Nb, Y, Mn, Al, Hf, Zr, Ce, Ir, Ru, Zn, Mg, La, Ga, Tm, Cu, Tb, Eu, Sm
W .

가 . , 가

1

,



M Si, Ta, Ca, Sr, Ba, Ti, Bi, Pb, Nb, Y, Mn, Al, Hf, Zr, Ce, Ir, Ru, Zn, Mg, L
 a, Ga, Tm, Cu, Tb, Eu, Sm W .

5nm
가
가

가

2

가

가

10 m/s
kHz

200

1MHz

0.5 μ m (pores)

가 가

Hz, 1MHz

200k

3

가

4

가

가

가
가
가

가

1 20nm , 10nm 20nm
, 1 10nm , 5nm
200 가

가 , 가 가

가 , 가 ,

(2) , . , 가

(3) , , .

‘(W), -(L)’ \vdash (W) (64) (W)
 ‘(W), -(L)’ \vdash (W) (L) (W) \vdash (L) (W)
 ‘(W), -(L)’ \vdash (W) (L) (W) \vdash (L) (W) (62a) (W)

가 (46) (42) (42) - .
가 (42) , , , .
46) 가 .

가 (90) (W) 가 , 가 (98) 가 (90)
. 가 (90) - 가 , 가 (104) 가
(100) . (104) (106)

), (96) 가 (114) . 가 (114) (116)
), (96) , (118) (116)
 , (W) 가 (90) , (W) (W) , 300 5
 가 , 300 5 , (W) 10 , 300 5
 (110) 가 (92) , , , N₂ 가 가 가
 (110) 가 (92) , , , N₂ 가
 , , , , , N₂ 가
 (W) , , , (W)

· , (W) (42) , (L) (W)
 . (W) - (W) (L)
 , (W) 가 (46) , (42) -

, (W) 가 (50) . 가

· , 가 , , (evacuation)

가

(57)

1.

- 9 -

;

가

2.

1 , 가 가

3.

1 , 가

4.

1 , 가 가

5.

1 , Si, Ta, Ca, Sr, Ba, Ti, Bi, Pb, Nb, Y, Mn, Al, Hf, Zr, Ce, Ir, Ru, Zn, Mg, La, Ga
, Tm, Cu, Tb, Eu, Sm W

6.

, ;

;

,

;

7.

6 , 가 가

8.

6 , 가

9.

6 , 가

가

10.

6 , Si, Ta, Ca, Sr, Ba, Ti, Bi, Pb, Nb, Y, Mn, Al, Hf, Zr, Ce, Ir, Ru, Zn, Mg, La, Ga
, Tm, Cu, Tb, Eu, Sm W

11.

, ;

;

;

가

;

12.

11 , 가

가

13.

11 , 가

가

14.

11 , 가

가

15.

11 , Si, Ta, Ca, Sr, Ba, Ti, Bi, Pb, Nb, Y, Mn, Al, Hf, Zr, Ce, Ir, Ru, Zn, Mg, La, G
a, Tm, Cu, Tb, Eu, Sm W

16.

,

;

;

가

가

17.

16

,

가

18.

16

,

가

가

19.

16

,

가

20.

16

,

가

가

21.

16

,

가

가

가

22.

16

,

가

가

가

23.

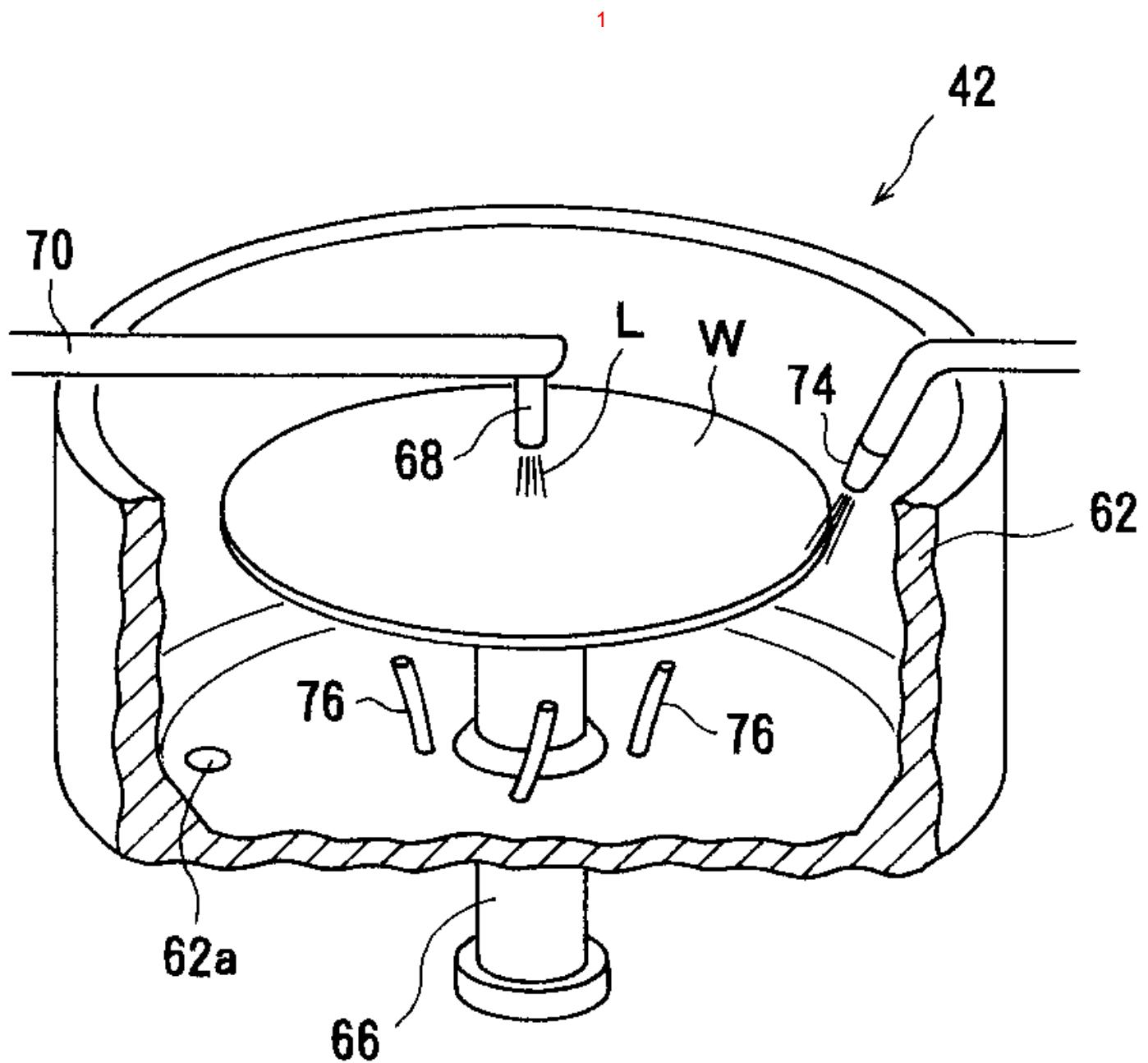
16

,

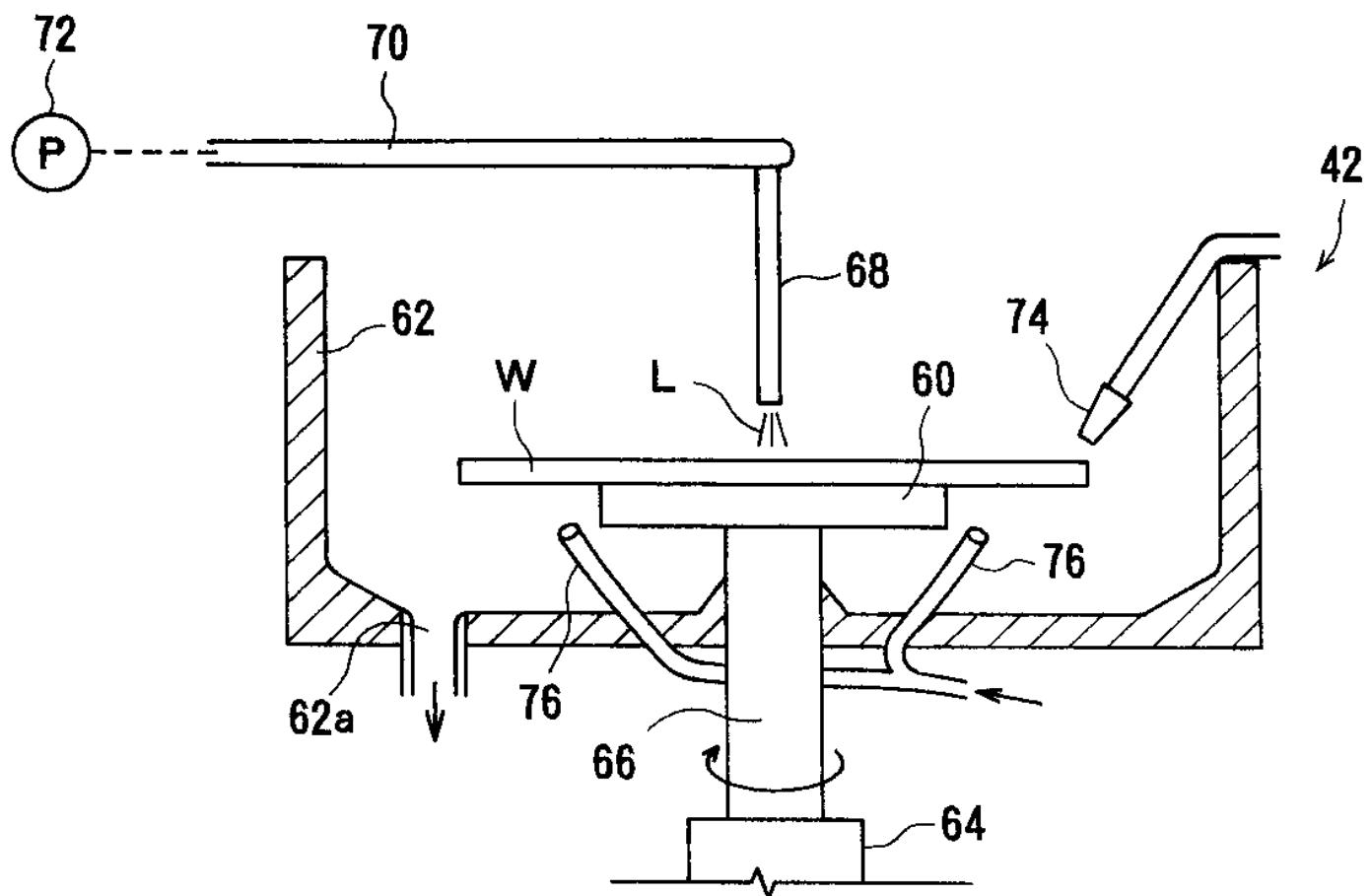
가

가

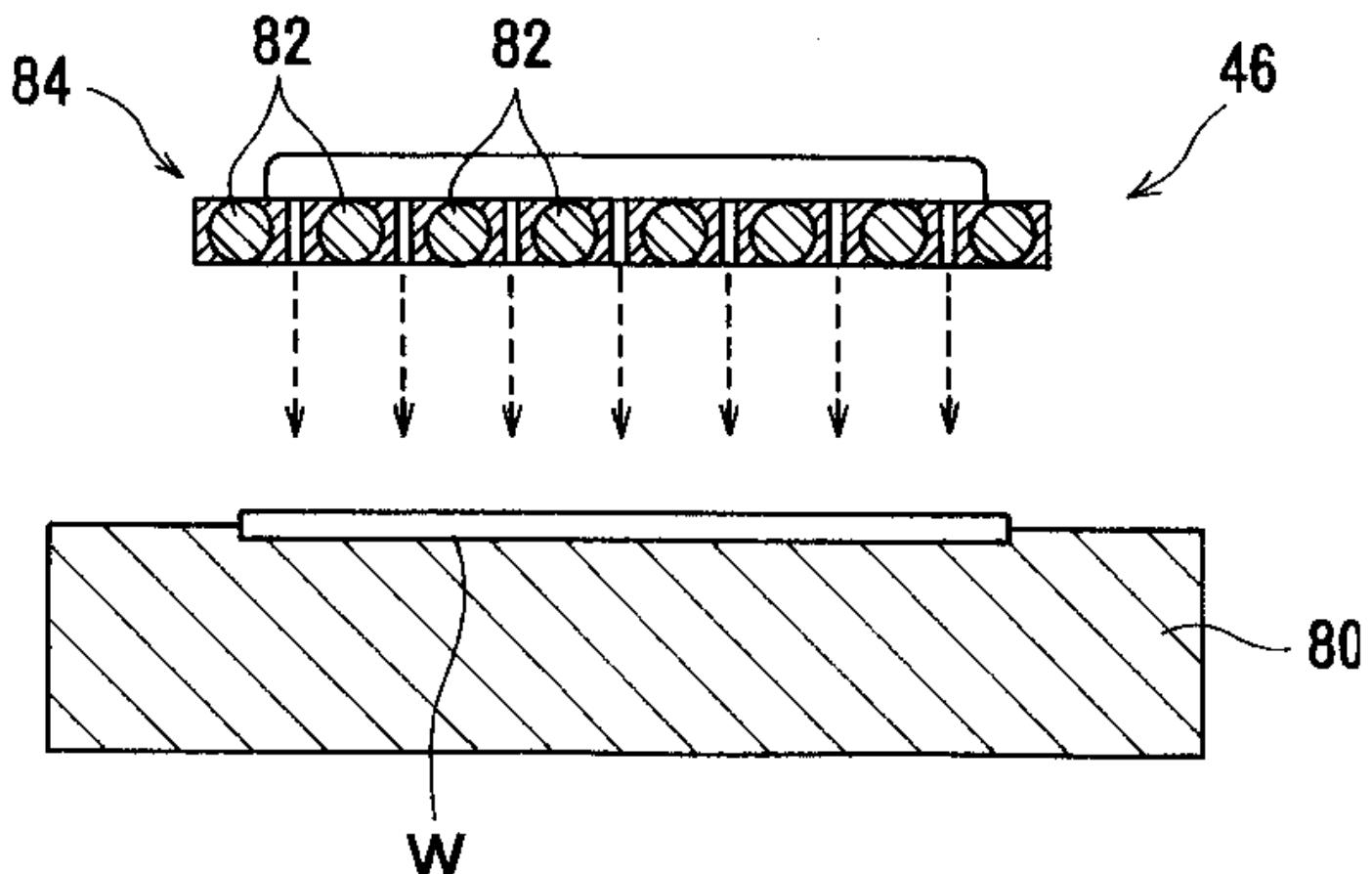
가



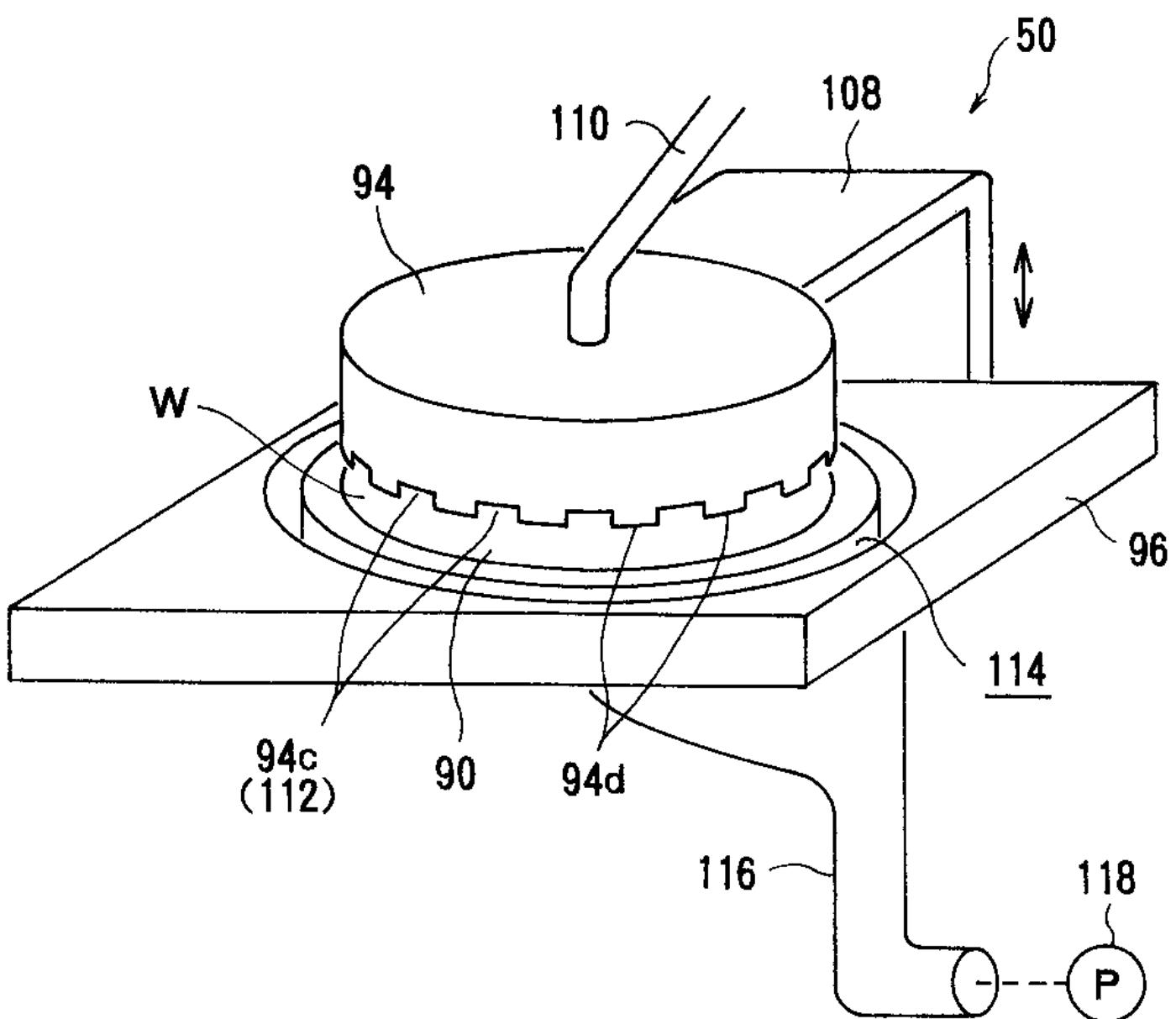
2

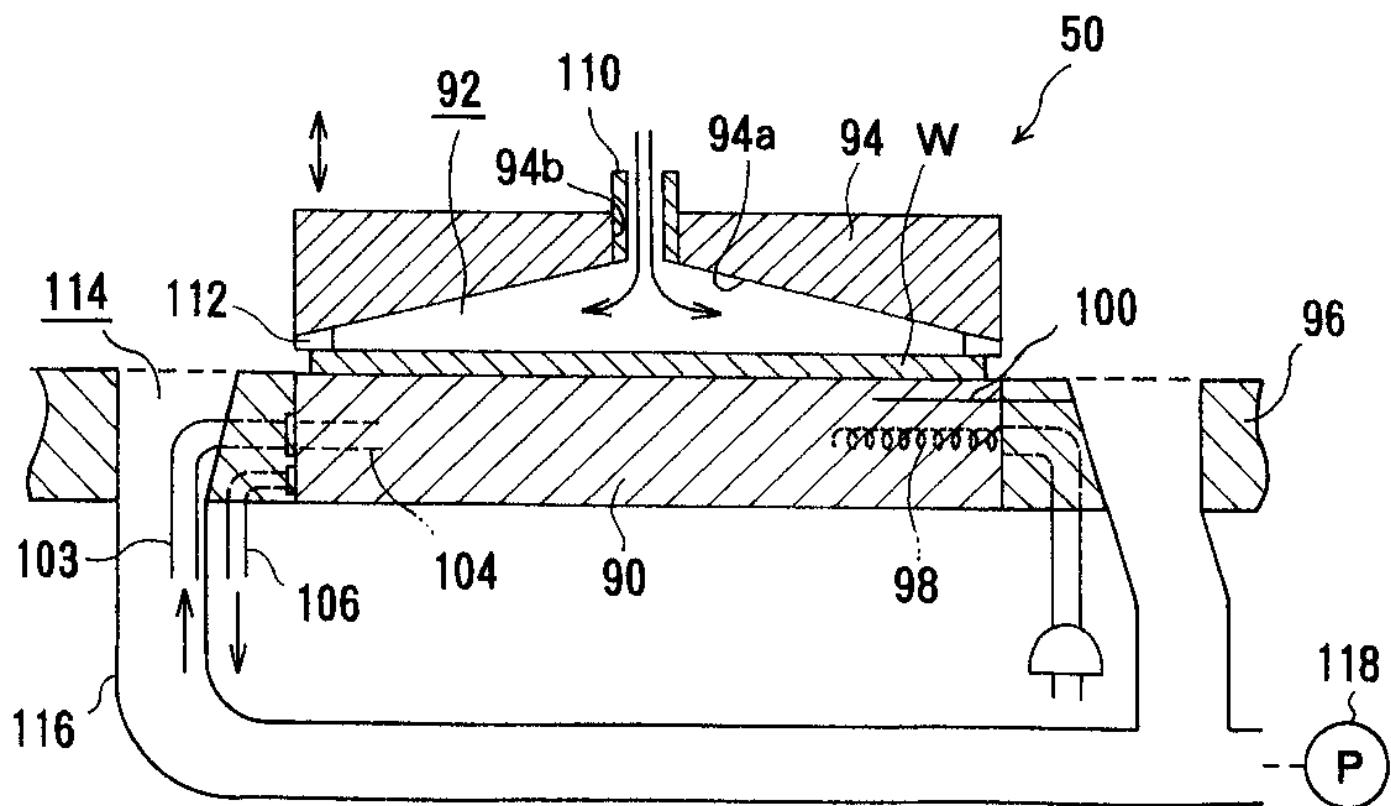


3



4





6

