

()
 가
 (100kV) 가 가
 5,637,951 가

$\cdot 10^{-6}$ (torr)

1 100kV
1

가
 (Alexander Slocum) " (Precision Machine Design)" [
 (Prentice Hall) , 1992]
 가

()
(perturbation)

가 가 가 가

6
300mm

()
가

가

가 ;
 ;
 2 ;
 2 3 가 ;
 1 2 가 ;
 1 1 ;
 가 ±0.1 ;

(buckled column)

2 2 1 2 ;
 6 가 / ;
 100mm 가 가 75kV / ;
 300mm 45.4Kg(100lb) ;

가 ;
 3 1 ;
 2 가 1 ;
 2 3 가 ;
 4 ;
 6 ;

1

2a

2b

2a

X - X'

2

2c

3a

3b	3a	A - A'							
3c									
3d									
3e	1								
4									
5									
6a									
6b	1								
6c	2								
6d	2								
7	2								
8a	3								
8b	8a	2							
8c	8a	1							
9a	3								
9b		3							
9c			3						
10a	2								
10 b		2							
9c			2						
2a								가	
4),	2a	(200),	(220),	1	(230),	(240),	(242),	(24	
(290)가	(250),	2	(260),	(270),	(280),	(285),			
0),	(280),	2b	(215),	(220),	1	(230),	2	(260),	(27
	(285),		(290),			(295)가			2

c (246), (247), (248), 2c (249), (245),

2a (220), (250), 1 (230), (240), (290), (285), (270), (270), 2 (260)

2b (210), (220), (215), (210), (295)

(242), (270), ()가 ()

2c (240), (248), (249), (248), (246), (270), (260), (249), (248), (270), (200), 가 (200), (295), (240), 가 (240), 6 (240), 6 (240), 2a (290), (290), (290), x, y, z, x, y

3 (x, y, z) 가 (270), (285), " " (285), z, x, y

2a (270), (240), 가 가 (200), 가 가 (245), (248), (290), 가 가 2c

2a , (240) (210) .
 44) (200) , (240) (242) (2

(240) (270)
 46)가 , (247) (245) U ; , (2

3a 3c (290)
 , (240) (210) 가 . 3a 3e .

3a , (210), (240), (330), (350)가 . 3b 3a A
 A' (335), 3b , (210), (240), 1 (310), (325), (330),
 (337)가 . 3c 3d
 1 (316) . 3c , (240), (340), 1 (310),
 3d , (240), (325), (350)
 2), 2 3e , 1 (310) , 1 (316), (330), 1 (31
 (314), (322)가 .

3a 3b , (330) , N S
 (335) 1 (310) (240) 1 (340)(3c) (21
 0) . 1 (310) (240) 1 (340)(3c)
 . 1 (dF=IdlXB, dF l 1 dl B 가 가
)
 가 (x, y) 1 1 1
 z 1
 1

3c (240) 1 (310) . 3c
 , 1 (310) (240) 가 .
 가
 () (200)
 , 1 3c , 1 ,
 3c

가

1 (310)
 (350) 1 ±0.1
 (350)
 (325) 3d

(210) (340) (350) (210)
 (325) 1 (316) 가
 가 (270) 가

3e (330) 1 (310) 3e 1 (312) 1 2
 (322) 1 3e 가
 가
 가 3 가 3

4 (200) (2a, 3c, 6b) (340)
 4 (340), (360), (362),
 (364), (366), (368), (370), 가 (372),
 (374), (380), (390)가
 (290) (430) (2).

(340) , (380)
 (390) 4
 (340) (380) (362)
 (x, y, z, x, y, z) (368),
 (366) (370) (360) (x, y, z, x, y, z) (366)
 (364) (366)

가 (364) , 가 가 (362)
 가 (368) (364) (240) (370) ,
 (368) (240)

4 , (364)가 (366) (null) .
 ,가 (372) , 가 (374)
 가 (390)
 가 (240) 가
 가 (240) (370)
 ()

5 (380) 5 , (382), ((384), (385), (386), (388), (laser triangulator)(3
 83)가 가 (388) 가 ()
 386) (385) (Zerodur:)
 (240) (382) (383) ()
 (295, 2b)
 (385, 386)

5 , (382) (384) , (242)(2a)
 (385) .
 (240) (386) 가 (383)
 (240) 가
 가

가 가 가

2a , (240) (270)d0 (220) , (210)
 2a , (290)가 가 가 ,
 가 (200) 가 가
 x, y (280)

6a 1 (230), (285), (410), (420), 6a (270), (220), (430)가

6a (285), (410), (420), (430)가

6a (410) 1 (230) (220) (420)

가 가 6a z 가 3 가

(430) ()

(410) (230) (220) ()

) 5,310,157 ()

(240)

6b 가 2 (450), 2 (460), (270), (220), 1 (317), (230), (340) (430), 2 (440), 6b (440),

6b (430) (220) 1 (230) (220) () 2 (450) 2 (440) , N S " 1 가 (440) 1 (230) 2 (460) (317) (340) 가 (4) 2 (290) (240) 가 (2)

6c 6d (285) (voice coil actuator) 6c 6d (220), (510), (520), (530), (540), (550), (317), (340)

6c (220) (510) (520) (530) 1 (230) () (540) (550) (530) (540)

6c , (520) 가 z . (520)
 (550) z (340) (540)
) (530) (

0,352 , 5,390,892 , 5,549,270 , 5,669,594 , 5,794,909 , 5,178,357 , 5,310,157 , 5,37
 5,833,204
 5,345,206

LA25 - 42 - 00A BEI
 (Minus k Technology, Inc.) SP1014, 317, 318, 319
 - (Nano - k:) (vibration isolator) . 가 , 가 가

가 , 가 , 가

2a , (240) (27) 1 (230) 2
 (260) 가 . , 1 2 (230) 2 (260) 2 3
 가 , 1 2 가 .

7 2 (230) 2 (260) . 7 , 1 (610), 2 (620), 1
 (630), 1 (640), 2 (650), 1 (660), 2 (670),
 (fastener) (680), (685)가 .

7 , (640, 650) (680) ()
 . (685) , (685)
 가 , 1 (610) 2 (620) 1 (640) 1
 (660) . , 2 (620) 3 (630) 2 (650)
 2 (670) . 1 2 , 1 2 .
 , 1 (650) , 3 2 . (2
 70) 가 , , / , ASTM 304 . 0.254mm(0.010)

3 , (85) (210) (240) (2a) .
 , 1 (230) . 1 (230)
 , 7 가 ,
 , 1 (640) 2 (650)(7)

가

(710), 2 (720), 3 (730), 2 (740), 1 (750), 2 (760), 1
 1 (770), 3 (780), (790)가 1 2 , 3

1 , 2 , 1 2

8a , 1 (710) 3 (730) 2 (740) ,
 3 (730) 2 (720) 1 (750) , 2 (760)
 1 (770) 3 (780) 3 ,
 가 3 2
 , 3 (720) (220) (270)(2
 a) 1 (710) () 가

8b 8c 2 (740) 1 (750) 8b 8c ,
 1 (710), 2 (720), 3 (730), 2 (705), 1 (715),
 (725), (735), (270)가

8b , 1 (710) 3 (730) 2 (705) 2
 (735) (725) 1 3 2 (740)
 (715) 2 (720) 3 (730) , 8c 1
 (725) 2 3 1 (750) (735)
 , 2 (705) 1 (715) 3 8b 8c
 (710) (285) (270) 가 1
 , 1 2 8b 8c
 , 0.254mm(0.010) 가 , / , ASTM 304

9a 3 9a , 1 (810),
 (812), 1 (814), 1 (816), 1 (818), 2 (8
 20), 2 (824), 2 (826), 2 (828), 3 (830), 3
 (833), 3 (835)
 9a

1 , 1 (810) (285)(2a) 2 (820)
 1 (270) 3 (830) 3 ()
 830) 2 2 1 (810) 2 (820) (2
 70) (814, 824, 833, 835)
 1 (816) 1 (810) ,

(285) 1 (818) 1 2 (826) 2
 (820) , (270)가 2 (828) 2
 2 1

9b 3 9b , 1
 (810), 2 (820), 3 (830), 1 (814), (815),
 (817), 1 (822), 2 (824), 3 (833), 3
 (835), (865) (270) 2 (834)

9b , 가 9a 1 (822) (815)
 (817) 2 (824) 3 (833) 2 3
 2 1 (9a), 9b 1

9b 1 (822) 2 (820)가
 (865) ()
 , 2 2 ()

9c (865) 3 9c
 , 1 (810), 2 (820), 3 (830), (812), 1
 (814), (815), (817), 2 (824), 3 (833), 2
 (834), 3 (835), (865) 9c 9a 9b (27
 0) 1 (824)

9c , 9a 2 (834) (815)
 (817) 1 (814) 3 (835) 1 3
 2 2 (9a), 9c 2

9c 3 (834)가
 (865) , 2 (820)가 (865)
 ()

, 9b 9c , 3 , ,
 2 , ,
 ()

9a 9c 3
 8a
 가 , 9a 9c , 1 (230) 2 8a (2
 60)(2a) 3 9a 9c .

9a 9c 3 2
 , 2 10a 10c . 2

10a 2 10a , 1 (810),
 (812), 1 (814), 1 (816), 1 (818), 2 (8
 20), 2 (824), 2 (826), 2 (828)
 (814, 824) (10a
). 1 (186) 1 (810) 1 (818) 1
 . 2 (826) 2 (820) . 2 (828) 2
 . 2 1 .

10b 2 10b , 1
 (810), 2 (820), 1 (814), (815), (817), 1
 (822), 2 (824), (865) .

10b , 가 10a , 1 (822) (815)
 (817) 2 (824) 1 (814) . 1 2
 2 1 (10a), 10b 1

10b . 1 (822) 2 (820)가
 (865) () .

10c (865) 2 10c
 , 1 (810), 2 (820), (812), 1 (814), (8
 15), (817), 2 (824), 1 (822), (865) . 10c
 10a 10b .

10c 2 . 1 (822)
 (865) , 2 (820)가 (865)
 () . 1 2 2 1
 (10a), 10c 1 .
 , 10a 10c , 2 ,

2b [(210) (215)] [(295)
]

2b , ,
가 , ,
 . , ,
 (200)
 (,
가) , ,
가 , .

100mm, 300mm

가

, 300mm 45.4Kg(100)

(386) (385) (240) (270)

120kV 가 50kV ,

가
가 가 가

(57)

1.

; 3 가 (limb) ; ; , 1 ,
3 가 ; 2

2.

1 , 1 2 .

3.

1 , 1 3 .

4.

1 , 2 3 .
5.
2 , 2 3 .
6.
1 , 2 2 .
7.
3 , 2 2 .
8.
1 , 1 .
9.
1 , 1 .
10.
1 , 2 .
11.
1 , 2 .
12.
8 , 2 .
13.
9 , 2 .
14.
1 , 3 .
15.
14 , .
16.

15 , , 1 ,
1 , 1 , 1 ,

17.

16 , , .

18.

17 , ±0.1
.

19.

1 , ,
.

20.

19 , .

21.

20 , .

22.

1 , ,
.

23.

22 , .

24.

23 , 2 , 2 , 2 , 1
2

25.

1 , 가 .

26.

1 , .

27.

1 , .

28.

1 , .

29.

1 , , 가 , , .

30.

1 , .

31.

1 , .

32.

1 , .

33.

1 , .

34.

1 , 100mm .

35.

1 , 300mm .

36.

35 , 45.4Kg(100lb) .

37.

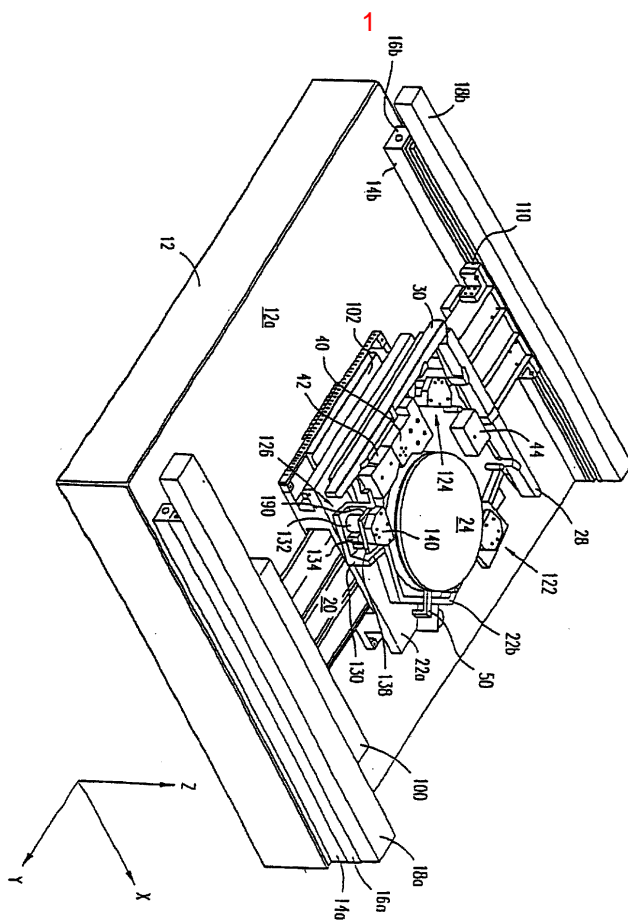
; 3 가 ; (limb) 3 , ; 1 , , 1

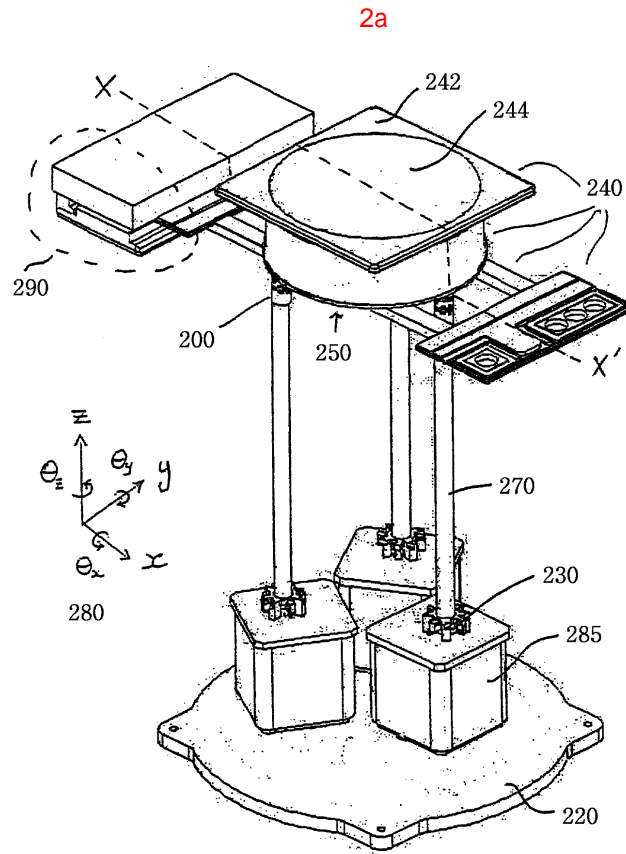
가 ;

3

2

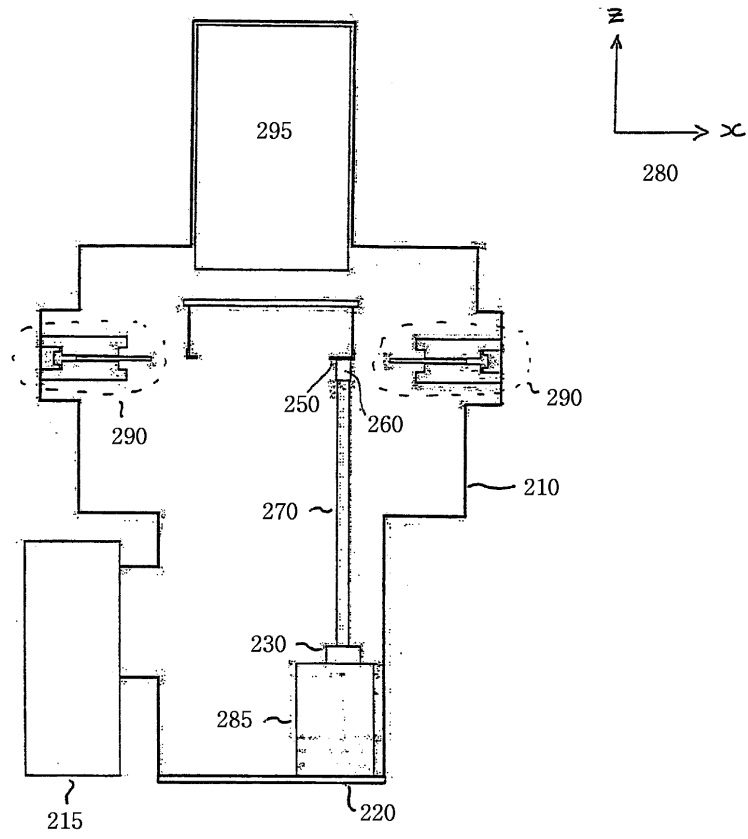
4
6



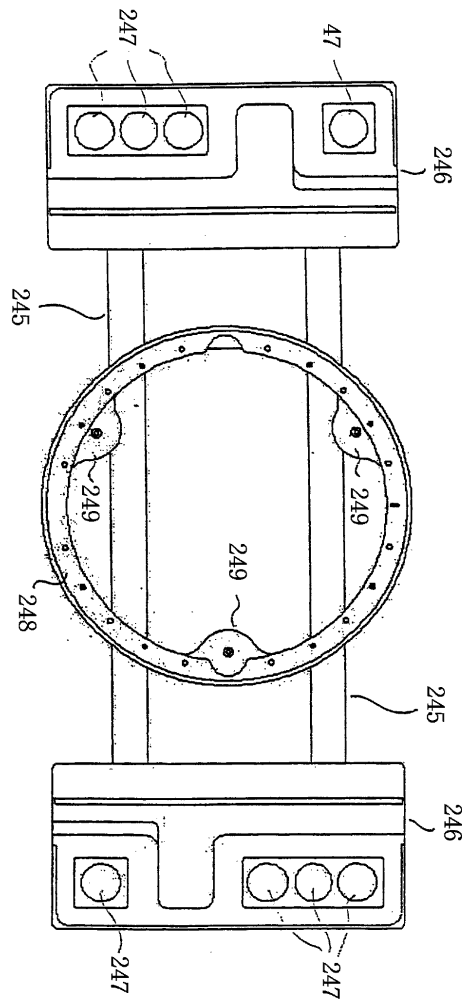


200

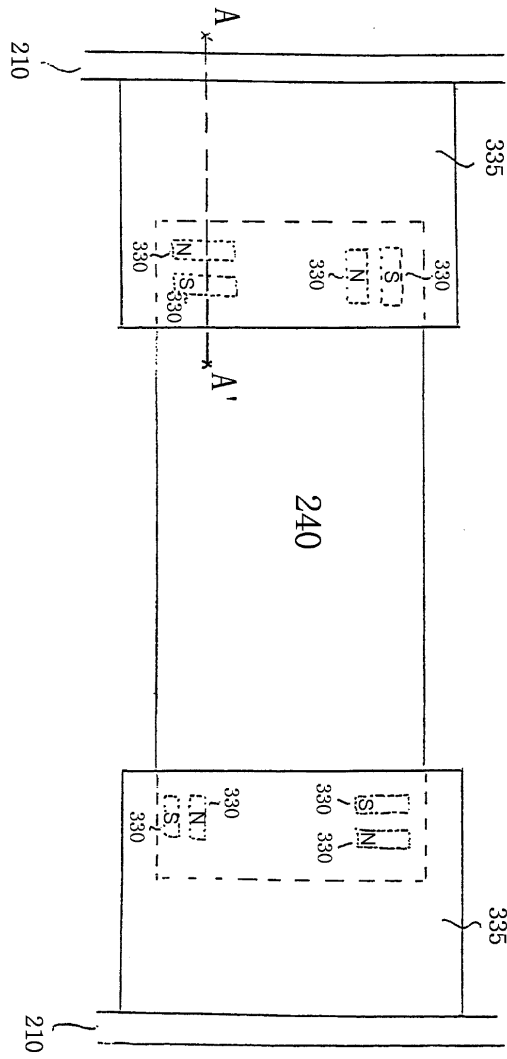
2b



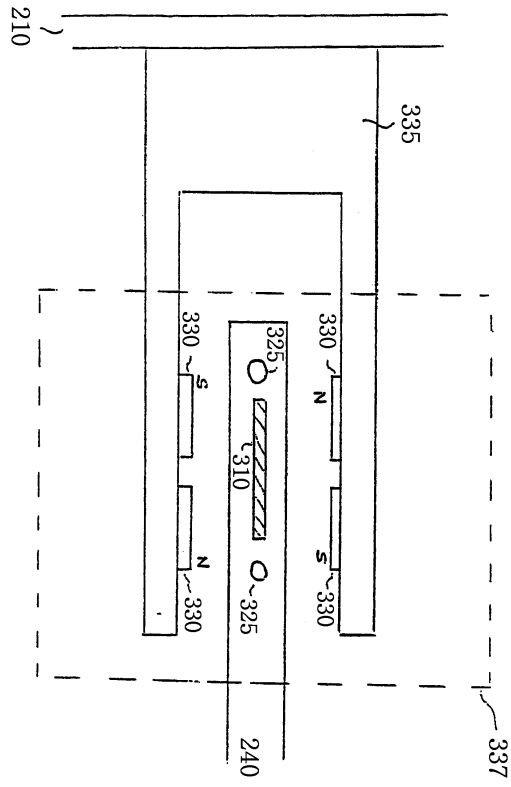
2c



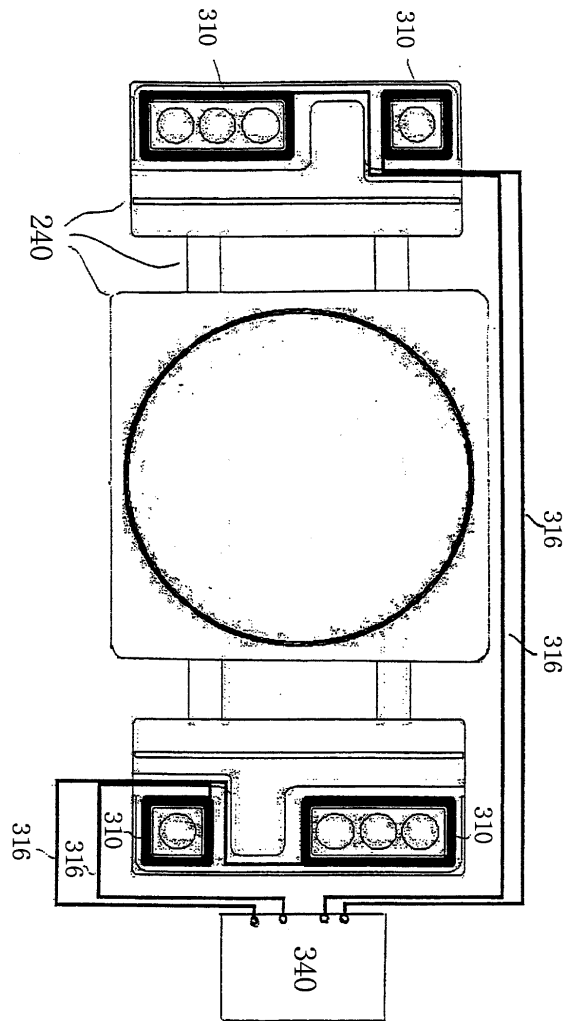
3a



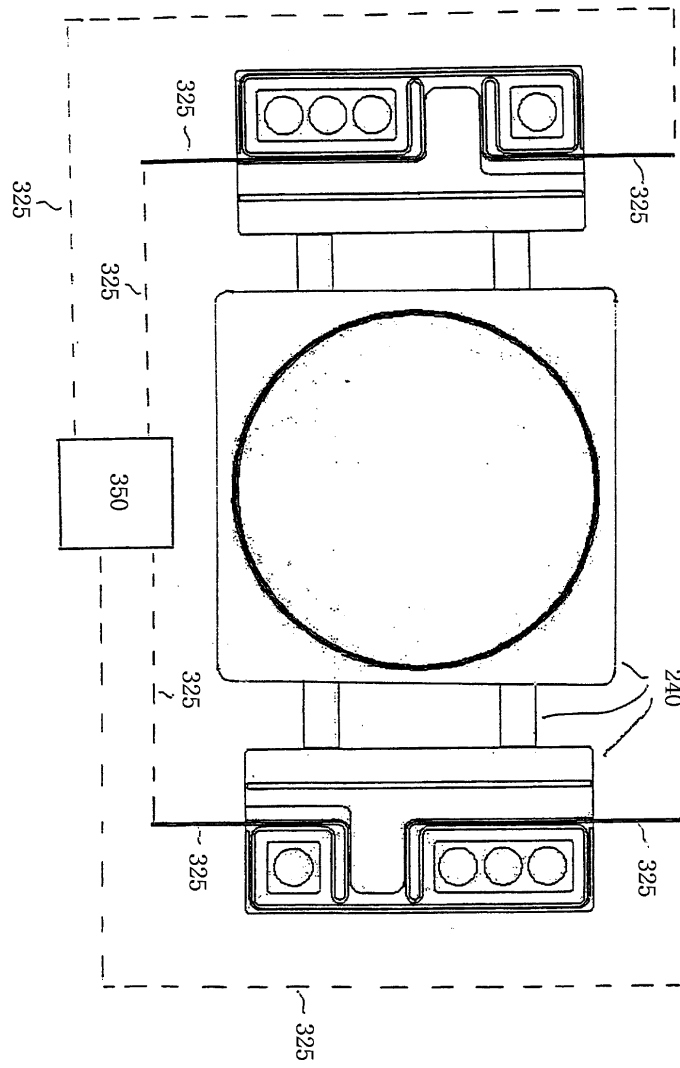
3b



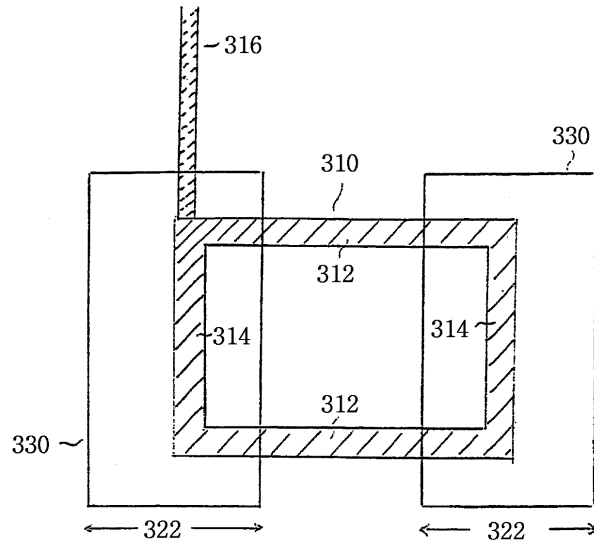
3c



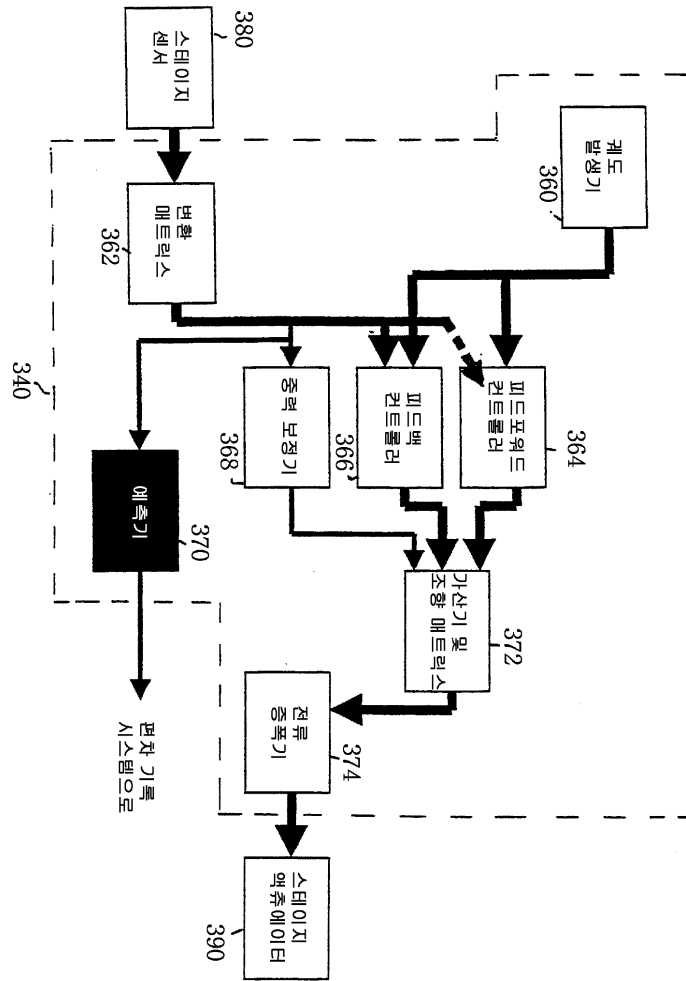
3d



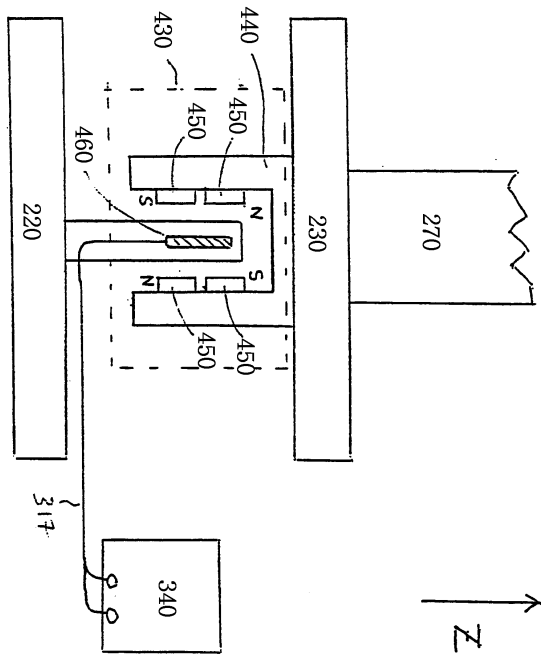
3e



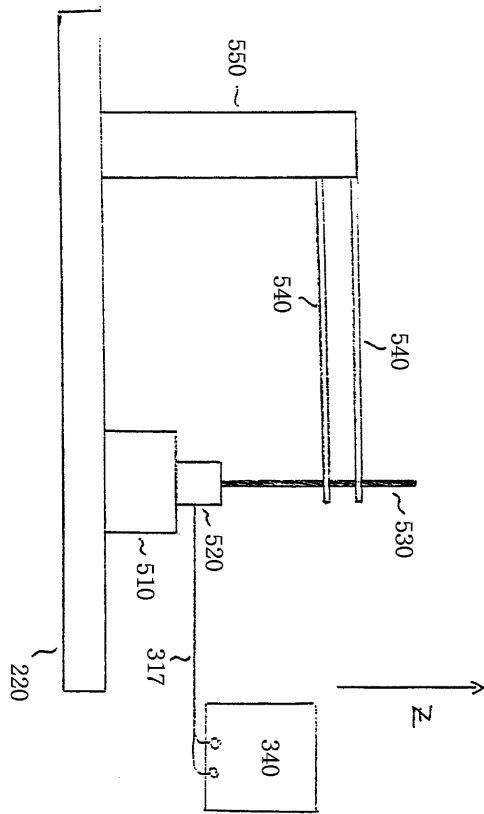
4



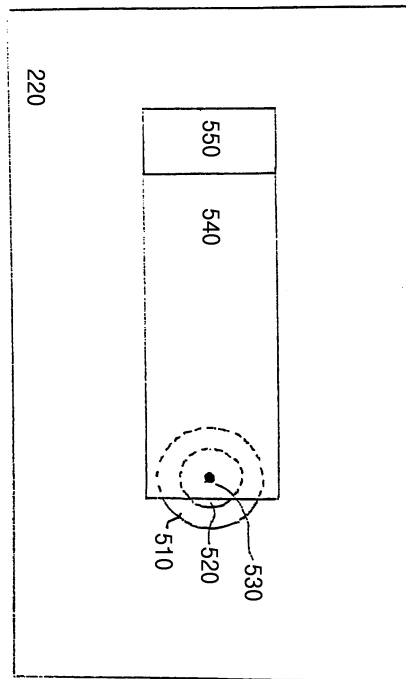
6b



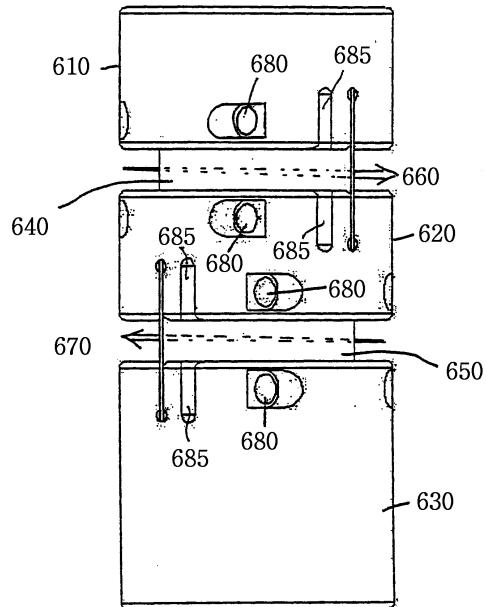
6c



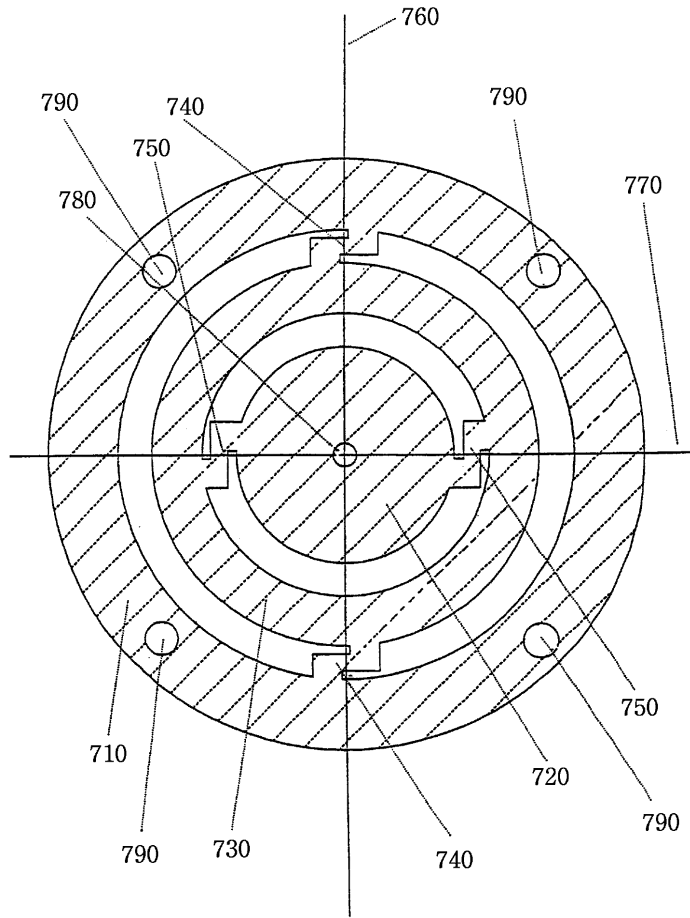
6d



7

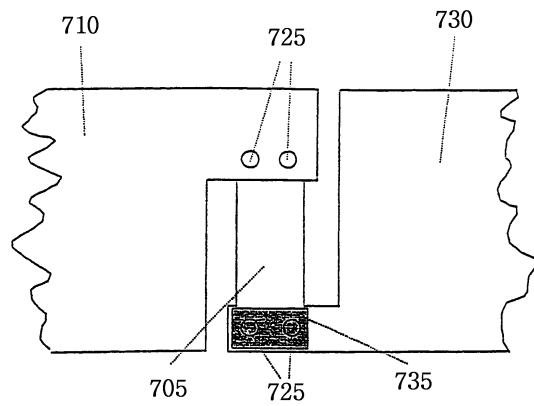


8a

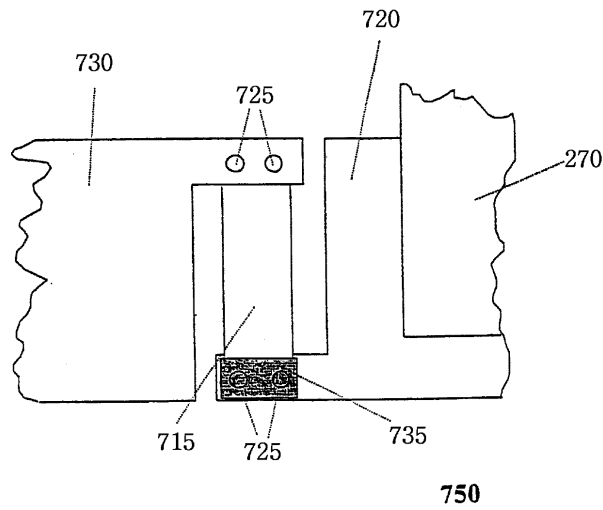


700

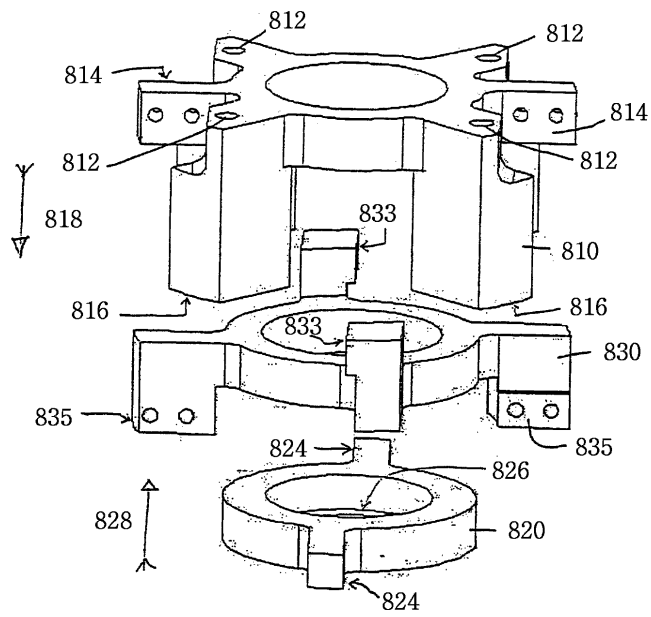
8b



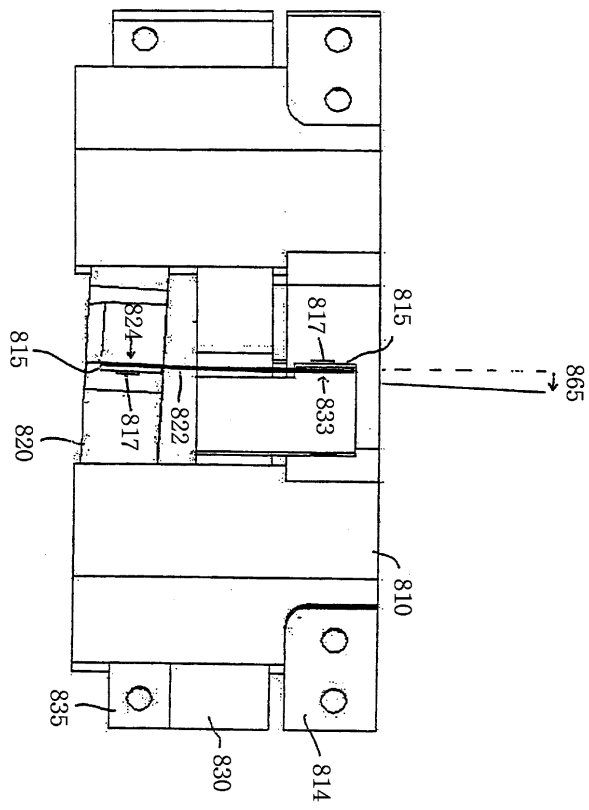
8c



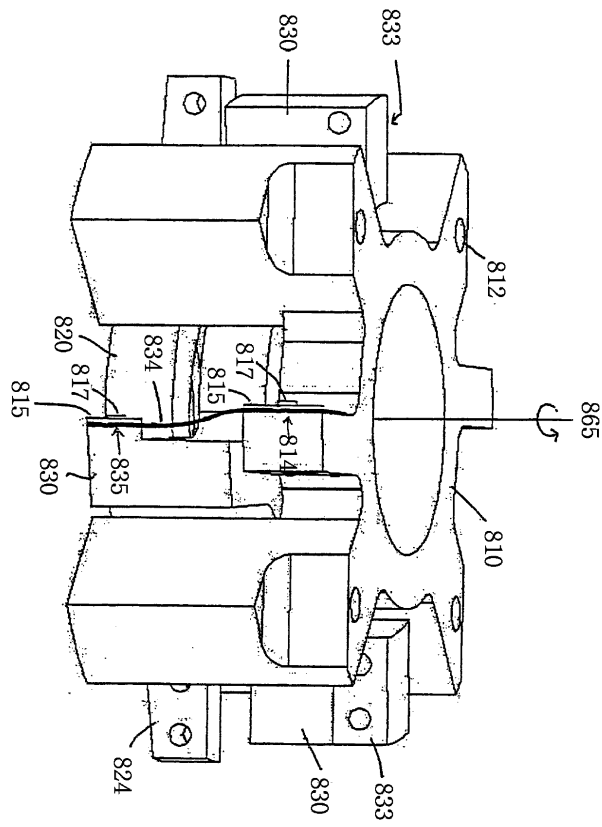
9a



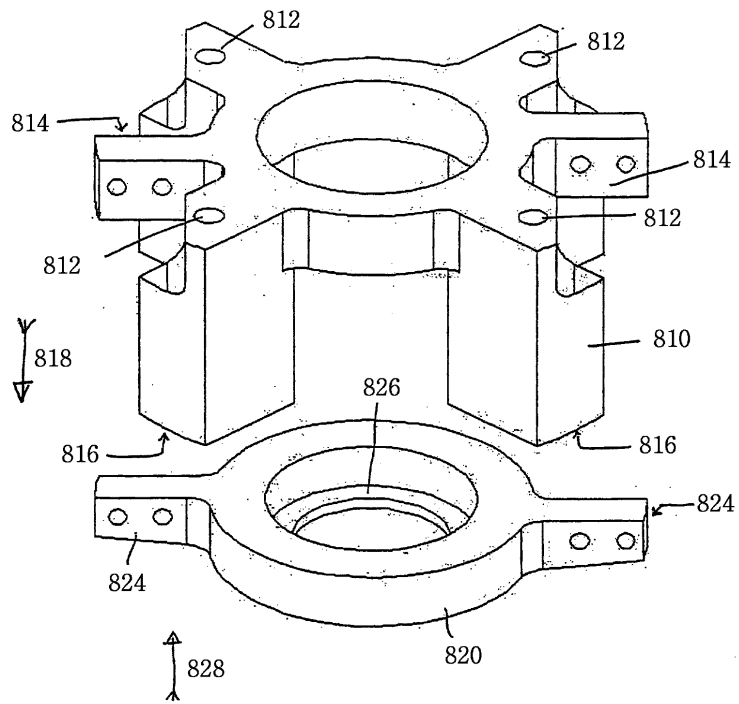
9b



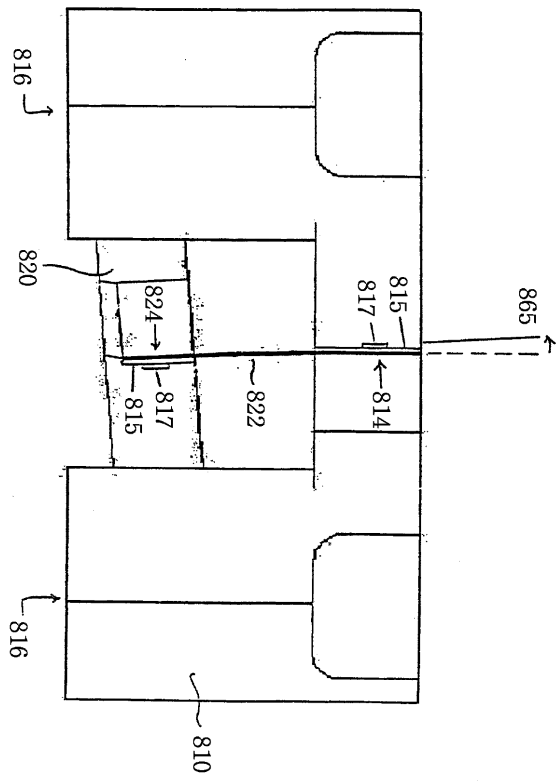
9c



10a



10b



10c

