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F01C 19/08

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(71) 77843-3369 3369

(72) 77840 1805

77845 2811

14853 1032

77808 322

77801 2909

(74)

:

(54)

가 가 가 가 가

(throttle) , - (,),
 cycle engine), (Diesel Cycle engine), (Rankine Cycle engine), (Otto
 (Stirling Cycle engine), (Erickson Cycle engine), (Carnot Cycle engi
 ne) (Brayton Cycle engine)

가

가

가

가

(T_{cold})

(T_{hot})
3

(max)

$$\eta_{max} = 1 - \frac{T_{cold}}{T_{hot}}$$

가 '가 (reversible)'
 '가 (irreversibility)' 가

가

가

가

가

4							
5							
6a							
6b							
7							
8a							
8b			가				
9							
10	46	-					
47			가				
48	52	-					
53a	53b		(anti-backlash)				
54	58						
59	63	가					
64a	64b						
65a	65b						
66	69		가				
70	79	가			가		
80	83						
84	87						
88	91						
92			가	,	,	,	가
93	94		,	,			
가							
95	가						
96	101	-					

1 101

2002

(Texas A & M University System)

가
1 8 6,336,317 ('317 amp; ') /

가 1 2 2가 1 2 - 2
(408) (410) (406) (400) (402) (404) 가
(work) (412) 가 (412) (414) (404)
) (402) (402) (408) (408) (404)
406) (400) (404) (402) (400) (402)

가 2가 2
, 1 2

가

3 5 (1a) 3 (1
4 (2a) (2a) (4a) (4a) (6a)
a) (8) (2a) (4a) (4a) 1
(9) (4a)가 (2a) 가 (10) (2a) (4a) (12) 가
(8) (12) (4a) (12) (4a) 가
(14) (6a) (18) (14) (4a) 가
(22) (6a) (20) (24) (20) (14) 가 (4a)
(4a) (26) (16) (2a) (4a)
(4a) (22) (20) (6a) 3
5 (1a) (20) (29) 30 (1a)
, 가 (28) (6a) (4a) (29)
(가 (1a) (24) (20, 22) 32
(34) (1a) (18) (38) 36 40
(34) (4) 3
(29) (42) (42) (29) 3
(6a) (8) (9) (4a) (6a) (8) (4a)
(42) (42) 가 (8) (9)
6a 6b

(42) 6a , (42) 6b
(8) (9) , 가 (6a) (4a) , (6a)
(1a) (4a) 가 (8) (9)
(1a) , (1a) 가 , (42) 가 3
(1a) 가 , (42)
4 5 가 (1a) (44) (44) (8)
(44) 7 (44)
7 (44) (45) (44), (47), (48), (45) (49) (50)
(44) (44) (51) (44)
(51)가 (44) (51)
(52) (47) (47) (52) (51)
(4a) (46) (44) (53) (53)
(48) (53) (48) (49)
(49)가 (46) (49) (44) (50) (50)
가 (49) (50) (44) (50) 가
(53) (45) (53)
(53)
(6a) (6a) (4a) (54) 8a
(6a) (55) (6a) (54) $2 \times 10^{-6} \text{ m}/(\text{m} \cdot \text{k})$
4) (54) (54) (54) (5) (6a)
(56) ()
8b (6a) (54) (6a) (54) (57)
(54) (6a)
9 (8) (58) (1a)
(8) (28)가 (58) (8) (30)
(1a) (28) (30) (1a) (30)
(8) (58) (58)가 (58) (30) (30)
(1a) 가 (30) (1a)가 (30)
(1a)
10 15 (1b) 10 (1b) (2b),
(2b) (4b) (4b) (6b) (60)
1b) 1 (2b) (60), (63, 64) (65) (60)
(6b) (62) (60) 2 (66)가 (62)

(66) (4b) (67) (4b) (68)
 (65) (69, 70) (71) (2b)
 (6b) (71)가 (4b) (66, 67)
 (72)가 (4b) (72)
 (73)가 (74) (72) (73)
 (76) (75) (75) (62) (73) (73)
 (74, 76) (62) (soft mounted)' (73) 가
 (74, 76) 가 (72) (62) (73) (74, 76)
 (cantilevering)' (4b) 가 (73) 가
 (4b) (69, 70) (69, 70) (4b) 가
 가 가 (2b) (78) (2b) (77) 가
 (77) 가 (4b) (4b) (77) (69, 70)
 (1b) (6b) (4b) 가
 가 (6b) (6b) (4b)가 (4b) 가
 (4b) (2b) (4b) 가 (6b) (80)가 (2b)
 (4b) 가 (2b) (80) 가
 (1b) (1b) (roughening) 가
 (4b), (6b), (72), (73)
 11 가 (1b) (73) (74, 76)
 (65) (60) (4b) (74, 76)
 (63) (4b) (74, 76)
 12 (1b) 11
 12 (4b) (69, 70) 가, (2b) (4)
 b) (4b) (73) (74, 76) 가 (81, 82) (72)
 가 (73) 가 10 11 (60) (83) (4b)
 가 (83) (73) (60) (60) (83) (73)
 가 (83) (73) (60) (60) (83) (73)
 13 (1b) 13 12 (4b)
 , 13 (81, 82) (84)

14 (1b) 14 12
 , (83)가 14 (85) (73)
 , (85) (86) (2b) 가 (85) (85)
 (4b) (71) (85)
 (85)

15 (1b) (60) 10 (71)
 , (65) (2b) , (89)
 (4b) (71) (4b) (89)
 (88) (71) (90, 91) (2b)

16 20 (1c) 16 (1c)
 (2c), (2c) (4c) (4c) (6c)
 (1c) (94) , (94) (96, 11)
 0) (2c) (95) (6c) (95)
 , (97)가 (95) (97) (4c)
 (98) (4c) (99, 100) (94)
 10 15 (1b) , (4c) (101) ,
 (103, 104) (101) (4c) (102) (101)

(95)가 (97) 가 (98)
 (4c) (1c) (4c) 가
 (106) (2c) 가 (2c)
 (105) 가 (107) 가 (1b) (80)

17 (1c) 16
 17 (102) (103, 104)
 (6c) (101)

18 (1c) 17
 18 (101) (4c) (6c)
 (4c) (101)

19 (1c) 16
 19 (94)가 16 (2c)
 (108) (2c) (108) (94) ' (floating)'
 (94) (94) 가 (94)
 (2c) (109) (108) 가 (2c)
 (94) (2c)

20 (1c) 19
 20 (94) , (1c) (94)가 19
 (102) (111) (102) (111) (9)
 4) (103, 104) (4c)
 ' (hard-mounted)' , (1c)

21 24 (1d) 21 (1d) (2d),
 (2d) (4d) (4d) (6d) (115) (6d) (16)
 1d) (6d) (4d) 가 (115) (16)

(4d) (2d) (117) , (6d) (2d)
 (118) (117) (115) (120)
 (119) , (118) (115) (120) (1)
 19) (120) (116) , (121) (117)
 (119) , (116) (120) ,
 (118) , (6d) (117) (4d)

(117) (115)
 (119, 120) (6d) (4d)
 (60) (115)
 (1d) (2d) (123)
 (122) (122) (4d) 가 (가, ((124)
 1d) (2d) 가
 22 (1d) (117) (118) 21
 (2d) 가, (117) (118)
 (115) (4d) (6d)
 (125) (117) (4d) (126)
 (118) (6d) (4d) (12)
 5) (129) (128) (127) (129)
 (130, 131) (2d) (132) (129)
 (128) (127) (125)
 (4d) 가, (125) (115) (133)
 (115) (134) 22 (126)
 (135) 가 (6d) (2d) 가
 23 (1d) 23 21
 , 23 (117) (118) 가
 (116)가, (4d) (137) (136) (6d)
 (138) (116) (115)
) (115)
 24 (1d) 24 23
 24 (117) (118) (2d)
 (6d) (139) (118) (4d)
 (141) (142, 143) (117) 가, (141)
 (146) (145) (144)
 (147, 148) (2d) (146) (149)
) (145) (144) (141) (4d)
) (136) (116) (138)
) 가 (6d) (2d) 가
 25 (1e) (1e) (2e), (2e) ((4e)
 4e) (4e) (6e) (1e) (2e) (2e)
 (150) (151) (150) (4e)
 (151) (6e)
 (4e) (6e) 1 (154) 2 (155) (153)
 (152) 1 (154) (156) , 2
 (155) (157) (156) (150)
 (157) (151) (4e) (6e)
 , 158 (153) 1 2 (154, 155)
 (156) (157) 가 , (1e) (4e) (6e)
 (160) (159) 가 , (158) (160) ((2e)
 2e) (161) 가, (1e) 가 (150) 151)

26 (2f) 28 (2f) (1f) (4f) 26 (6f) (1f) (2f), (가, (1f) (165) (166) (165) (167) (168) (6f) (166) (171) (4f) (169) (172) (166) (170) (170) (171) (173) (가 (2f) (173) (2f) (175) (가 (2f) (176) (177) (가 (1f) (2f) (177) (176) (4f) (가 (가, (1f) (2f) (178) (가 (4f) (2f) (179) (2f) (2f) (174) (173) (2f) (173) (175) (가 (2f) (176) (177) (가 (1f) (2f) (177) (176) (4f) (가 (가, (1f) (2f) (178) (가 (4f) (2f) (179) (2f) (2f) (168, 181) (6f) (4f) (165), (166) / (가 (6f) (167, 180) (6f) (166) / (2f) (27 (1f) 27 (168, 181) (6f) (6f) 26 (4f) (168, 181) (1f) (가 (가 (165), (166) / (2f) (6f) (4f) (28 (1f) 가 28 (168) (6f) (4f) (181) (6f) 26 27 (29 33 (1g) (4g) (1g) (2g), (2g) (4g) (190) (190) (6g) 1 (193) 2 (194) (190) (192) (6g) (195) (196) (197) (198) (199) (199) (200) (26 28 (199) (192) (201) (가 (4g) (가 (190), (192) / (2g) (가 (193, 195) (198) (194, 196) (4g) (6g) (6g) (6g) (6g) (190), (192) / (4g) (1g) (203) (2g) (202) (2g) (202) (가 (4g) (4g) (4g) (2g) (2g))

(202) (204) (2g) 가 (2g) (205)

30 (1g) 30 (197)가 (6g) 29 (197)가
, 30 (4g)

31 (1g) 31 (190) [, 29 (195, 196)] (190)
, 31 (206) 가, (193, 194) (190)

32 (1g) 31 (197)가 (6g) (197)가
32 (4g)

33 (1g) 32 (193, 194) (190) 가,
33 (196)

34 42 (1h) (1h) (2h) (2h)
(2h) (4h) (4h) (6h) (4h) (2h)
(210) (213) (210) (214) (212)
(1h) (215) (210) (214)
(212, 214) (6h) (216, 217) (210) (6h)
(218) (219) (219) (4h) (1h)
(220) 26 33 가 (1h)

29 33 가 (1h) (224) (2h)
(4h) (223) (223) (2h)
(224) (2h) (225) (226) (2h) 29
33 가 (4h) (220) (212)가 (2)
26 (6h) 34 (4h)가 (210) (219) (2)
15 (4h)

35 (1h) 34 (227)가
35 (214)가 (214) (227) (212)
(227) (227)

36 (1h) 35 (212)가 (210) (210)
36 h) (212)가 가 (210) (2)

37 (1h) (210)
, (228)가 (229, 230) (210)
, (2h) (212) (213) 가
, (2h) (210)

38 (1h) (213) (2h)
(212) (210) (2h) (6h) (4h)
(232) (2h)

(210) (233) (2h)

(210)가

39 (1h) 39 38
 (2h) , 39 (232) (233) (210) (235)
 (235) 38 (232) (233)

40 (1h) 40 37
 , 40 (2h) (212) (213)
 (2h)

41 (1h) 41 34
 , 34 (215) (210)
 (210)

42 (1h) (210)
 , (2h) (238, 239) (210) (2h)
 (212) , (210) (242) (241)
 (240) 가 (237) (210)가

43 46 (1j) (1j) (2j) , (2j)
 (4j) , (4j) (6j) 43 46 (2j)
 (1j) (1j) (2j) (250) 43 ,
 (253, 254) (2j) (252) (1j) (252)
 (256) (255) (4j) (256) (6j)
 (258) (252)가 (261) (250) (25)
 6)가 (258)가 (6j)가 (4j)가

(259, 260) (6j)
 (253, 254)

44 (1j) 44 43
 , 44 (4j) (270)
 (252)

47 (4j) 가 (4j) (272) (270) (270)
 (4j) 가 (4j) (274)
 (4j) (2j) , (270) (278)
 (276) 가 (270) (274) (278)
 가 (276) 가 (270)

45 (1j) 44 ,
 45 (280) (2j) (280) (252) ()
 282) (2j) (280) (253) (252)
 (284) (2j) (4j)
 (286) (4j) (2j)

46 (1j) 46 44
 , 46 (294) (6j) (292) (290)
 (4j) (290) (290)
 (295, 295) (250)

48 k) 53 (1k) (4k) , (4k) (2k) (1k) (2k) , (1k) (2k) , (1k) (2k) (322) (326) (324) (320) (2k) (328) (326) (320) (330) (332) (2k) (335, 336) (328) (330) (6k) (4k) (337) (338) (334) (320) (328)

4) (326) (4k) 1 (342) (6k) 2 (344) (340) (340) (345, 346) (330)가 (347) (4k)가 (6k) 1 (342) (340) (6k) 2 (34) (6k)

49 (1k) 49 (328)가 (2k) (350) (330) (353) (350) (351, 352) (2k) (354) (328) 가 (2k) (334) (320)

50 (1k) 50 (360) 50 (362) (2k) (362)가

51 (1k) 51 (326) (6k) 50 가

52 k) 52 (1k) (2k) (2k) (370) 51 (370) (2k) (4k) (376) (376) (374) (3) (4k) (4k) () () (370) (2k)

53a 53b (300) (300) (304) (302) (300) (308) (302) (306) (306) (302) (304) 가 (310) (302) (302) (304) 가 (310) (302) 가 가 () , () , ()

54 1L) (2L) , (4L) (514) 가 (3L) , (508) 가 (5L) (3L) () (508) 54 1 (5L) 2 (3L) (6L) (518) (514) 54 3 (520) 4 (522) 가 (2L) 가 (516) (2L) (514)

(4L) (524) (524) 54 (6L) (524) (1L) 가 (526) 가

(526) 가 (524) (528) , 가
 (524) (530) .
 (4L) (6L) , (1L)가
 (528) , 1 (6L) , 1 가
 , 1 (524) (4L) 가
 (530) (1L)가 (530) , 가 (6L) / (4L) 가
 (524) (524) (514) / (4L) (508) ,
 (528) (524) .
 (5L) (6L) (4L) (6L)
 (524) (534) 가 (532) .
 , 54 (514) (524) (6L)
 (538) (536) (534) , ,
 (6L) (4L)
 (6L)가 (534) (532)
 (524) , 55 (534)가 (6L)
 (528) (6L) 가 . (524) (534)
 / (524) (524) (524) (53)
 4) 가 (524) (2L) /
 (526) .
 55 54 A-A (4L) (6L) , 5
 5 (2L) . 55 (524) (524)
 (542) (540) (6L) (4L)가 (542)
 / 가 (540) (540)
 , (6L) (6L) (532) 55
 (538) (542) (534)가 (6L) (542)
 (524) 가 (532) (532)
 5 (6L) 5 (542) (544) 5
 4) (524) 5 (540) , 가 (6L) (52)
 , .
 56 (534)가 (524) (528)
 (524) , (1M) (2M) , (1M) 56
 (6M) (5M) , (4M) (3M) ,
 (8M) (9M) (6M) (7M) (4M) (7M) (7M)
 (6M) (4M) .
 56 (6M) (524) 1
 (556) , (7M) (9M) (524) 2 (55)
 8) (7M) , (9M) 57b 가 55 57a ,
 (7M) (9M) (534)가 (524) (558)
 (534)가 (532) (524) (558) 가 (8M) (558)
 (550) , (3M)가 , (550) (52)

4) (558) (4M) (554) (534)

(558) (1M) 가 (528) (524) 2
 가 (534) (524) 1 (556) (528)
 (524) 1 (552) (534) 가
 (556)

57a 57b 56 B-B (7M) 2 57a
 (7M) (8M) (7M) (9M)
 (524) 2 (558) (8M) (560) (562)
 (524) 가 (558) (524) 2 (558) (534)가
 (9M) (564) , [, (550) (534)
 (532) (9M) , (524) 2 (558) (550)
 (524) (562) , (550) (562)가
 (550) (566)

57b 57a 57b (7M)
 (9M) (568) (568) (570) 가
 (570) (524) 2 (558) (562) / 가
 (572) (572) (532)가 (524) 2 (558)
 (524) 2 (558) 57b

58 63 / / 가 /

58 (2N) (1N), (4N) (3N),
 (6N) (5N), (7N)
 (6N) (1N) /
 (7N) (6N) (4N)
 (4N)

(7N) 56, 57a 57b (8N) (9N)
 (8N) 가 (580) (8N) 가 (580)
 (582) (582) (534) (584)
 58 가 (580) (584) (532)
 (534) (582) (580) (580) (580)
 (582)] 가 (580) (528) (524) 58
 (524) (534) (528) (524)
 (524) (524) (534)가 (524)

59a (9N) (8N) 58 C-C
 (7N) (9N) (6N)
 가 59b (58) 59a (8N)
 (9N)

59a 59b 가 (580) (586) (582)
 (5N)가 (3N) (586) 가
 (588) (588) (7N) (9N)

56 (7M) (9M) (524) (524) 2 (558) (614) (524) (616)

2 (558)

(9M) (618) (618) (620) 62a, 62b

62c (622) (622) (9M) (620) (622) (622) (9M) (620)

(622) (524) (614) / (524)

2 (558) (616) (5M)가 / (6M) (1M)

62b (7M) (9M) (620) (6) 22) (620) (624) (622) (624) (626) 1 (626) 2 (628) (624) (624) (630) (624) 2 (558) (624) (616)

(622) (630)

62c (7M) (9M) (620) (622) (636) (620)가 (620) (524) 2 (558) (616) (622)

(636)

63 가 가 (1Q) (1Q) (4Q) (3Q), (8Q) (6Q) (9Q) (5) (7Q) (7Q) (8Q) (9Q)

7M) (6Q) (524) 1 (642) (9M) (524) 2 (646) (7M) (9Q) (8Q) 가 (580) (582) (6Q) (53) (580) (7M) (9Q) 가 (582) (580) (580) (532) (534) (582) 가 (580) (584)

(532) (582) 가 (580) (534)

(7M) (8Q) (3Q) (592) (524) 2 (642, 646) (628) (526) 1 (628) (642) (526) 1

628) 2 (646) (534)가 1 (642) (642) (526) 1

(642) / 가

64a (6R) (652) (650) (654) (6R) (650) 64a (6R) (650) 64a 가

(6R) 64a (654) 가

64b (652)

65a (6S) (658) (656) (6S) 65a (660) (656) (658) 가

(660) 65a 가

65b (658)

66 74
66 74

66 74 가

66a (700A) (700A) (704A)
(706A) (702A) (702A)
(708A) (710A) (704A)
(712A) (714A) 66a (708A)
(712A) (716A)
(710A) (714A) (718A)
(716A) 1 (744)
(746) (720A)

66a (718A) (706A) (7)
22A) 66a (722A) 1 (724A) 2
(726A) (706A) (716A) (706A)
(706A) (716A) 3 (728A) 4 (730A)
(702A) (704A) (706A) (714A) (716A)

66a (700A) 가 (702A) 1
(732A) 가 (704A) 2 (734A) 1
(732A) (736A) (738A)
(736A) 가 1 (702A) (708A)
(738A) (710A)

2 (734A) (740A) (742A)
(740A) 가 (704A) (714A)가 (742A)
A) (704A) (704A) (712A)
) / (716A) (718A)

66b 66a C-C (702A) 66C 66A D
-D (704A) 66b (702A)
(708A) (744) (710A) 66
c (704A) (712A) (746) (710A) (
534) (714A) 66b 66c 가 (710A) (
(744) 가 (748))
(714A) 가 (746) (708A) (746) (744) (712A)
/ 가 / 가
가 (746) / 가 (710A)
(714A) (744 746)

67 (704B) (702B) (700B)
(700B) 66a (700A) (700B)
(716B) (706B) 3 (728B) 4 (700B)
(702B) (704B) (716A, 716B) (730B)

가 66a (706A) (706B) 66a 3 4
 가, 67 3 4 (728B, 730B) 66a 3 4
 (728A, 730A) (700B) 67 C-C D-D
 (700A) 66b 66c

68a (716D), (718D), (716D)
 (718D) / (176D) (718D)
 가 (760D) (700D) 68
 a , (700D) (760D) 가 66a (700A)

(760D) (762D), (764D) (766D) (
 764D) 가 (768D) (768D) (764D) 가 (76
 8D) , (770D) (718D)가 (770D) 가 (768D)
 (718)가 (716D) (716D)

68a (764d) (772D) (
 762D) (764D) (772D) , (774D) (762D) / (
 68c (764D) 가 (772D) 68a (762D) /
 (762D) (762D) 가 (764D) 가 (764D)
 (774D) (762D)가 (764D)
 (764D) (772D)

68b 68a J-J (700D) , 68b (
 702D) (704D)

68c 68a A-A (760D) (
 (772D) , 가 (764D) (764D) 가 (768D)
 가 (776) (766D) (770D) 가 (766D)
 (770D) 가 (768D) (766D)
 (534) 가 (768D) (77
 8)

(762D) (764D) (772D) 가
 (774D) (774D) (772D) (762D) /
 (764D) / 68C (762D) / (7
 72D) (774D) 가 , (772D) (762) (77
 764D) , () , (764D) (774D)
 2D) , (764D) (774D)

68a, 68b 68c 가

69 (700E) (700E) 68a (700E) 68a (700D)
 , (700E) 3 (728E) 4 (730E) 68a 3 (728D)
 4 (730D) (702E) (704E) 67 3
 (700B) 3 (728B) 4 (730B) (700E) 3 (72
 8E) 4 (730E) (700D) 3 (728D) 4 (730D)
 , (700E) (700D)
 , 3 (728E) 4 (730E) (716E)
 , (706E) (716D, 716E)

(706D) 가 .

70a (702F) (704F) 가 (702F) (704F)
 (702F) (704F) (700F) (702F), (704F) (706F) .
 (716F) (708F) (712F) (718F)
 (710F) (714F) .
 (716F) (790F) (718F)
 (792F) (790F) 1 (794F) (706F)
 2 (796F) (792F) (792F) 3 (798F) (792F) (7
 06F) (718F) 4 (800F) 5 (802F) (716F) (718F) (79
 2F) (706F) .

(700A 700E) , (700F) (708F)
 (712F) 가 (702F) (704F) .
 1 (804F) 2 (706F) (736F)
 (740F) (860F) (706F)
 (738F) (742F) .

(702F) , (736F) (706) , (70b 70c
) (808F) (744F) (744F) (708F) (708F)
 (710F) , (738F) (706F) .
 (744F) , (736F) , (738F) (706F) (738F)

(704F) , (740F) (706F) ,
 (712F) (810F) (746F) (712F) (714F)가
 (746F) , (742F) (706F) (810F)
 , (740F) , (742F) , (742F) (742F) (742F)
 F) . (740F) , , (742F) , (742F) (742F) (742F)

70b 78 A-A (702F) , (710F)
 (708F) (708F) (744F) (744F) (744F)
 F) (808F) (814F) (812F) (808F) 가 (814
 (814F) (744F) (812F)

(706F) (736F) 가 1 (816F) 1 (738F) 가 1 (816F)
) (818F) (744F) 1 (816F) 1 (818F) , / 가 1
 (702F) (744F) (812F) 가 (710F) (710F) (708F) 가
 08F)가 (708F) (808F) 1 (818F) 가
 .

(710F) (710F) (708F)
 748F) , (534) 가 (744F) 가 ()

70c 70a B-B (704F) (712F) (822F) (712F)
 (746F) (810F) 가 (822F) (810F) (746F) (820F)
 . (746F) (820F)

(706F) (740F) 가 2 (824F)
 (746F) (742F) 가 2
 (826F) 2 (824F) 2 (826F) / (70
 8F)가 (704F) (744F) (820F) 가 (826F) 가
 (712F) (810F) 2 (714F) (826F) 가
 (712F) (714F) (746) (714F) 가 [70b
 (748F)]
 70a, 70b 70c 가 가
 70d (700F) (702F) (704F)
 71a (700G) (700G) (712G), (704G),
 (706G), (716G) (718F) (700G) 10a
 G) (700F) (700G) (718G)가 (716
 가 (716G) / (760G) 68a 68c
 (766G) (760D) (760G) 68a 68c (764G)
 (762D) (760G)

71b 71a A-A (764G) (766G) 7
 1a H-H I-I (702G) (704G) 70b 70c (7
 702F) (704F)

72 (702H), (704H) (760H) (700H)
 60H) (700H) 71a (700G) (700H) (7
 (702H) (704H) (702H) (704H) 1
 c 72 H-H I-I (702H) (704H) 70b 70
 (702F) (704F) (702H) 72 A-A
 (760H) 71b (760G) 68c

73 (702J), (704J) (760J) (700J)
 (700J) 72 (700H) (700H) (760H)
 (700J) (760J) (702J) (704J)

74 71a, 72 73 (700G, 700H 700J)
 (716K), (700K) 74 (700K)
 K) (792K) (718K) 1 (830K) 2 (718
 (716K) 3 (834K) 4 (832K) (706K)
 (706K) (718K) (700K) (836K) (706K)
 K) 74 (716K) 가 (760D)
 (760K)

75a / (1L) (700L)
) (1L)가 (702L) 75a (700L)
 (708L) (790L) (716L) , (700L)
 (792L) (718L) (710L)

, (700L) 가 (702L) (736L)
 (738L) (736L)
 2 (738L) (706L) 가 (804L)
 (806L) (792L) 1 (830L) 2 (832L)
 (706L) (790L) 3 (834L) 4 (834L)
 (706L) (718L) (716L)
 L) (706L)

, (700L) (718L) (716L)
 (706L) (708L) (744L)
 (708L) 가 (744L) 가 (718L)
 (534) (708L) (808L)
 (760L) 가 (718L) (716L)
 (778L)

, (706L) 가 (744L) 가 (84L)
 (842L) (840L) 1 (844L) 2 (842L) (706L)
 (848L) (846L)
 6L) (708) (736L) (706L)
 (842L) (808L) (808L) (744L)
 (744L) (708L) (808L)
 가 가

75b 75a B-B (700L)
 (708L) 가 (744L) (708L)
 (808L) 가 1 (706L) (708L)
 (850L) 2 (852L) (850L) 2 (854L) (850L) 2 (852L) 1 (852L) 1
 1 (850L) 2 (852L) (856L) (854L)
 (856L) (702L)

75a, 75b 75c - (free-breathing)

75c 75a C-C (700L) 75c 1 (844L)
 2 (846L) (706L) (840L) (842L)
 (848L) 1 (844L) 2 (846L) (706L)
 L) (708L) 75b 75c (736L)
 (744L) (808L) (706L) 1 (844L) (840L)
 (706L) 2 (846L) (842L) (808L) (744L)

76a (1M) (700M)
 76a (1M) (708M) (710M)
 (702M) (700M) (706M) (702M) (700M) 75a
 (700L) (700M) (702L) (700L) (706L)
 (700M) (706M) (700L) (706L)

M) (700M) 가 (702M) (744M) 1 (844L)
 (844M) (706M) (844M) (736M)
 1 (844M) 1 (848M) (706M)
 75a (700L) (708M)
 (744M)

75a (708M) (808) (744M)
 (700L) (700M) 75a (842L)

(744M) 75a (1L)
 , 76a (1M) (702M)
 76b 76a D-D (700M) 76b
 (706M) 가 (708M) (808M) (858M) (744M)
 (702M) (858M)
 76c 76a E-E (736M) 1 (706M) 1 (844
 M) (844M) 1 (848M) 가 (744M) (706
 M) (848M) (706)
 77a 77b 76b (706N) (860)
 (860) (862) (862) (858N)
 (808N) (862)
 2)가 2 , 77a (744N) (862)
 가 가 77a 77b (862)가 1 (86)
 78a (700P) (704P) (700P) 76a (700M)
 (746P) (712P) (1P) (714P) (704P)
 (700P) 가 (746P) 가 (740P)
 1 (844P) (706P) 1 (844P) 1 (848P)
 (706P) (708P)
 (742P) (808P) (746P) 78b 78a F-F (700P)
 (706P) (712P) (808P) (746P)
 746P) (858P) (746B) ((746P)
 (712P) 가
 78c 78a G-G (700P) 78c (706P)
 1 (844P) (740P) 1 (844P)
 1 (740P) (746P) 1 (844P)
 (848P) (706P) 1 (844P)
 (704P)
 79a 79b , 70 75 78 (708) (712
) (708) 가 (708) 3 (712)
 70a (864) (808) (708 712) (708 712)
 (708 712) (866) (708 712)
 80 (872) (874) (870) (872)
 (882) (878) (876) (874) (882)
 (880) (878) (882)
 (878) (882)
 81a 80 (870) 81a (882)
 (878) (878A 878F) (882A 882E)
 (882A 882E)

(884)

81b (884) (878a), (882A) (878A 878F) (882A 882E) (888)가 (

878) (884) 81a (878A 878F)

82 (870) (890) (878) 가

83 82 (870) (892) (890) (892)

84a (872A), (874A) (900A) (switched reluc (900A) (900A))
 ctance machine: SRM) (892A) (872A) (902A) (872A) (872A)
 (83) (892A) 84b C (902A) (902A)

(872A) (900A)가 (902A) (892A) (892A) (872A)가 (900A)가
 (892A) (902A) (892A) 84a (872A)가 (902A) (900A)
 (892A) (902A) (firing sequence)가 (900A)

84b 84 (870A) (900A)
 84b (892A) (872A) 가 (902A)
 (872A) 1 (916A) 1 (914A) (872A) 2 (920A)
 2 (918A) C (902A) (922A) (902A) 가 (924A)
 (872A) (874A) (926A)가 (924A) (926) (9
 (924A)가 (928A) 가 (926)
 (872A) (902A) (902A)

22A) 가

84a 84b

85a 85b (872B), (874B) (900B) (8
 70B) 84a (892B) (902B) (900A) , 85a (983B)
 (900B) (872B)

85b (902B) (892B) 85b ,
 (902B) C 85a 85b

86 (872C), (874C) (900C) (870C)
 (902C) (900C) (872C) (904C)
 (900C) (902C) (904C) (872C) (900C)
 (902C) (904C) (872C)가
 86

87a (872D), (874D) (902D) (872D) (870D)
 (squirrel-cage; 906)

87b (906D) 3 (908D) (906D) 1 (910D) 2
 (912D) (908D) 87a (872D)

(900D)가 (902D) (906D)
 (872D) (906D) (872D) (900D)
 가 (902D) (906D) (872D)
 (906D)가

88 (870E) (870E) (870E) (872E), (874E)
 (870E) (930E) 89 90 (874E)
 (872E)가 (930E) (872E) (872E)
 (874E) (930E)가 (872E)

89a 89d (930E) 1 (A) (872E)
 (B) (874E) 90a 90d (930E) (930E) 2

89a (874F) (872F) (874F) / (872F) /
 가 (871F) (870F) 8 (871F)
 가 (A) (872F) (872F) (871F)
 (873F) (932F) 89a (872F)
 (873F) (932F) (933F)

(871F) (874F) (874F)
 (932F) (874F) (875F) (874F)
 (874F) (874F) (872F)가 (874F) (934F) 89a
 (874F) (872F) (932F) (934F) (934F)

89b 89a (870F) 89b (934F) (934F)
 1 (936F) (874F) (934F) (874F)가
 (872F) (932F)

89c (89a 89b) (872F) (932F) (932G) (873
 G) (872G) 3 (872F) (89a) (873F) (873
 (932G) (933G) (932F) (89a) (93
 3F)

89d (874G) (89a 89b) (874F) (874G)
 (934F) (875G) (934G) 3 (874F) (89a) (8
 874G) (874F) (89a) (874F) (874G)
 75F) 89d (934F) 89a

89a 89d

90a (872H), (874H), (872H) (874H) / (8
 72H) / (871H) 88 (871H) (870H)
 (871H) 88 (930E) (B)
 (872H) (932H) 90a

(872H) (873H) , (932H) (933H)

(871F) (874H) (932H)

(874H) (874H)가 (875H) (872H) , (90a) (934H) (874H) (932H) (874H) (872H)

90b 90a (874H) , (870H) (932H) 90b (934H)

90c (90a 90b) (932H) (872H) (872H)가 (90a (932J)) (873J) (872J) (873G) (932J) (932H) (90a) (933H) (933J)

90d (90a 90b) (934H) (874H) , (874J) (875J) (934J) (874J) (875H) , (874J) (874H)가 (874J)

90a 90d

91a 90d 89c 90c (89C 90C (932G, 932J) (873G, 873J)) 가 가 , (89d 90d (875G, 875J))

91a , 가 6 : 7 가 , (theta) (phi)

[1]

$\phi = \frac{6}{7}\theta$

(P0) (1) , (X_{1t}, Y_{1t})

[2]

$X_{1t} = R \cos(\theta)$
 $Y_{1t} = R \sin(\theta)$

, (P) (2) 가 (C2) (Pt)

[3]

$X_{2t} = X_{1t} + S$
 $Y_{2t} = Y_{1t}$

X , (D)

[4]

$$D = \sqrt{X^2 + Y^2}$$

$$D = \sqrt{(R \cos(\theta) + S)^2 + (R \sin(\theta))^2}$$

$$D = \sqrt{R^2 \cos^2(\theta) + 2RS \cos(\theta) + S^2 + R^2 \sin^2(\theta)}$$

$$D = \sqrt{R^2 + 2RS \cos(\theta) + S^2}$$

(2) (2)

[5]

$$X = D \cos(\psi)$$

$$Y = D \sin(\psi)$$

(Psi) (Theta) (theta) X Y

[6]

$$\eta = \phi + \psi$$

91b (C1, C2, Pt)

[7]

$$R^2 = S^2 + D^2 - 2SD \cos(\eta)$$

7 (eta)

[8]

$$\eta = \cos^{-1} \left(\frac{R^2 - S^2 - D^2}{2SD} \right)$$

8 4

[9]

$$\eta = \cos^{-1} \left(\frac{R^2 - S^2 - (R^2 + 2RS \cos(\theta) + S^2)}{2S \sqrt{R^2 + 2RS \cos(\theta) + S^2}} \right)$$

$$\eta = \cos^{-1} \left(\frac{-R \cos(\theta) - S}{\sqrt{R^2 + 2RS \cos(\theta) + S^2}} \right)$$

1, 6 9

[10]

$$\cos^{-1} \left(\frac{R \cos(\theta)}{\sqrt{R^2 + 2RS \cos(\theta) + S^2}} \right) = \frac{6}{7} \theta + \psi$$

$$\psi = \cos^{-1} \left(\frac{R \cos(\theta)}{\sqrt{R^2 + 2RS \cos(\theta) + S^2}} \right) - \frac{6}{7} \theta$$

4, 5 10 , X Y (,)
 , (P) 가 (2)

0 360 (theta)

d 91c 90c D R(2()/7 (psi) 가 , 91 (932G, 932J)

92 (940) (940) (942), (942), (944), (946), (948), (950), (952) 가 / (954) (940) (944) (956) (952) (942) (942) (958) , 가 / (95) 4) (942) (952) 가 / (954) (956) (958) (958) / (960) (956) (952) (956, 958, 960) (952) (958)

(942) (946) (948) (962) 1 (964) 가 가 (946) (944) (944) (966) (968) (944) (944) 가 (946) (940) (940) (942) (954) 2 (970) (956) (958) (952) (960) (952)

(940) (956) (952) (958) (952) (942) (942) / (960) (952) (942) (942) 가 (952) 가 / (954) (972) (954) 1 (964) 2 (970) (940) 가 (954) (972) 가 (954) 가 (954) (940) 가 (50) (942) 가 (954) (954) (954) (942) 가 (954) (944) (940) 가 (954)

(940) (960)가 (950) (954) (944) (964) (948) (970, 964)가 (958) (956) (952) (958)

93 (874K) (872K) 가 (978K) (976K), (874K), (872K) (870K) (982K) 2 (984K) (980K) (872K) 1 (986K) (874K) (976K) 3 (988K) 2 (990K) (976K)

(978K) (980K) 1 (992K), 3 (996K) (1000K) 4 (998K) 1 (992K) 3 (996K) 96K) 1 (1002K) , 2 (994K) 4 (998K) 2 (1004K)

1 2 (1002K, 1004K) (992K, 994K, 996K, 998K) (992K, 994K, 996K, 998K) , 93 (992K, 994K, 996K, 998K) , 1 2 (1002K, 1004K) (1002K, 1004K)

(1002K, 1004K) (Kevlar)

, (2r) (470) 96 (470)
 (2r) (2r) (471) (472) (474) (47) (4r)
 0) (2r) (476) (476) (477) (477)
 2r) (2r) (4r) (476) (476) (477) (477)
 97 (1r) 가 97 96
 , 97 (478) 1 2 (468) 2 (468) (464)
 98 (1r) 가 98 U (464) (464)가 (480) (456)
 . U (480)
 99 100 (1r) 가 99 100 가 98
 (450) 가 99 (2r) 99 , 가
 가 (482) 100 , 가
 가 (484)
 101 (1r) 가 101 99 100 (2r)
 , 101 (450) (450) (486) 가 (2r)
 (488) (450) (2r) (460) (2r) (491) (458)
 , (490) (476) (490)가 (492) , (491) (462)
 (493) (477) (486) (491)
 , 가,

(57)

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6 14.

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15 20.

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24 26.

21 27.

21 28.

$2 \times 10^{-6} \text{ m}/(\text{m} \cdot \text{K})$

21 29.

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30 31. , 2 ,

30 32. , 2 , 2

30 33. , 가 , 1 ,

30 34. , ,

30 35. , 가 ,

30 36. , ,

30 37. , 1 ,

30 38. , 1 ,

30 39. , ,

30 40. , 가 ,

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41 42. , 1 , 2 .

41 43. , 1 , 2 가 ,
가 .

41 44. ,
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44 45. ,

44 46. , 1 .

44 47. , 1 .

44 48. , 1 , .

48 49. , .

41 50. , 1 .

41 51. ,
가 ,

41 52. , ,

41 53. ,
가 ,

54. ,

54 55. , 2 1 2 , 1

55 56. , 2 가 1 1
2 가 1 2

56 57. , .

55 58. ,
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2 ,
2 가 1 1 ,
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3 ,
1 가 .

54 59. , 2 1 , 1
, 2

59 60. ,
1 ,
2 ,
2 가 1 ,
3 ,
3 ,
1 가 .

- 55 61. , 1
- 61 62. , 2 가 1 2 가 ,
- 54 63. , ,
- 54 64. , ,
- 54 65. , 가
- 66. , 1 가 1 , 1 , 2 가 , 1 가 2 , 66 67. , 가
- 68. , , , , , , 1 2 , 4 , 1 , 1 3 , 2 1 2 가 1 가 , 2

68 69. ,

68 70. ,

68 71. , 가

72. ,

가

72 73. ,

72 74. ,

72 75. ,

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1 2 가 1 가 , 2

72 76. ,

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72 77. , 가

78.

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88.

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89.

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89 , 1 , 2 .

91.

89 , 1 가 , 2 , 가

92.

89 , 1 .

93.

89 , 1 3 , 2 4

94.

89 , 1, 2, 3 4 .

95.

94 , 3 4 .

96.

89 , ,

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97.

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98.

89 , , 가

99.

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2 1 ,

1 가 2 ,

2 ,

1 ,

1 가 2 .

114.

113 , 1 , 2 .

115.

113 , 1 가 , 2 , 가

116.

113 , 1 .

117.

113 , 가 ,

118.

113 , 가 ,

119.

113 , , 가

120.

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2 가 2 ,

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140 149. , , .

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210 212. , 1 가 1

212 213. , 2 가 .

210 214. , 2 , 1 가 .

210 215. , , 2 1 가 1 , 가 1 2 1 .

216. , , , 가 , 가 2

216 217. , 1 2 .

216 218. , 3 가 .

216 219. , 3 .

216 220. , 3 4 .

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277.
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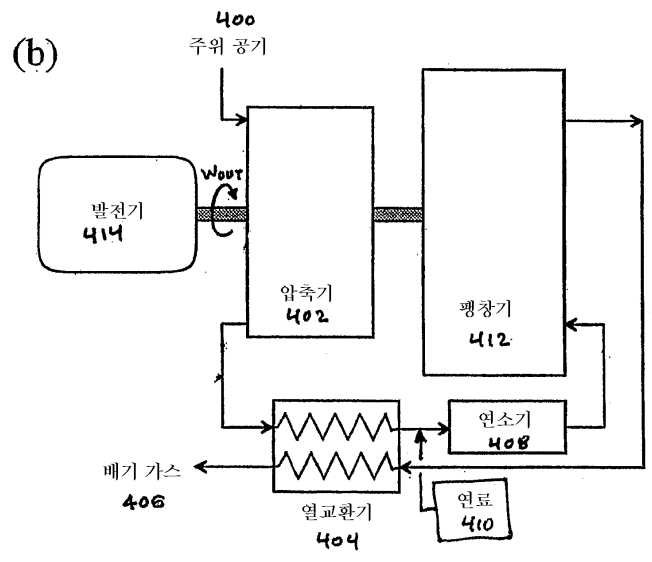
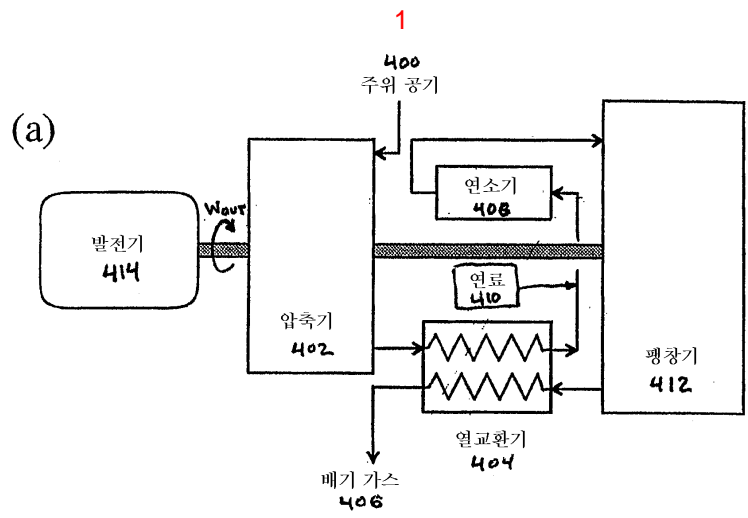
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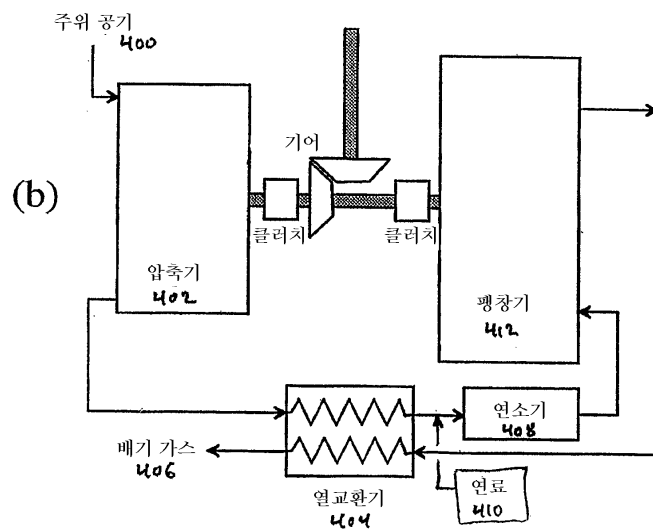
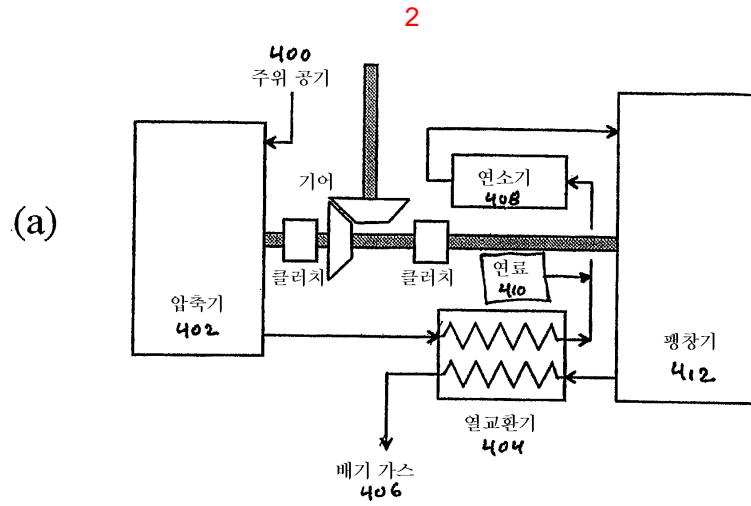
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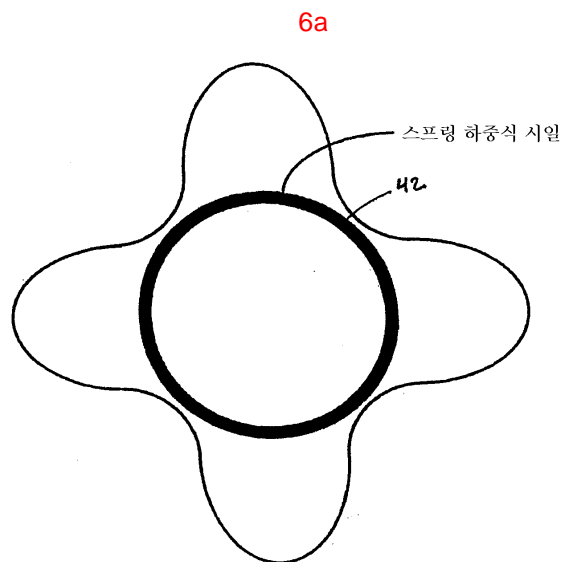
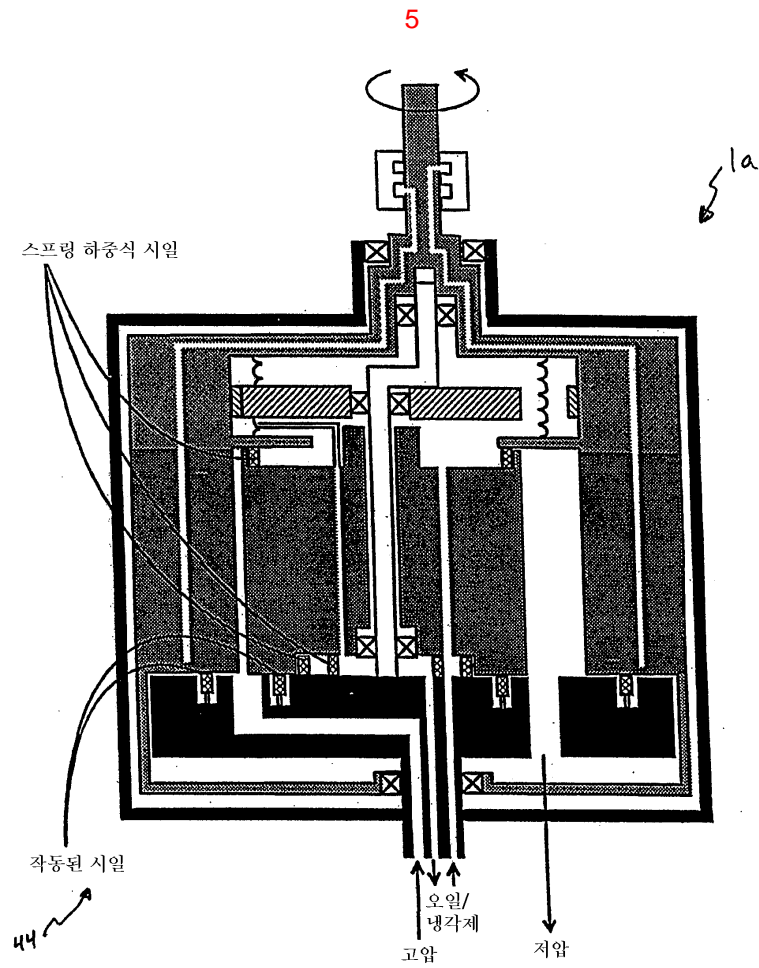
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1 가 2 1 가

282.
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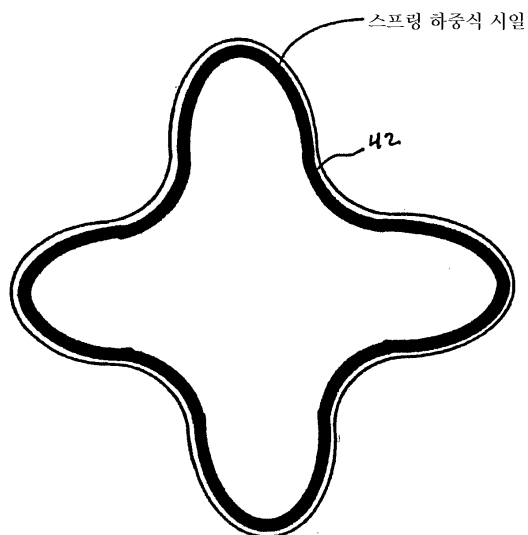
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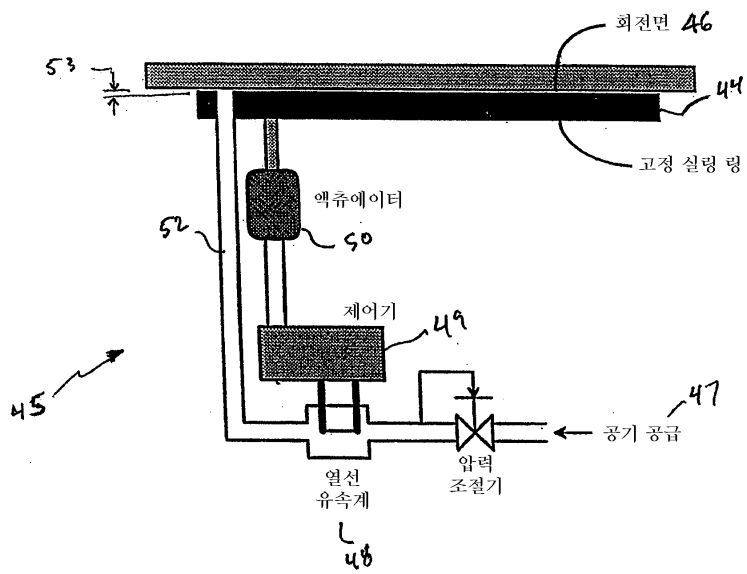
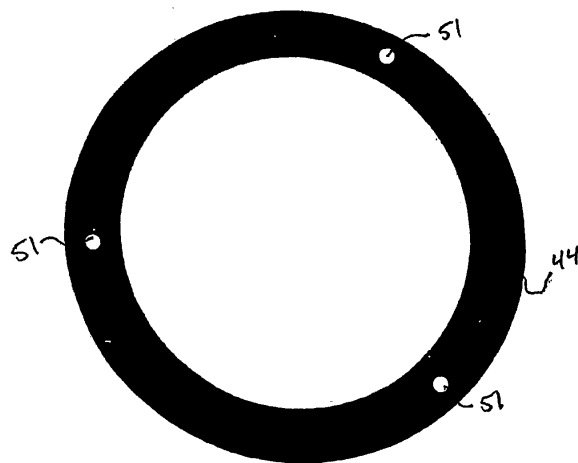




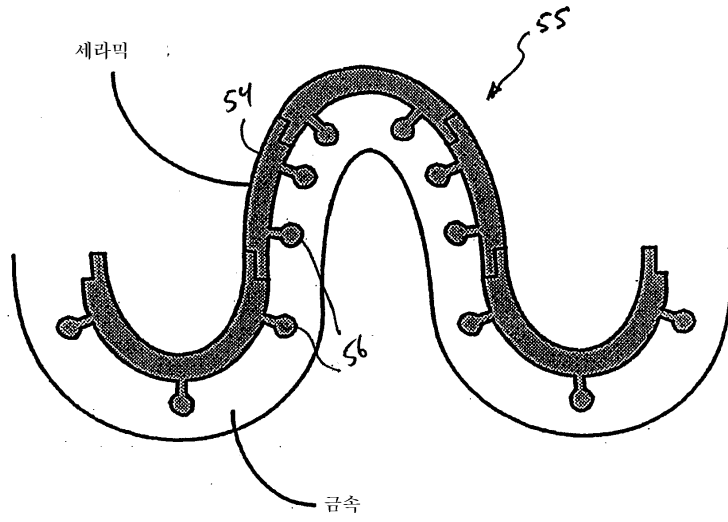
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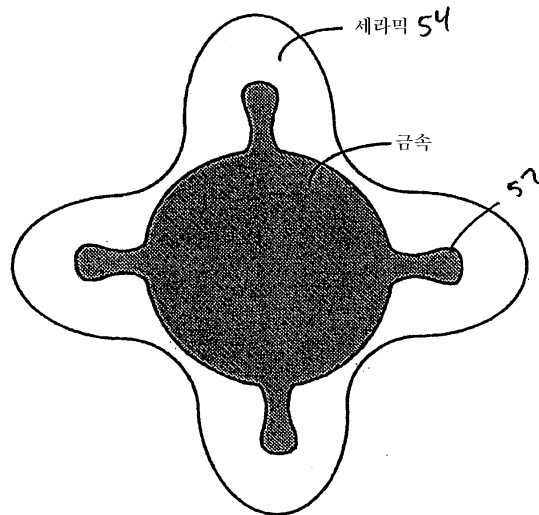
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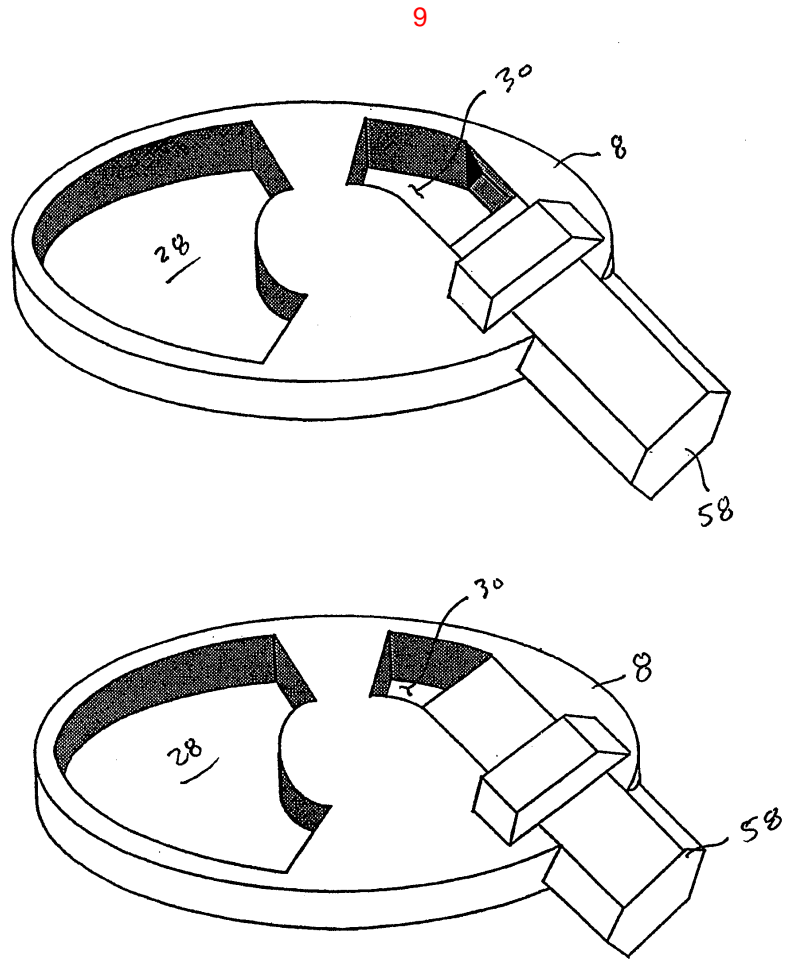


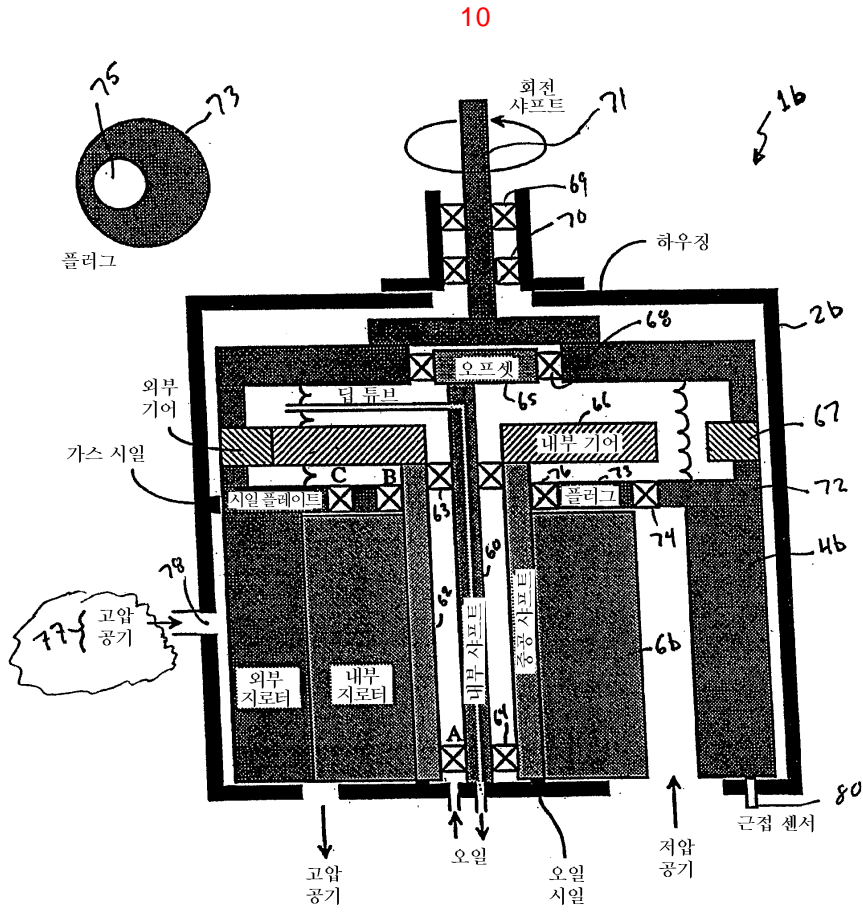
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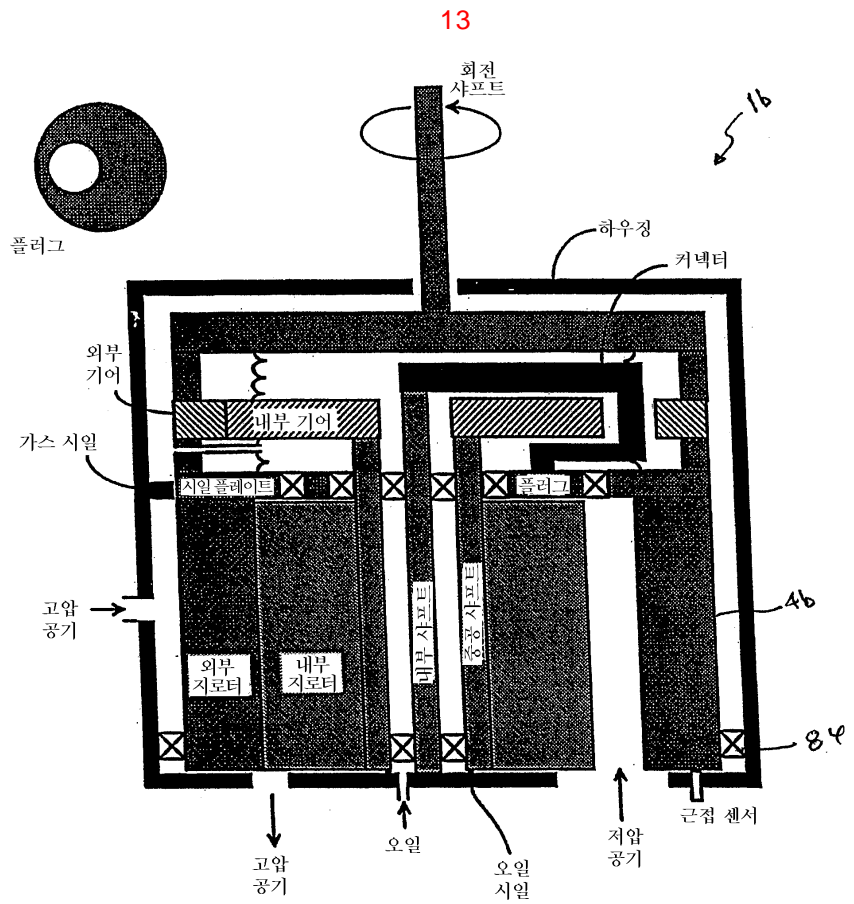
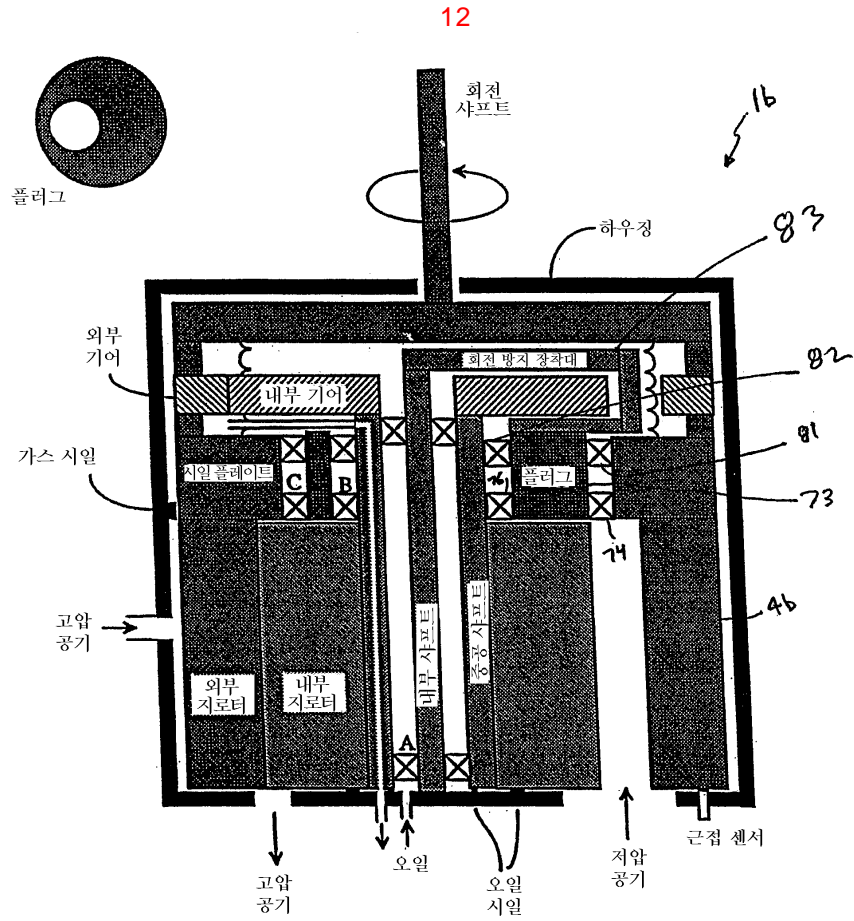


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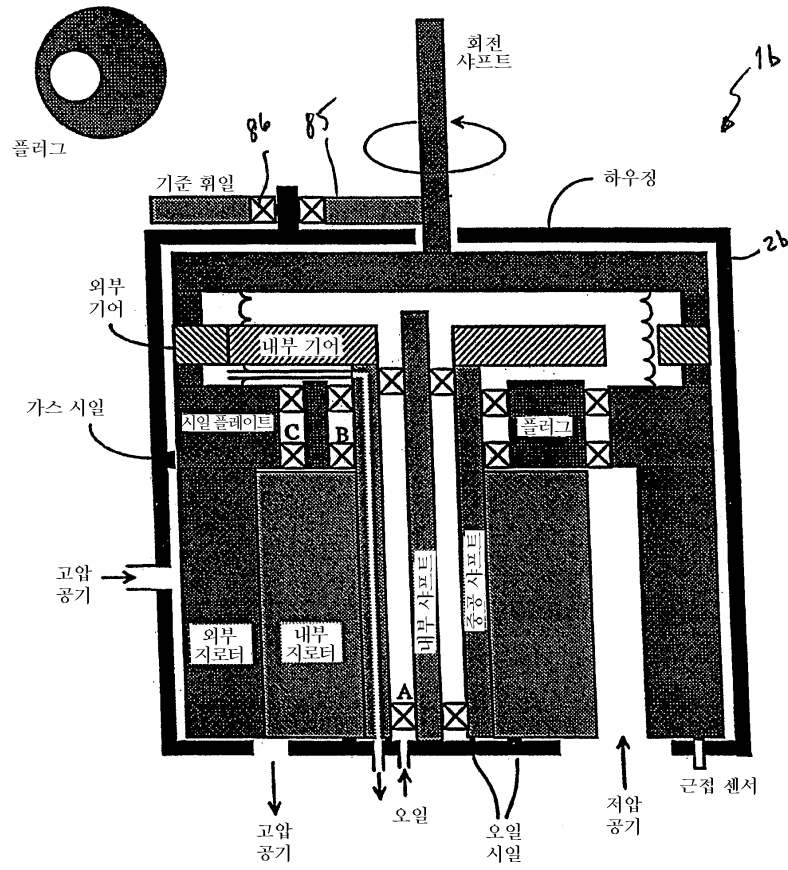


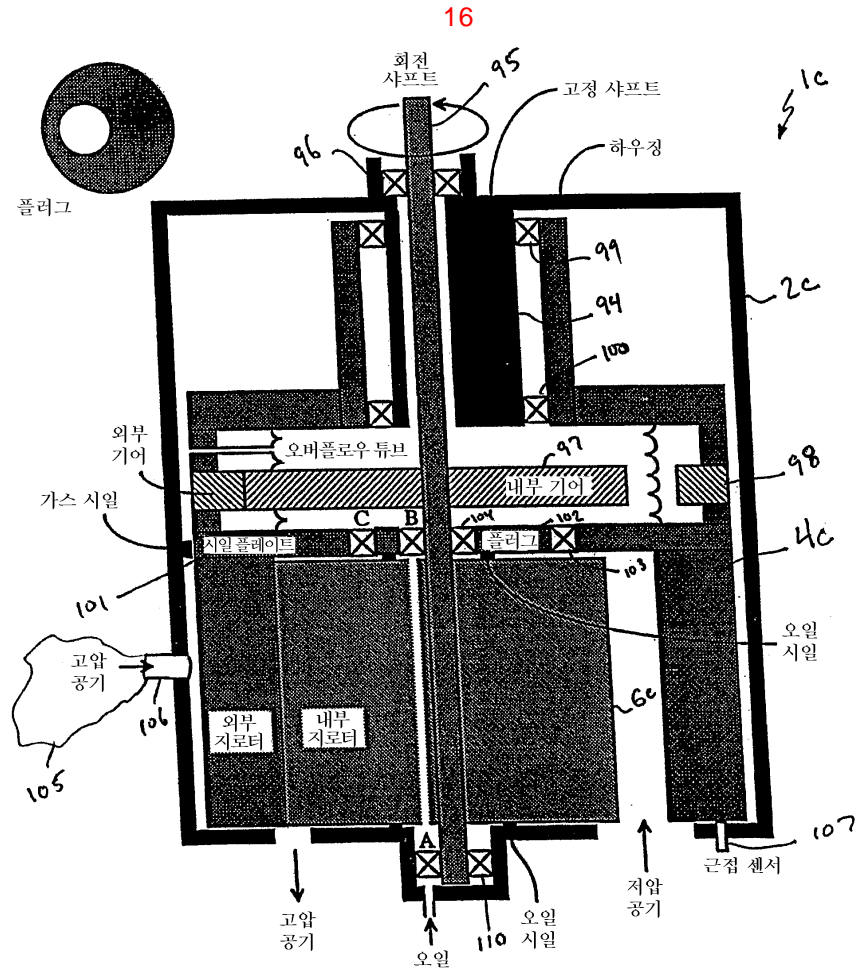


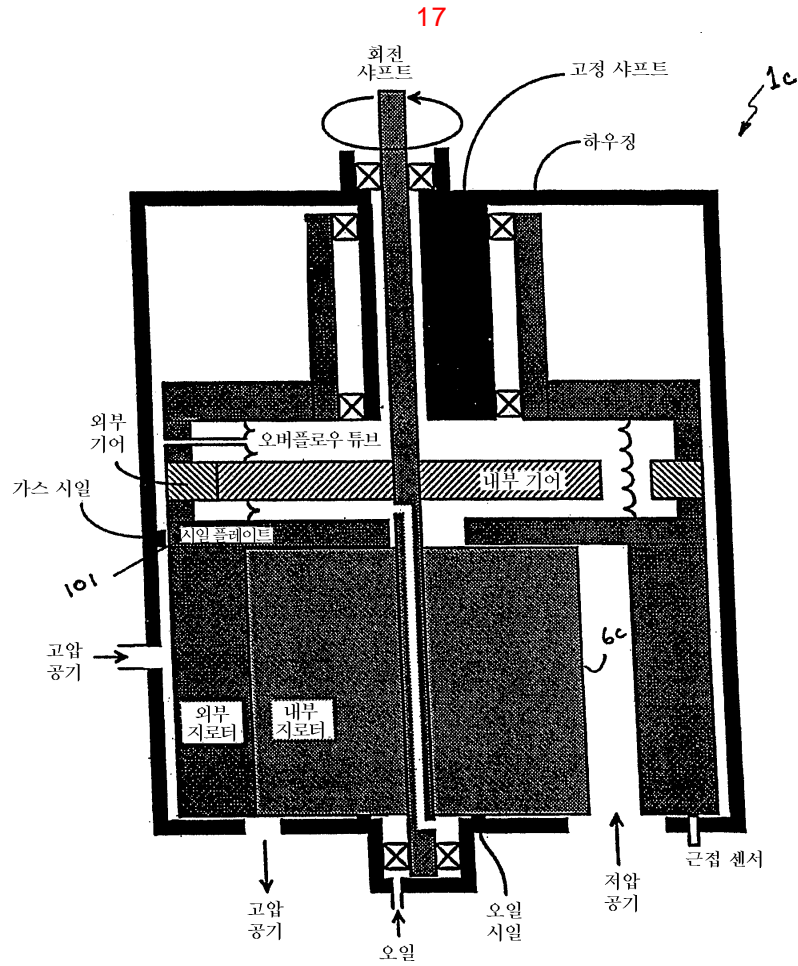


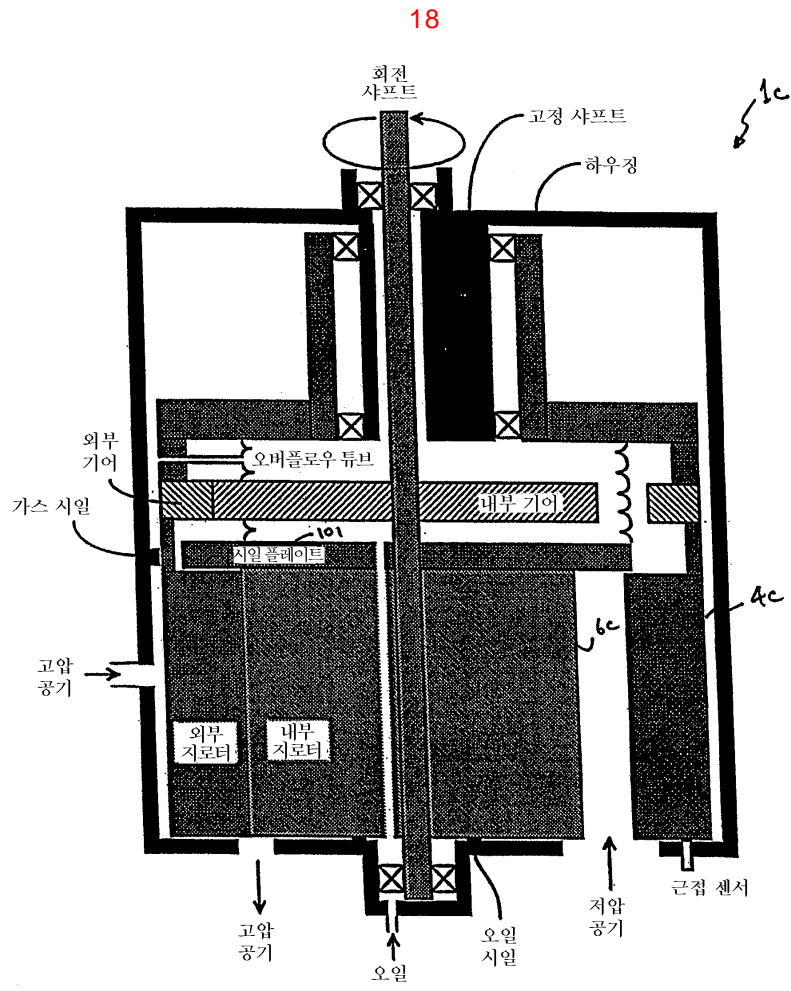


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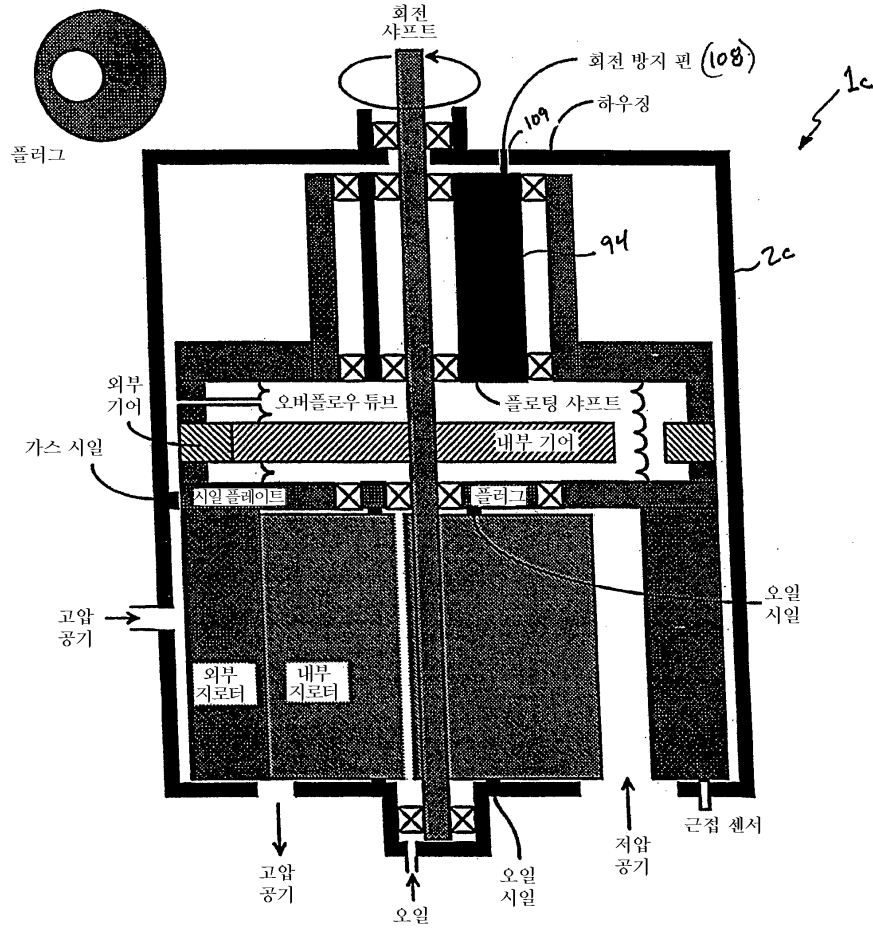




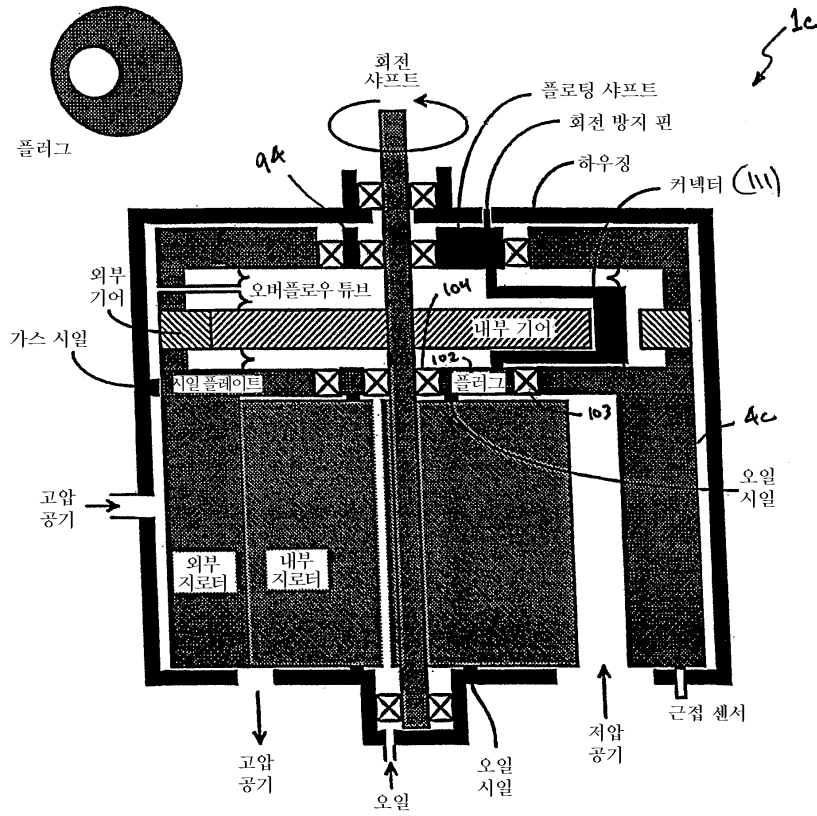




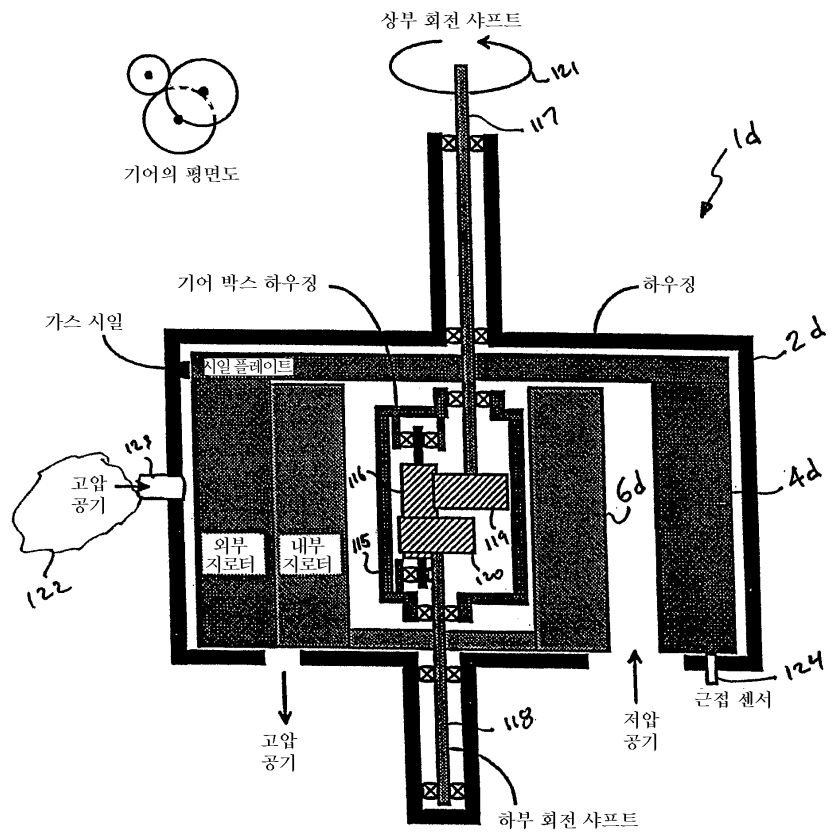
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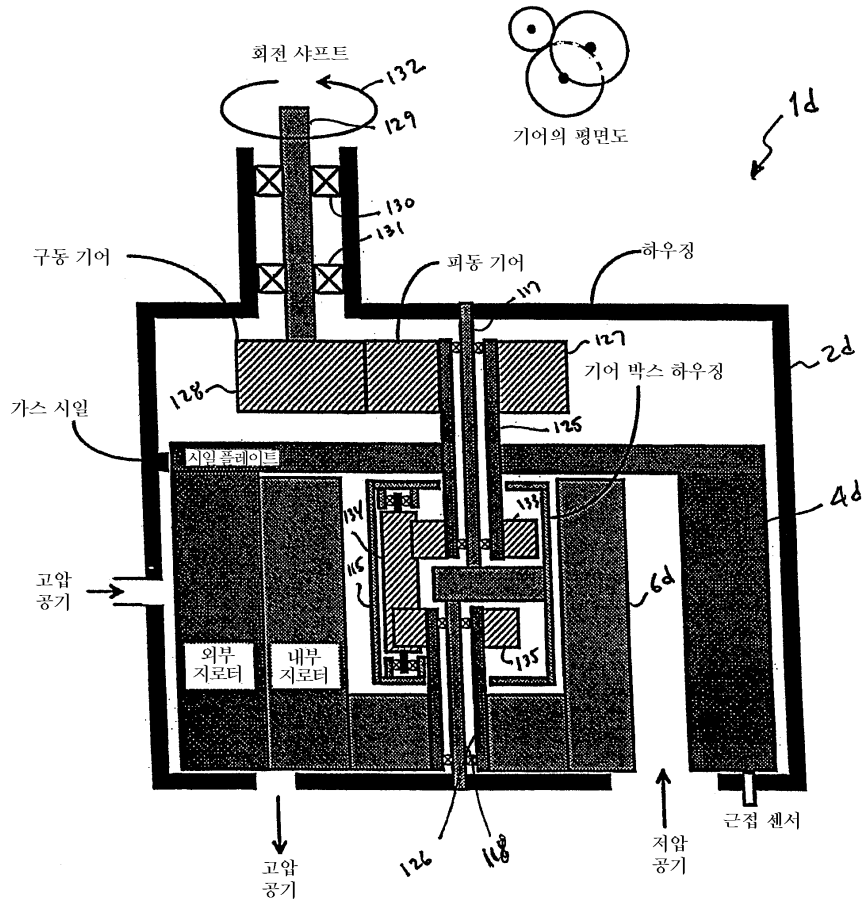
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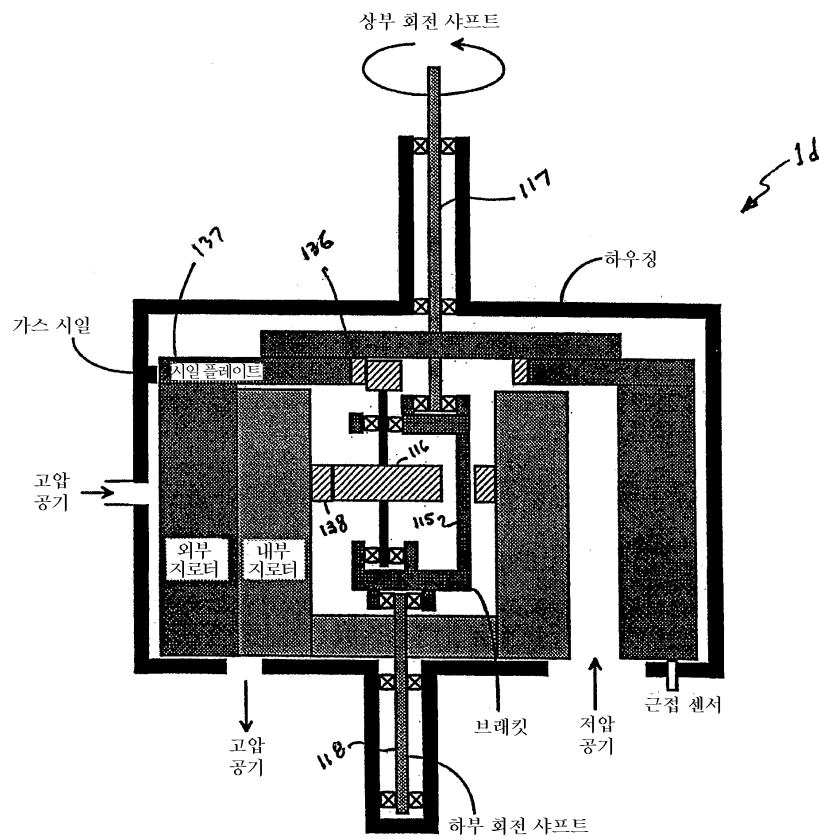
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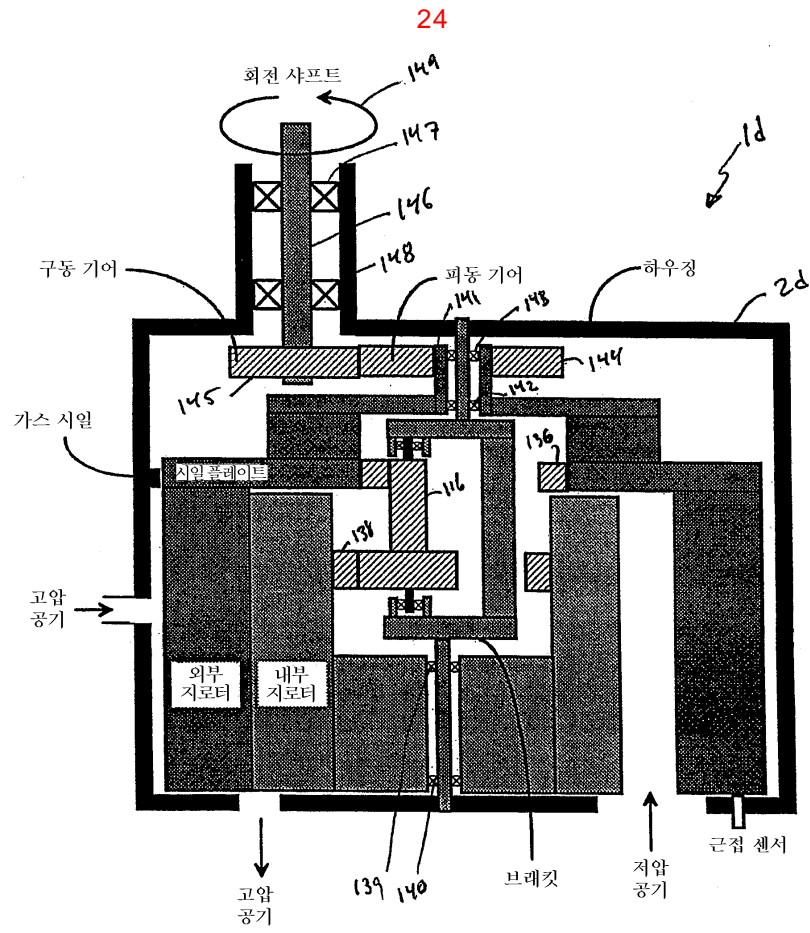


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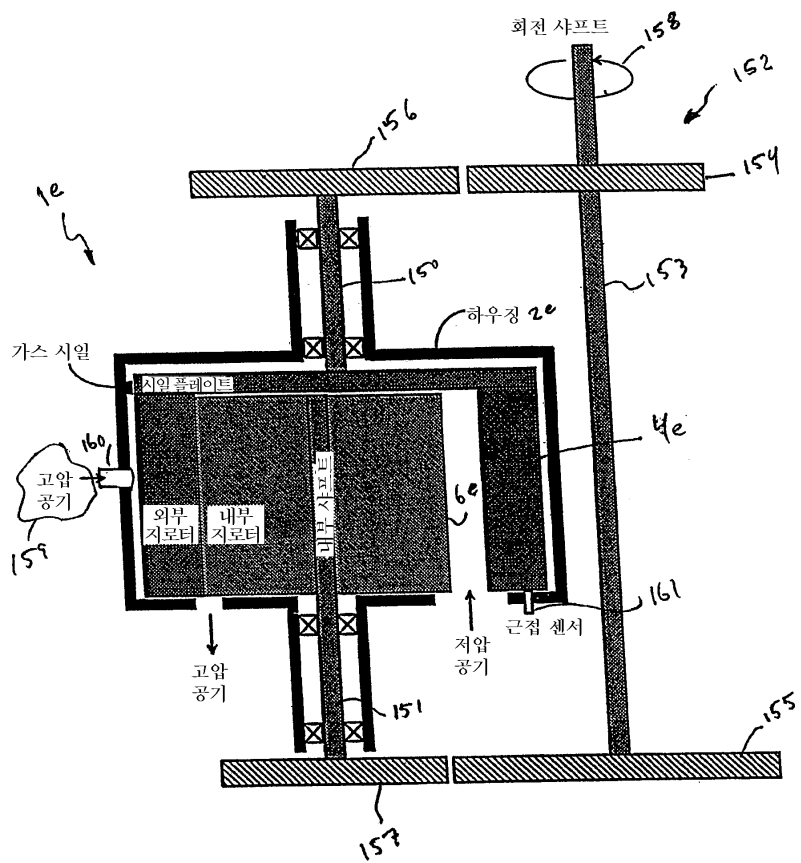


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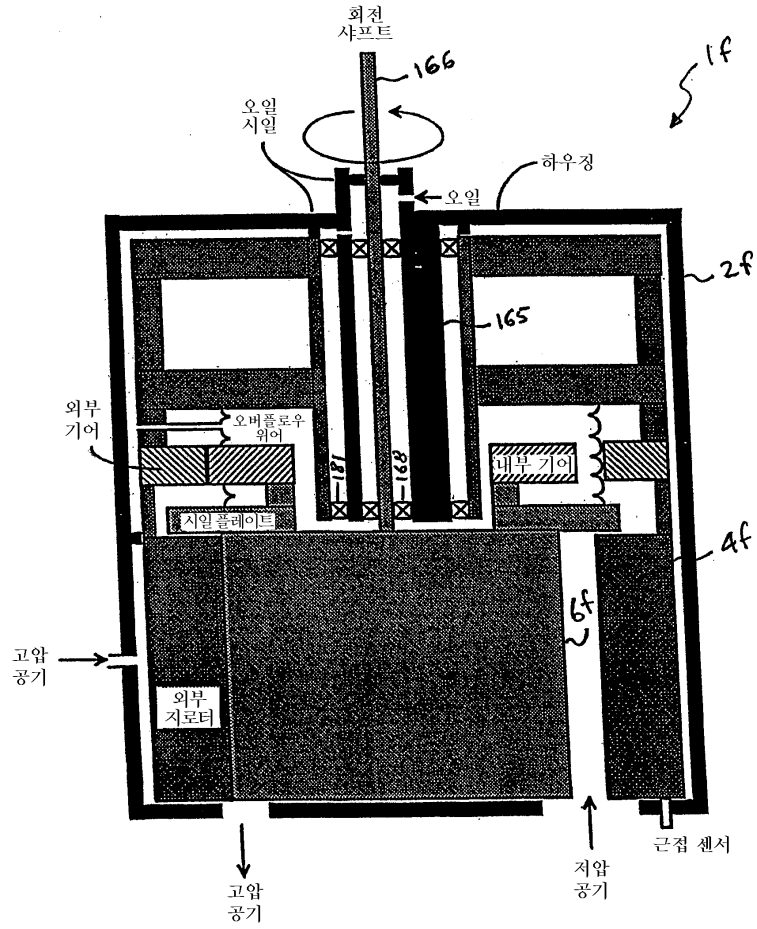


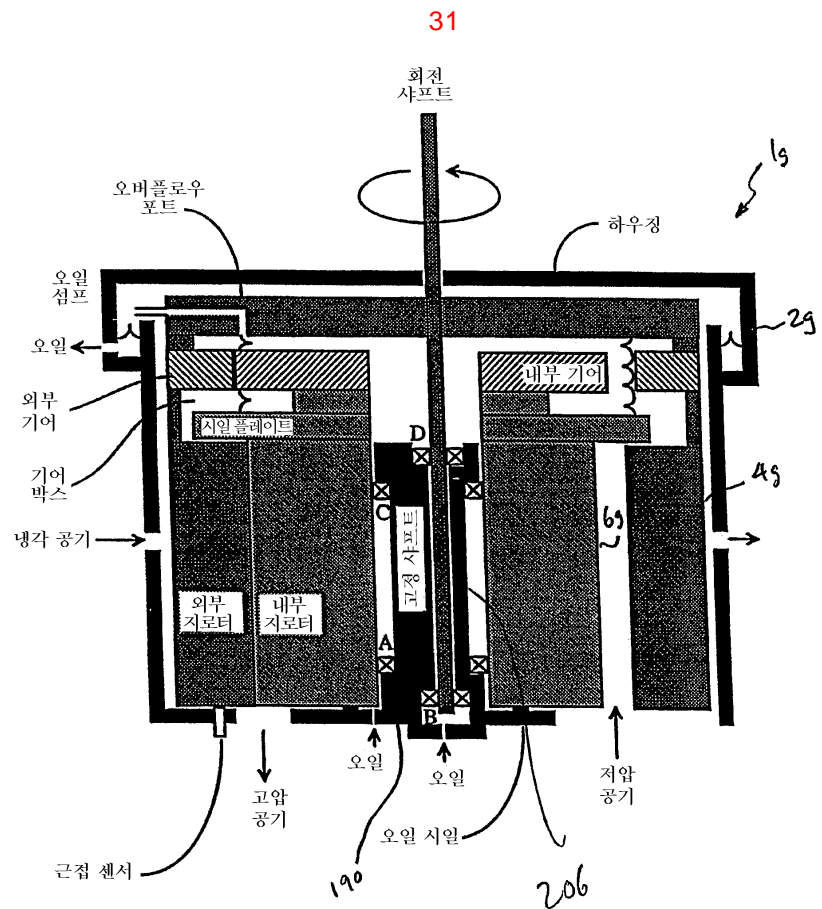
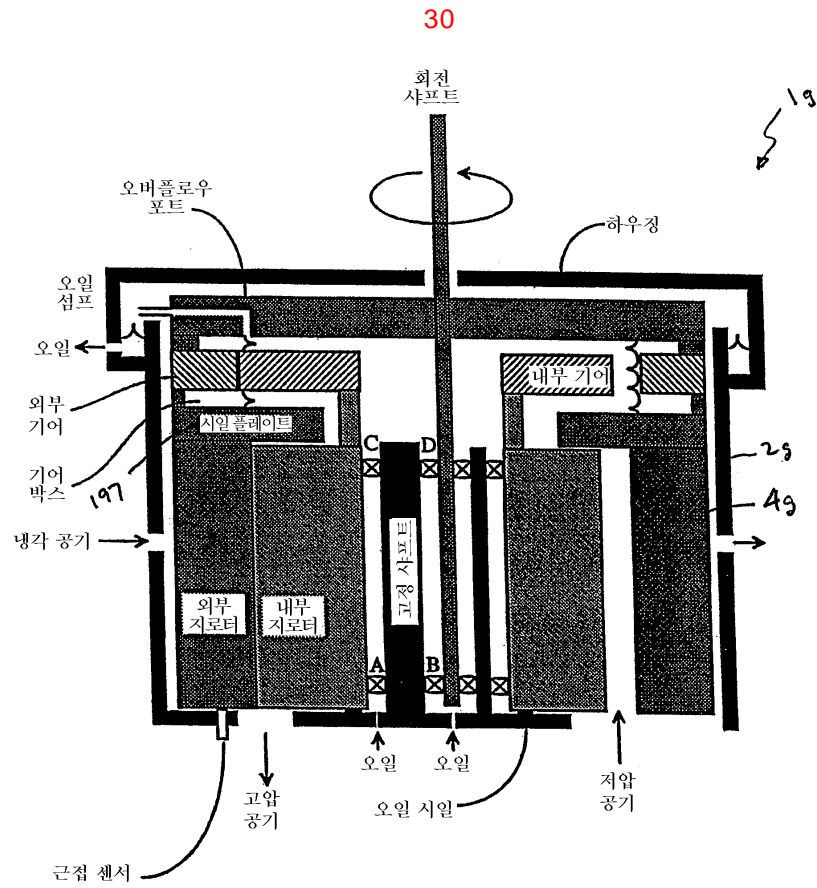


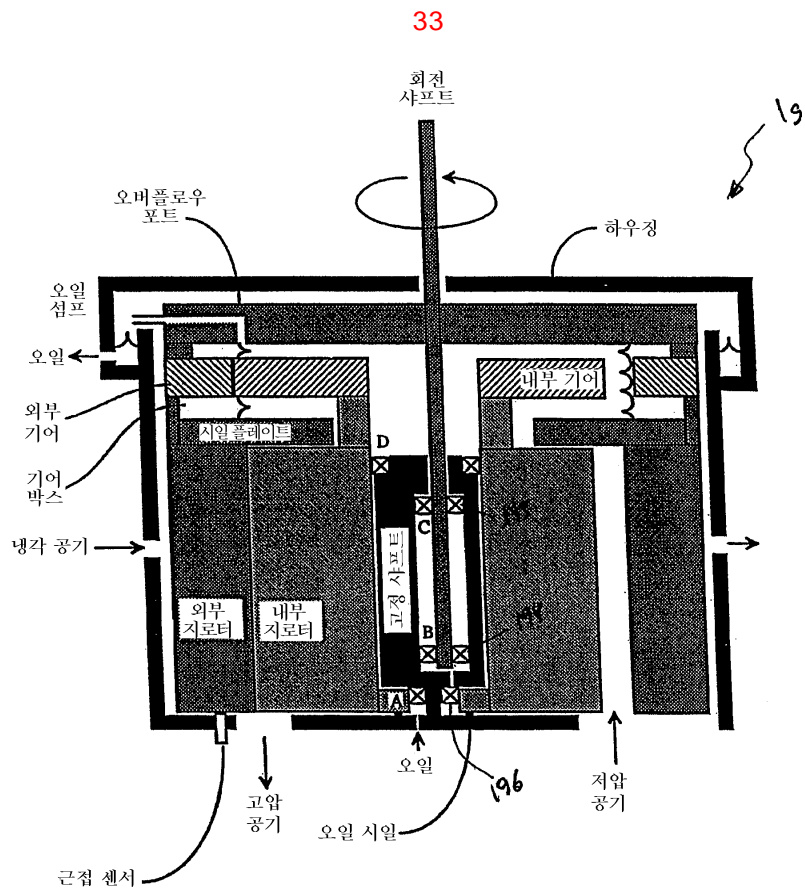
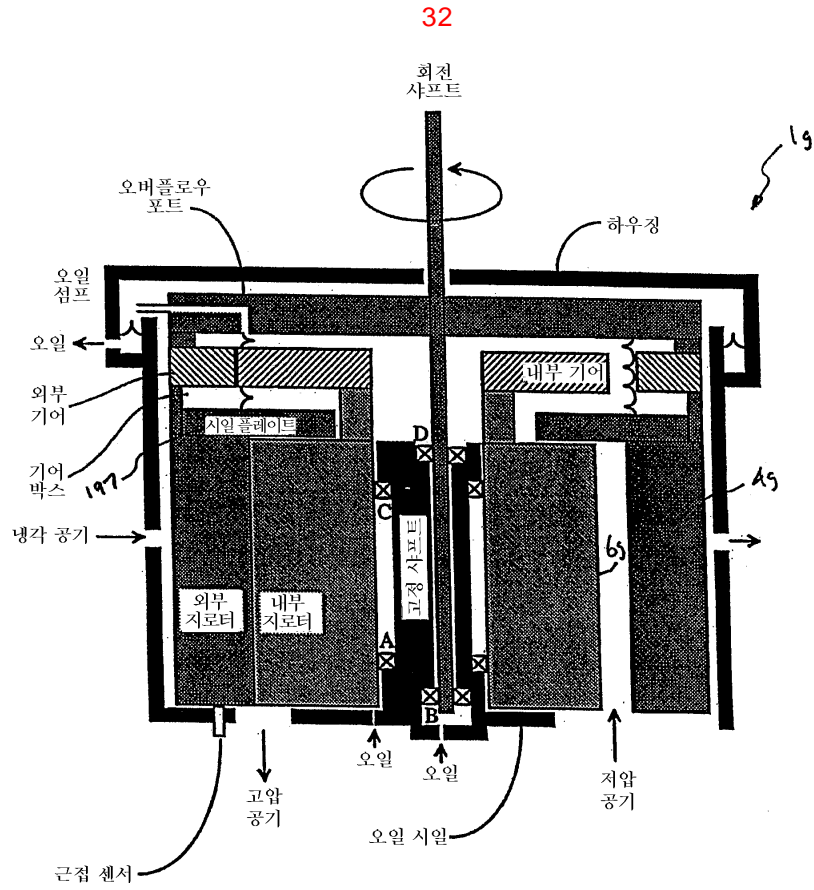
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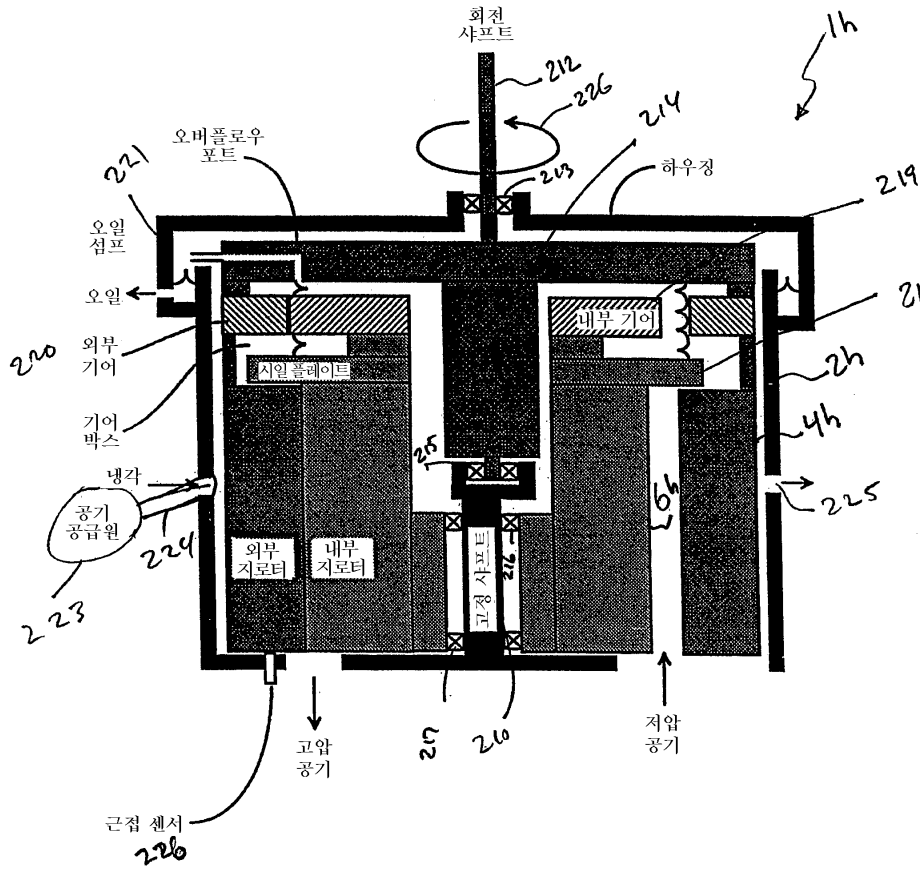
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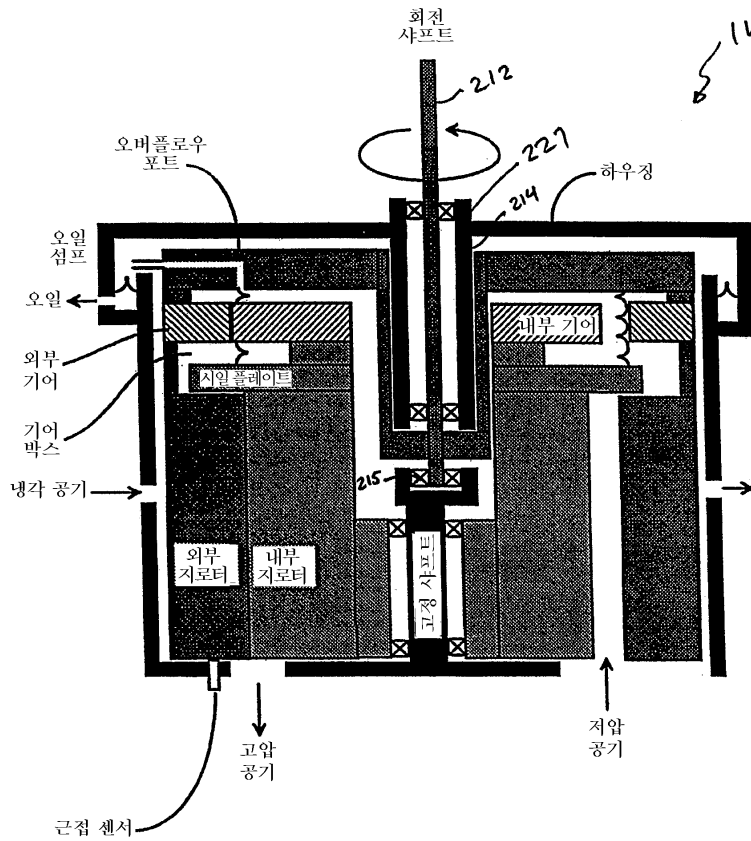


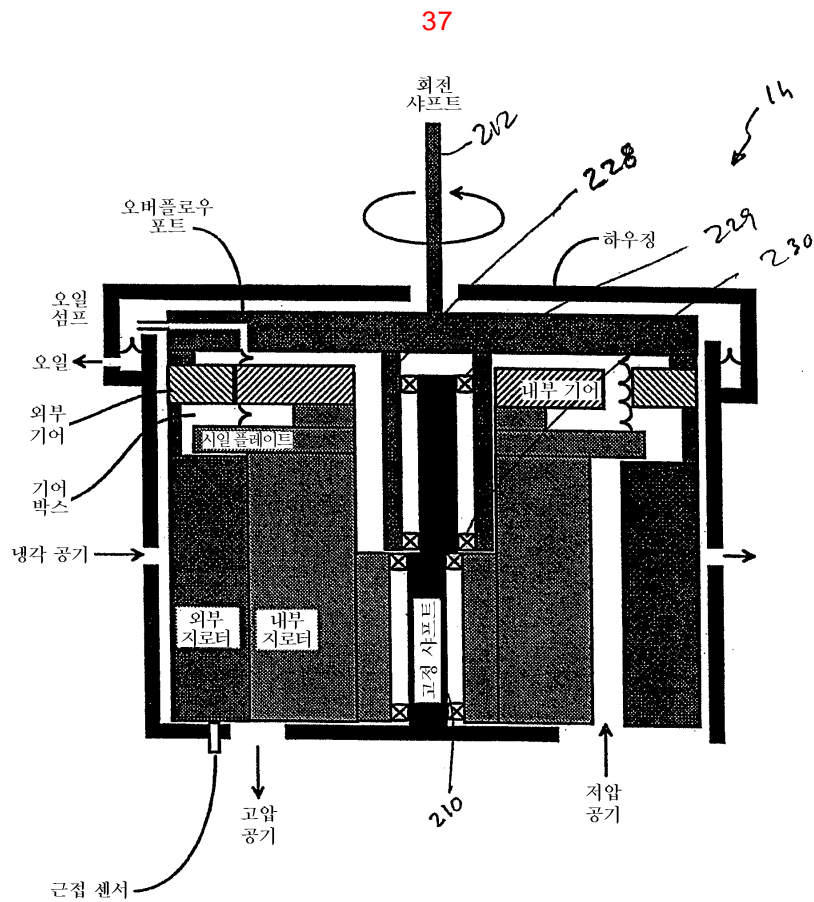
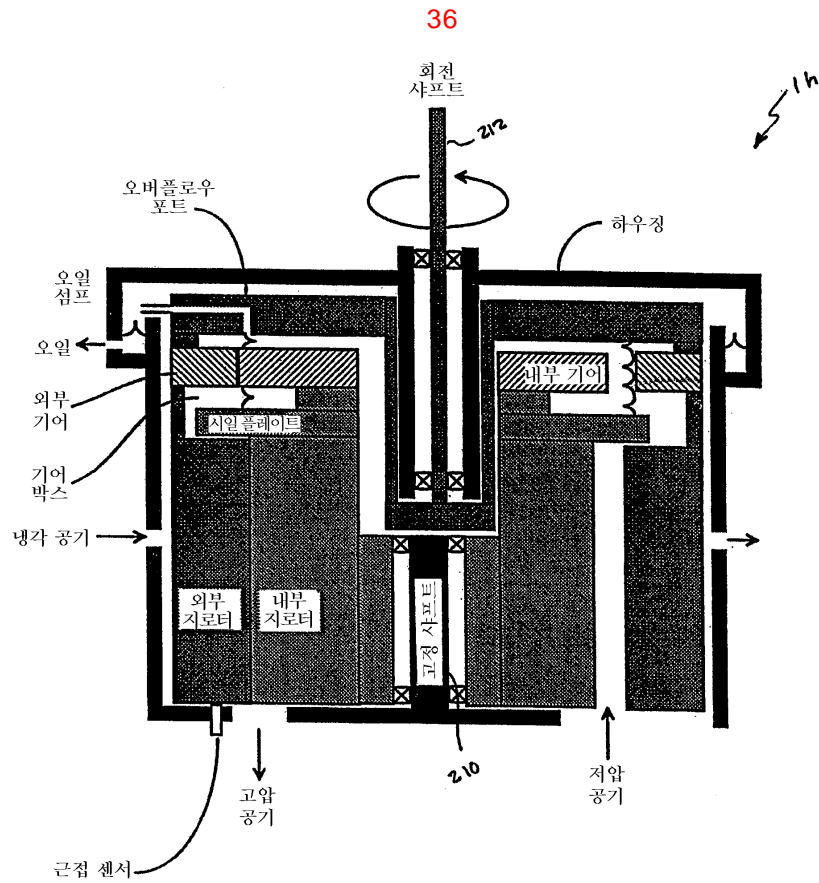


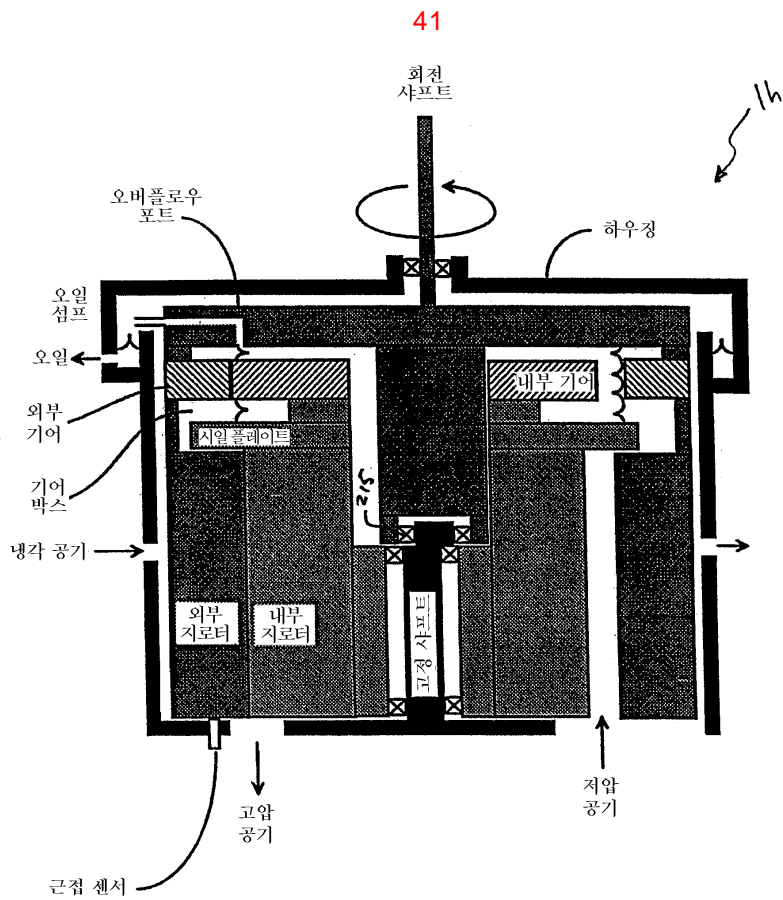
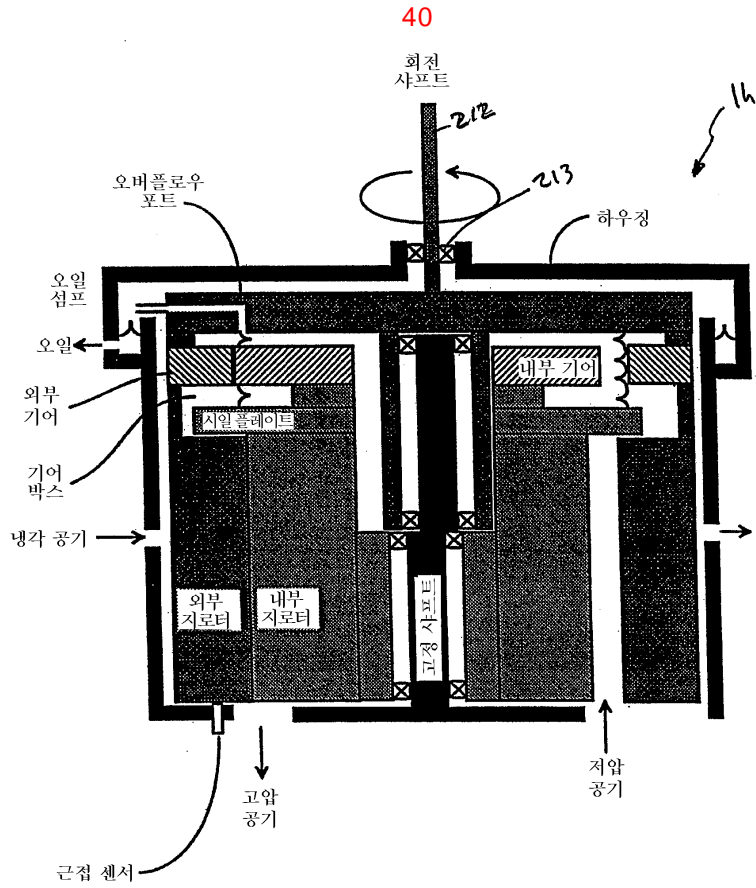
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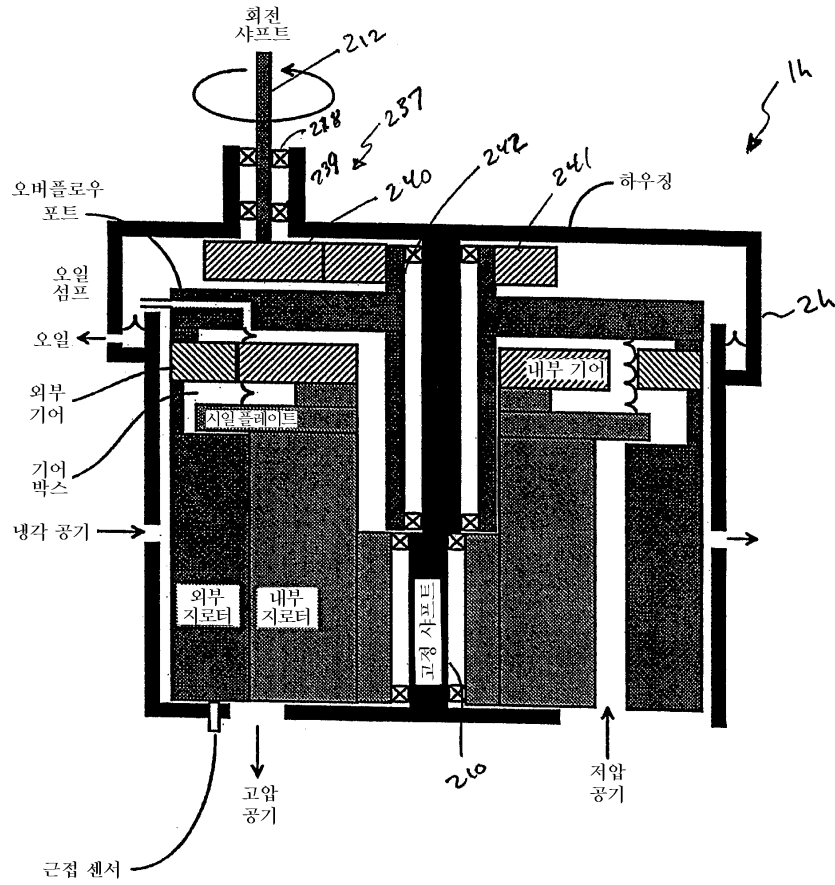
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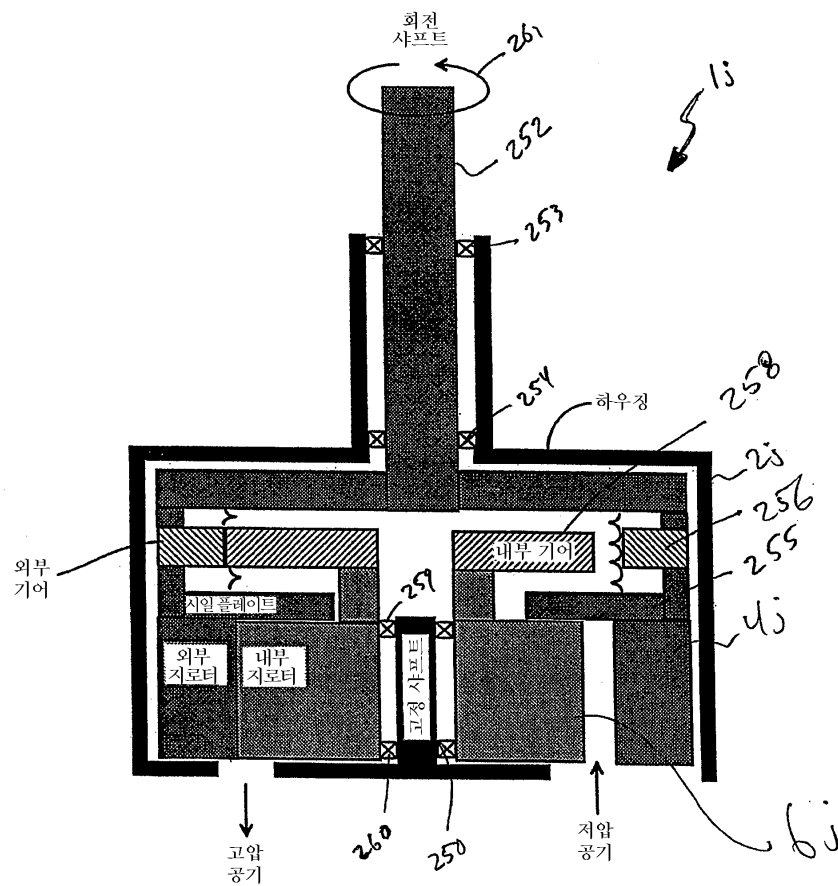


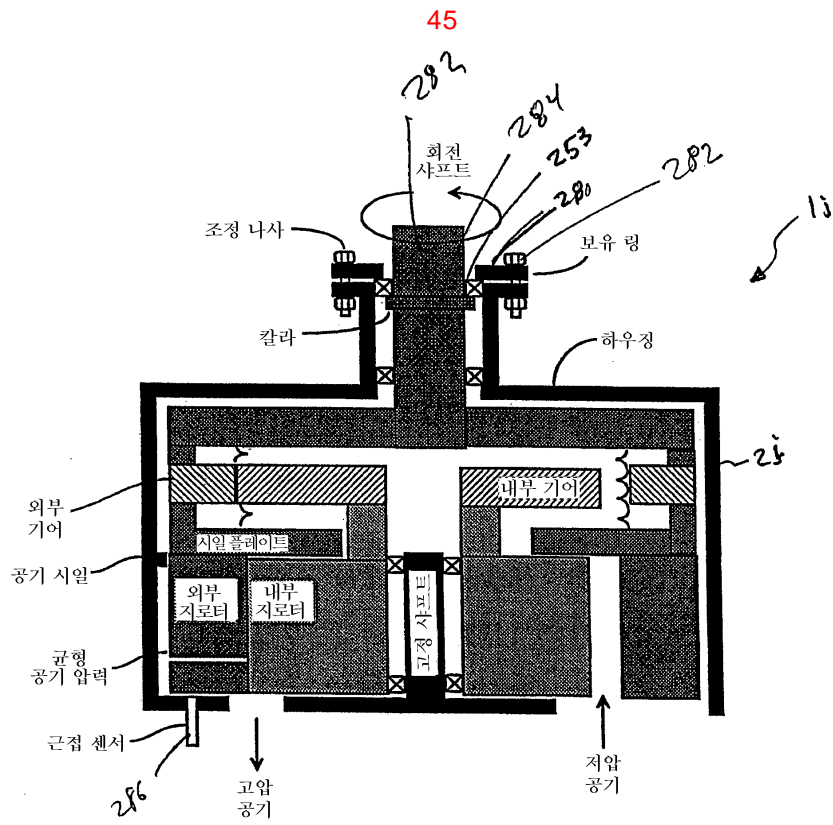
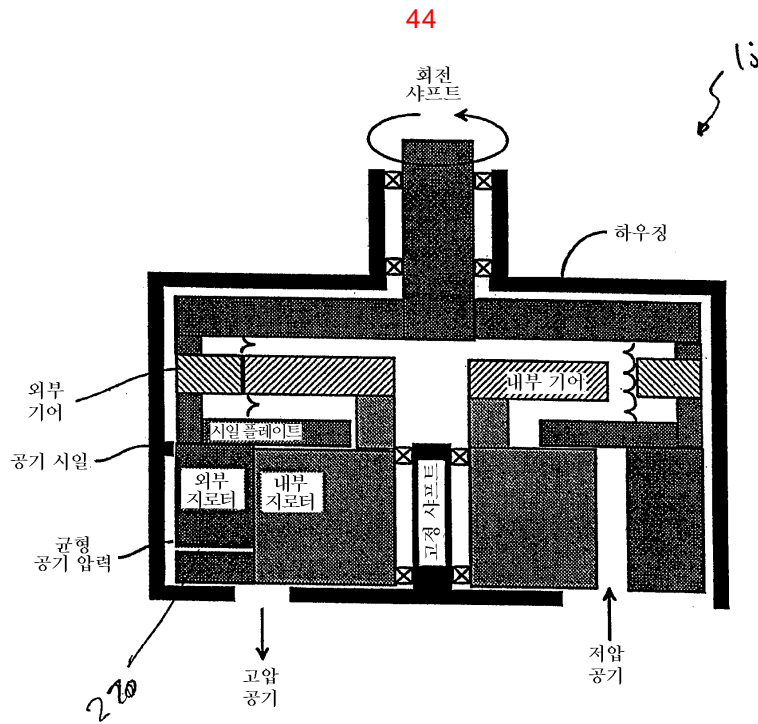


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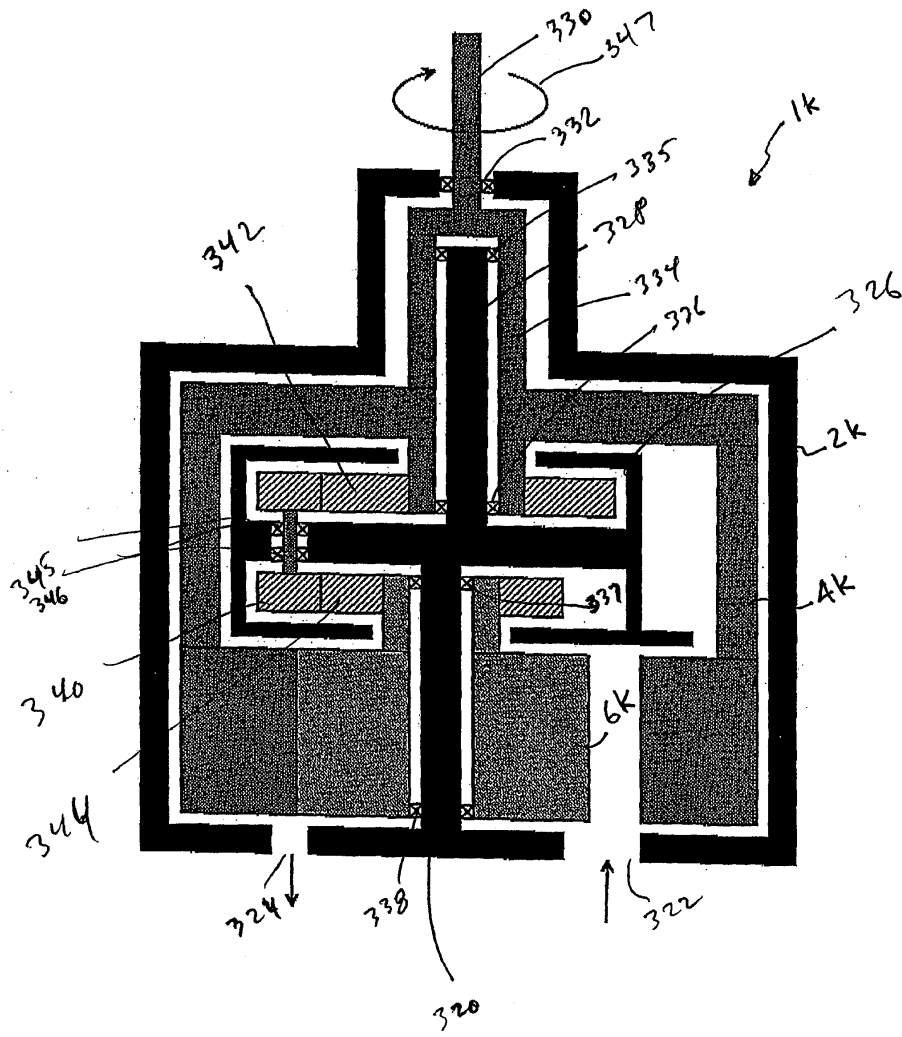


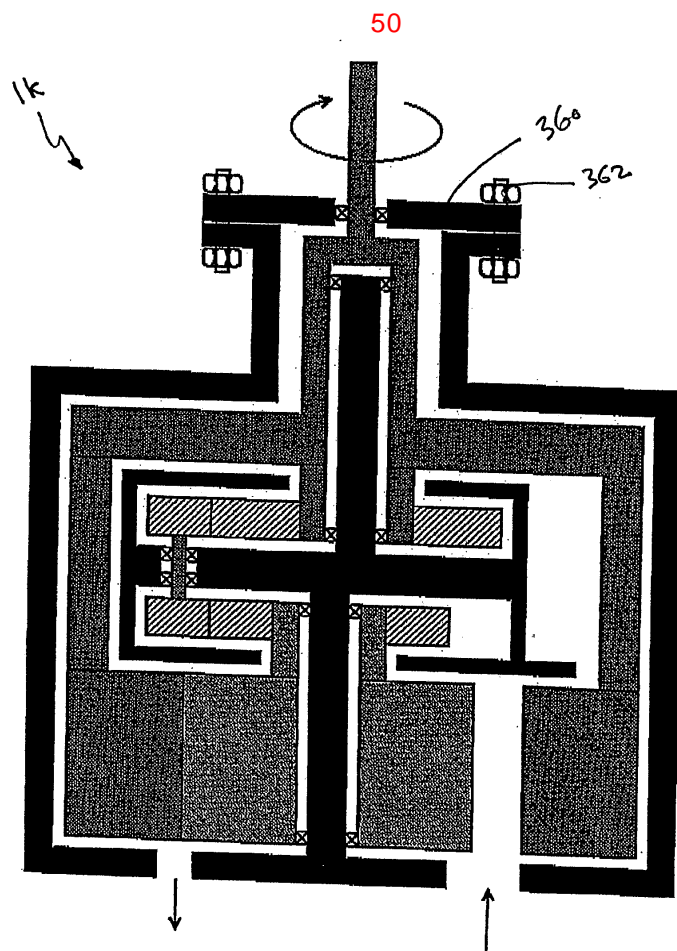
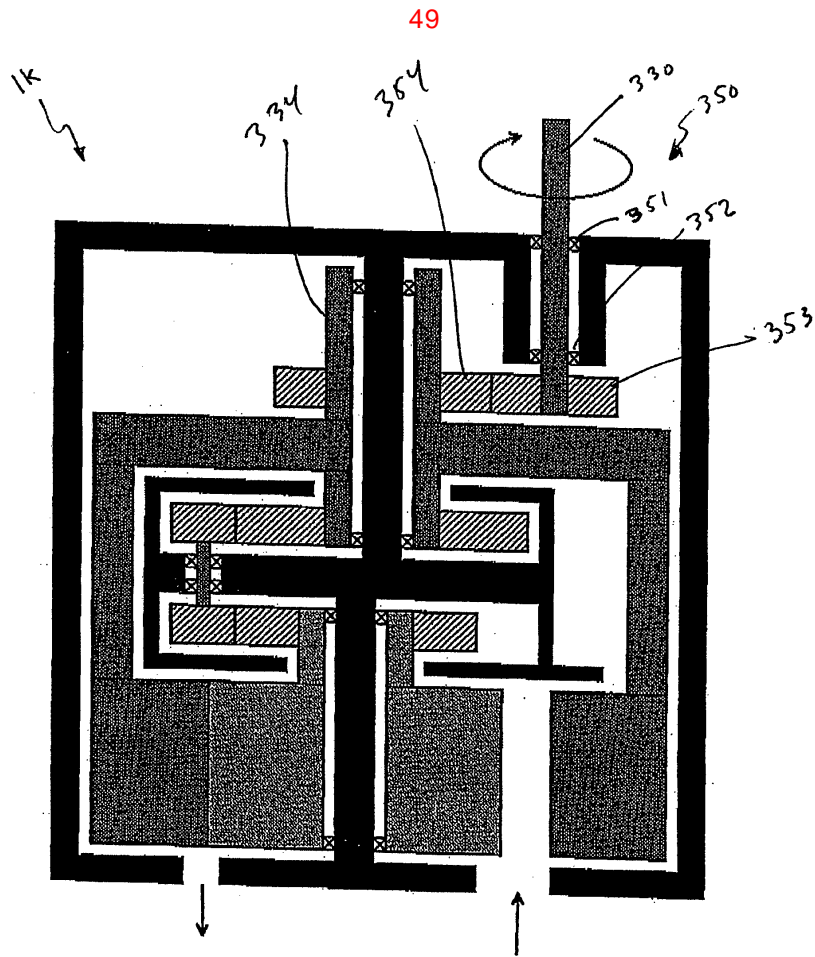
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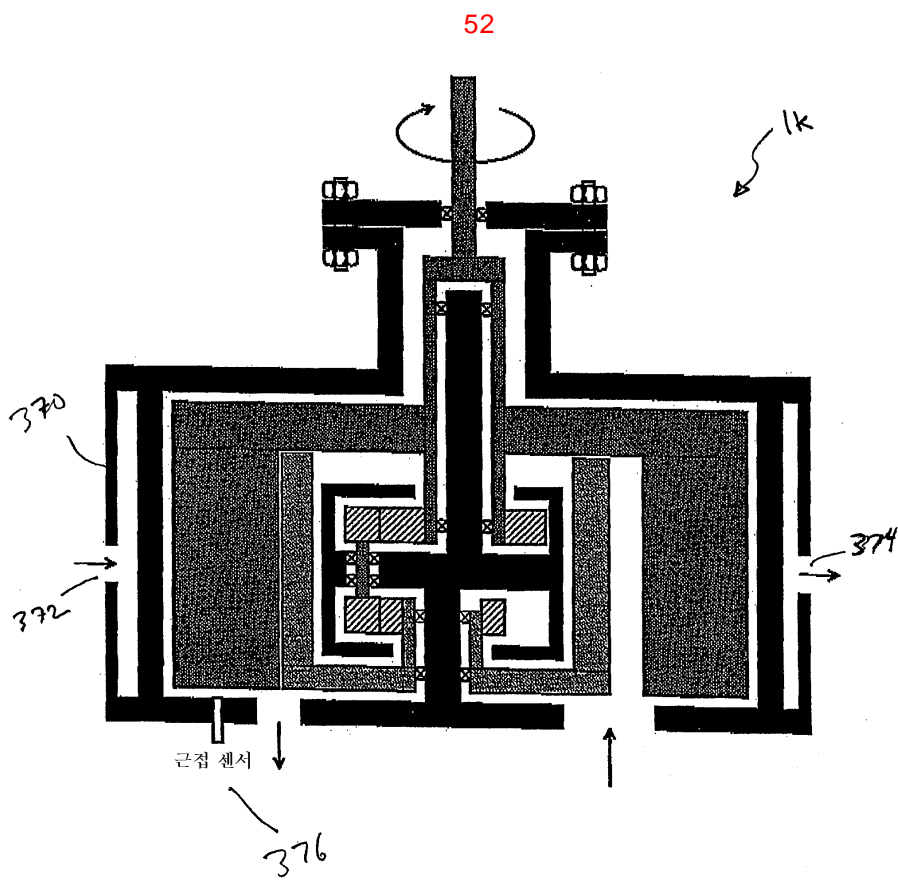
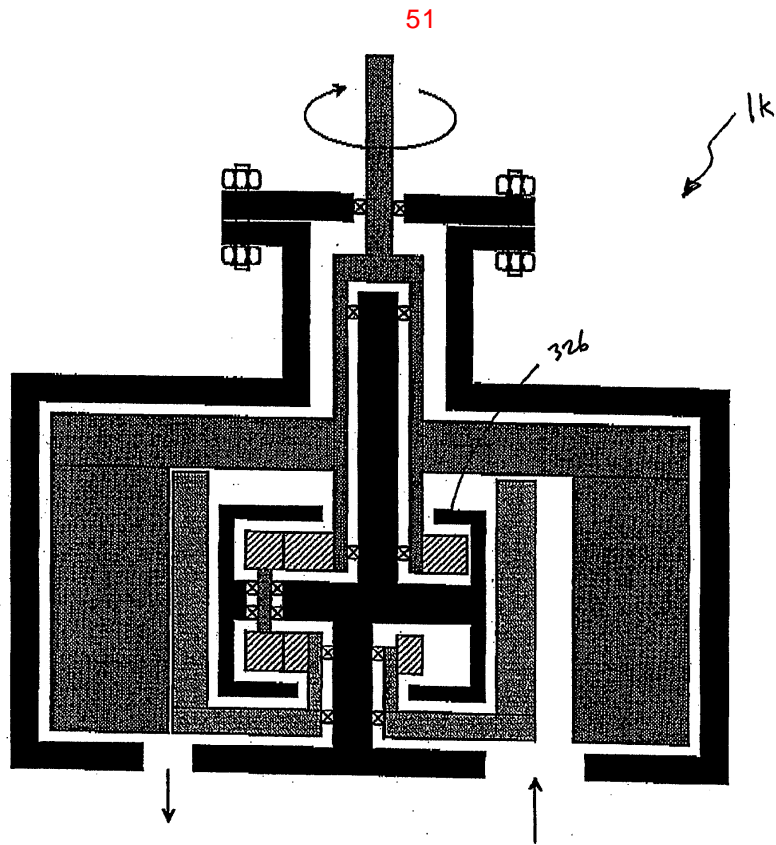


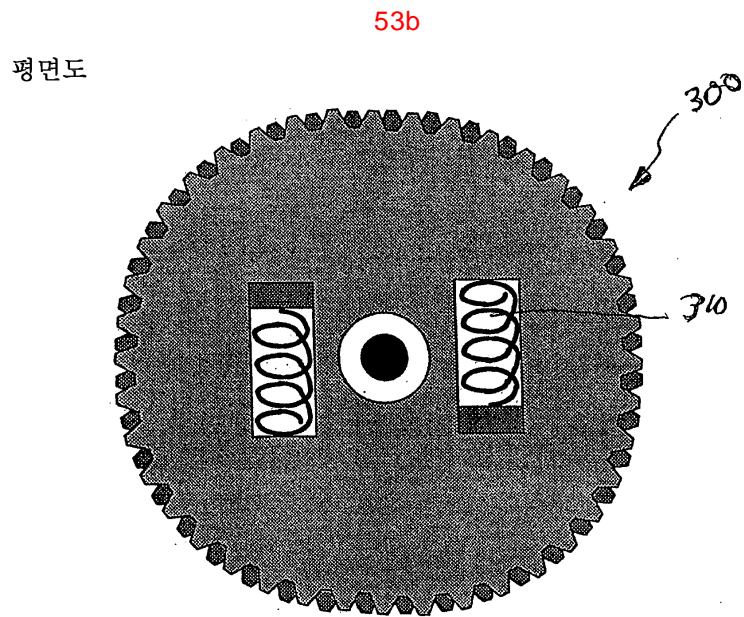
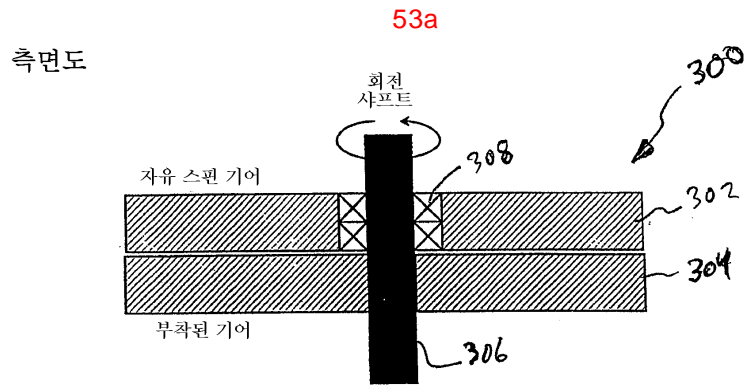


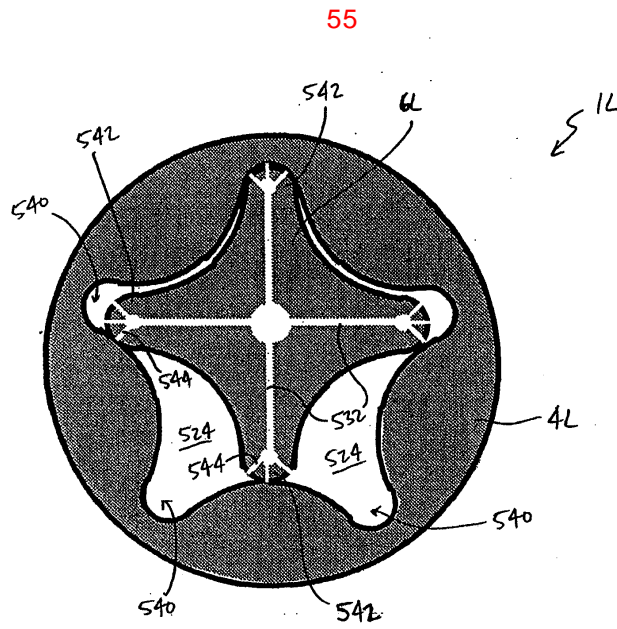
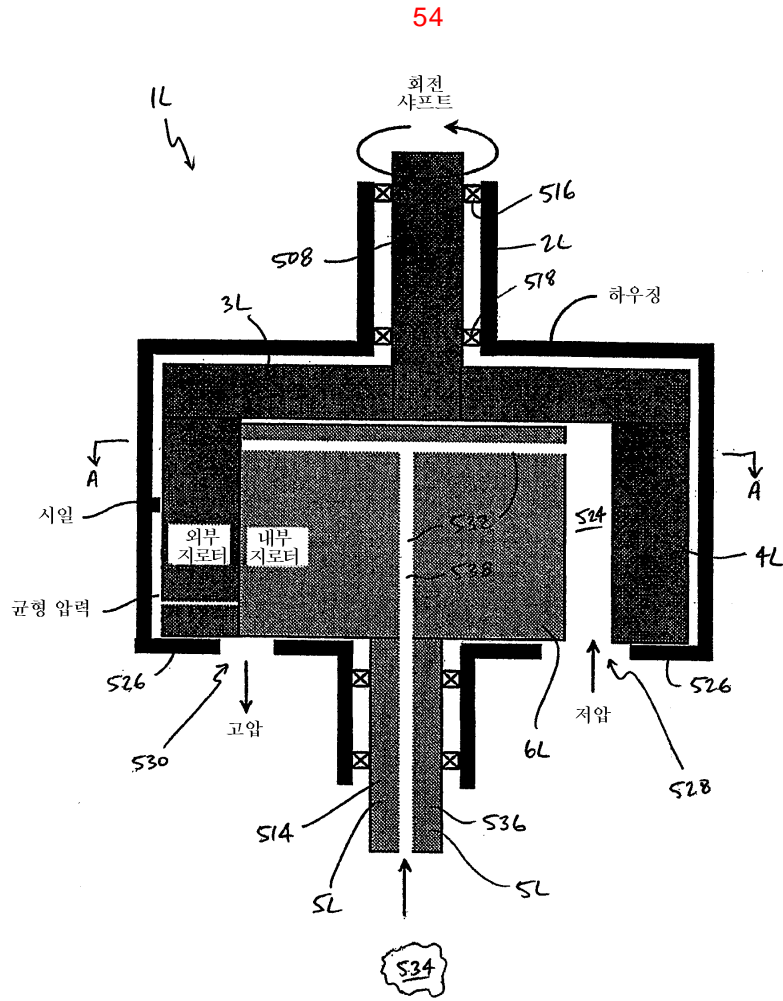
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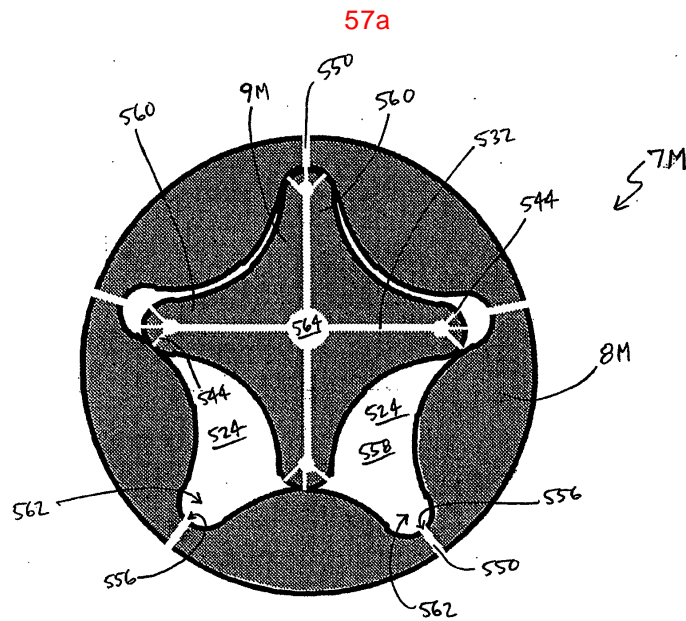
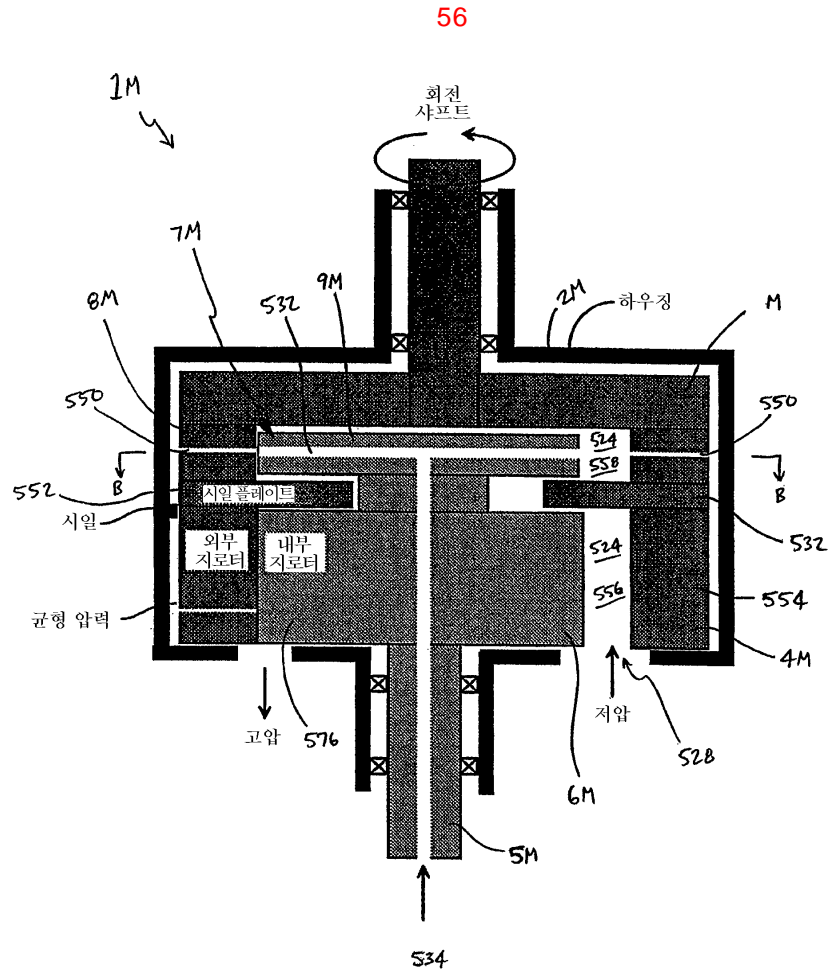




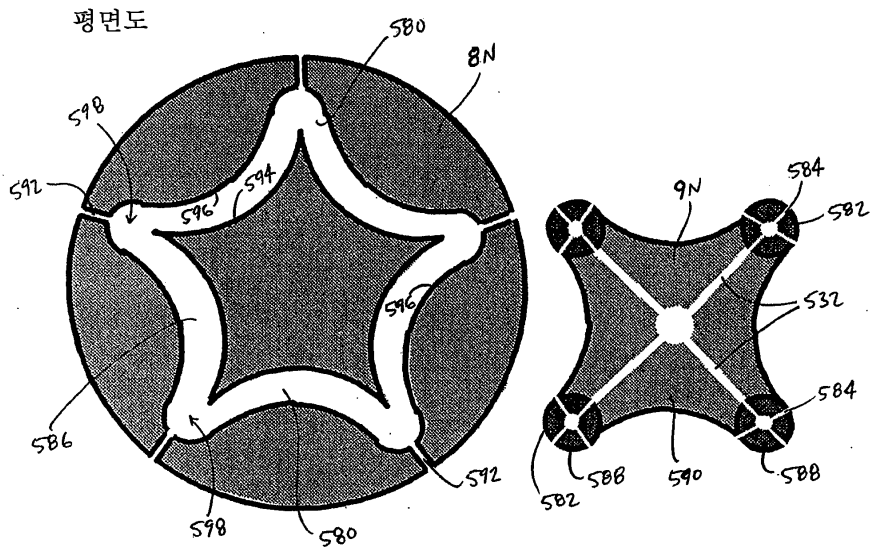






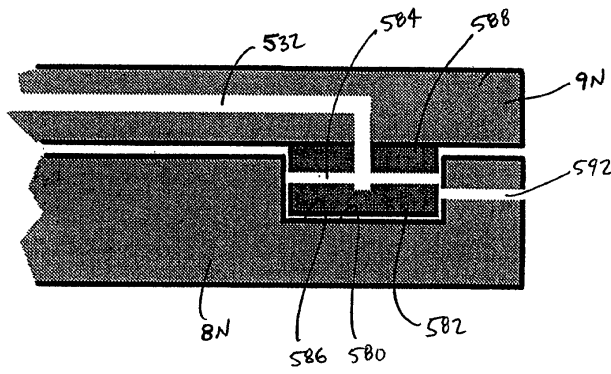


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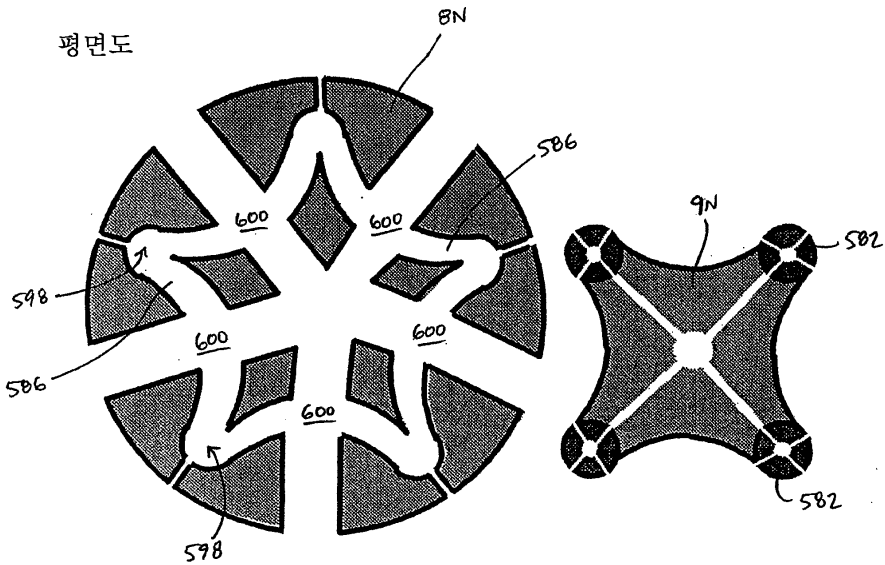


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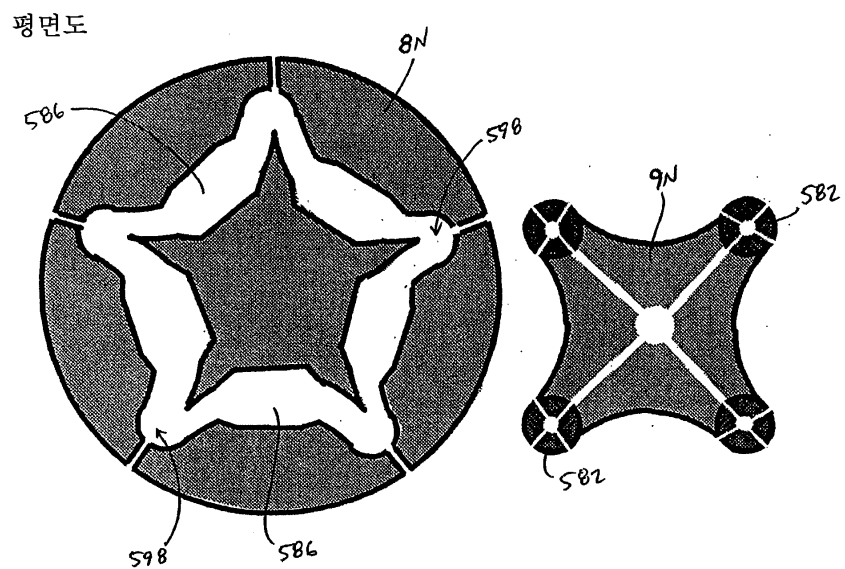
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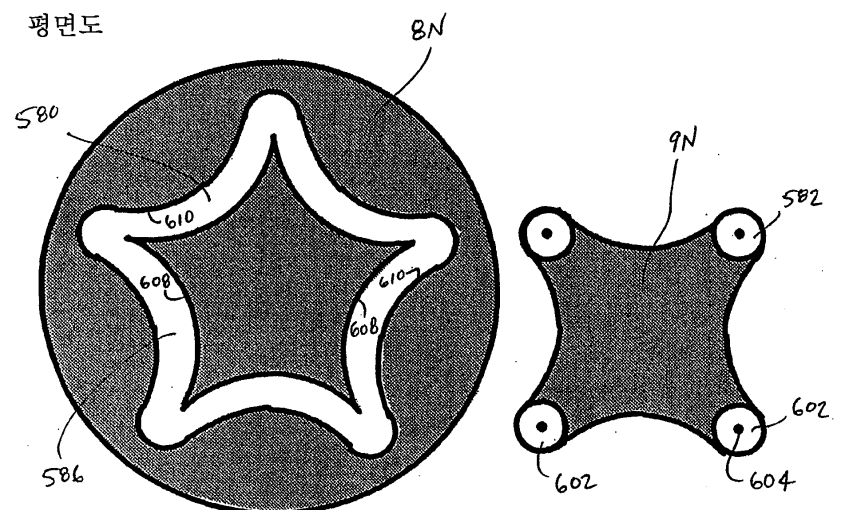
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59d

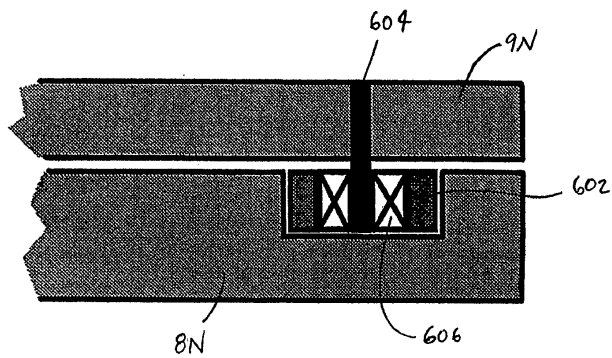


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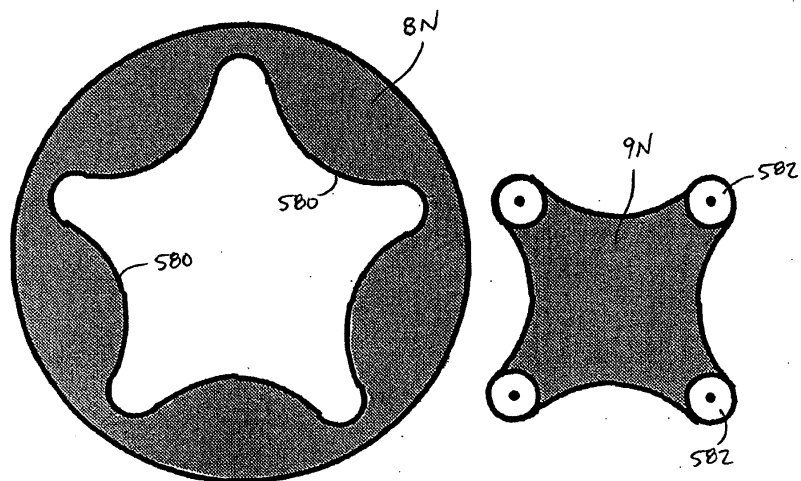
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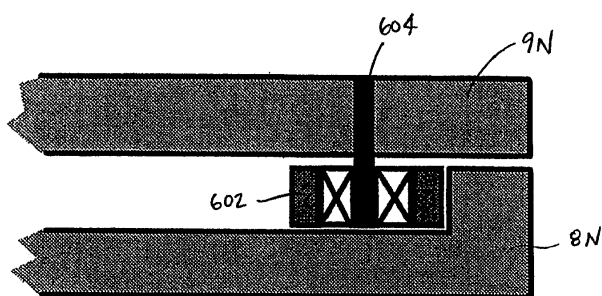
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평면도



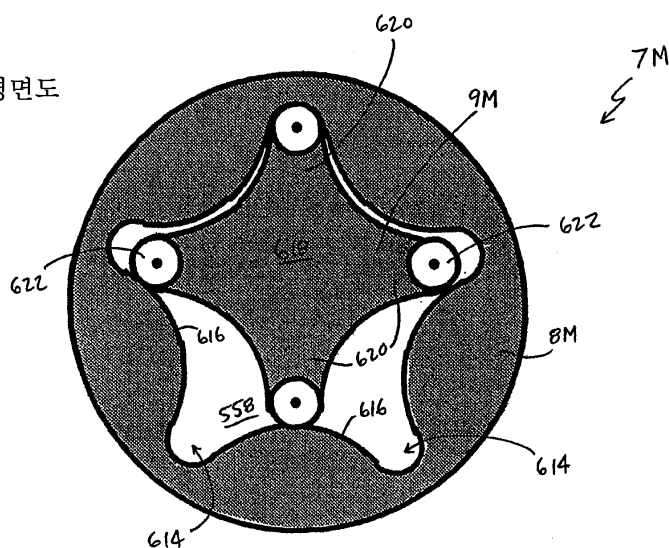
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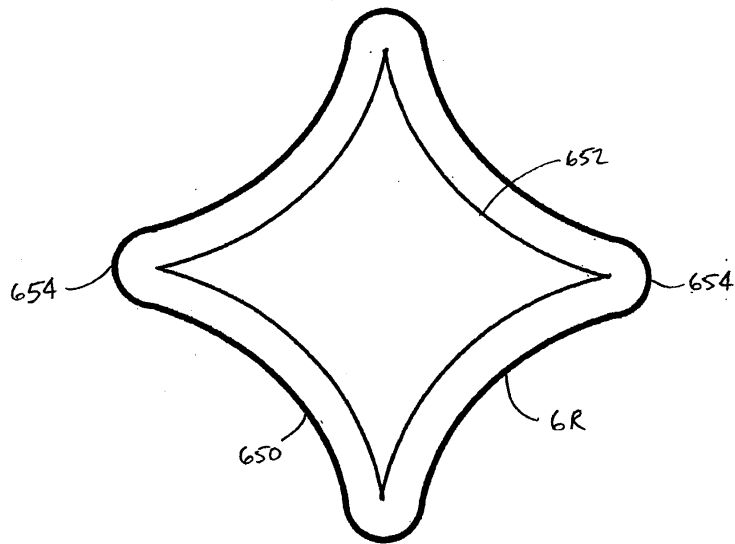


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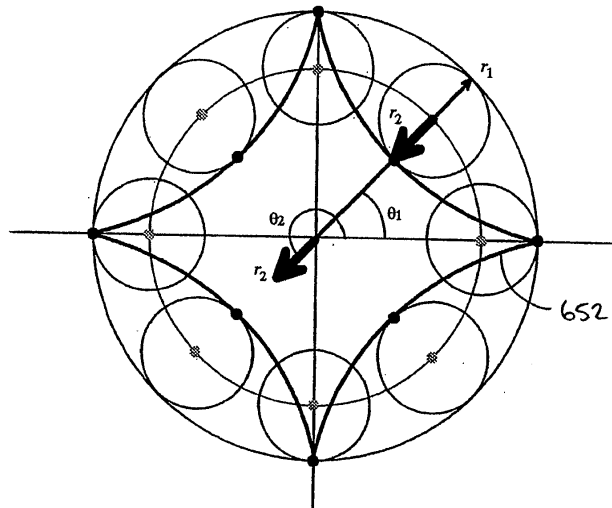
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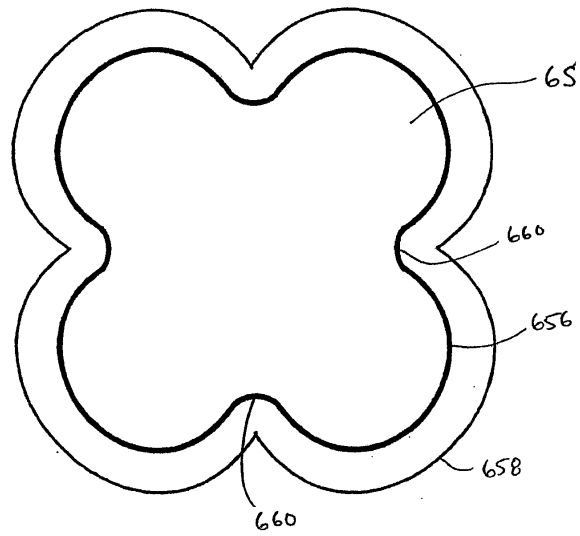
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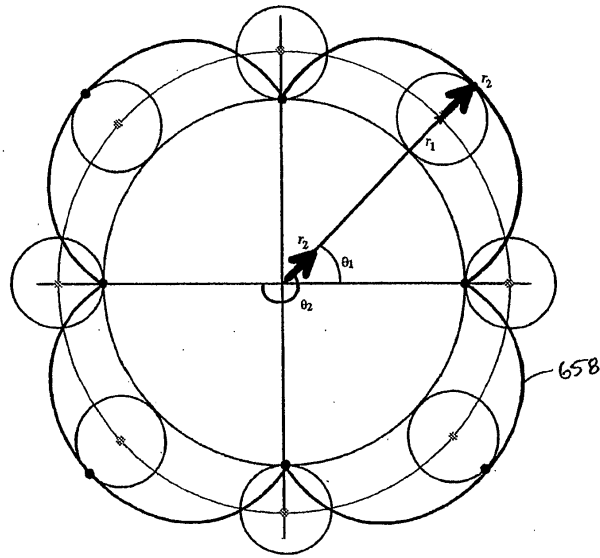
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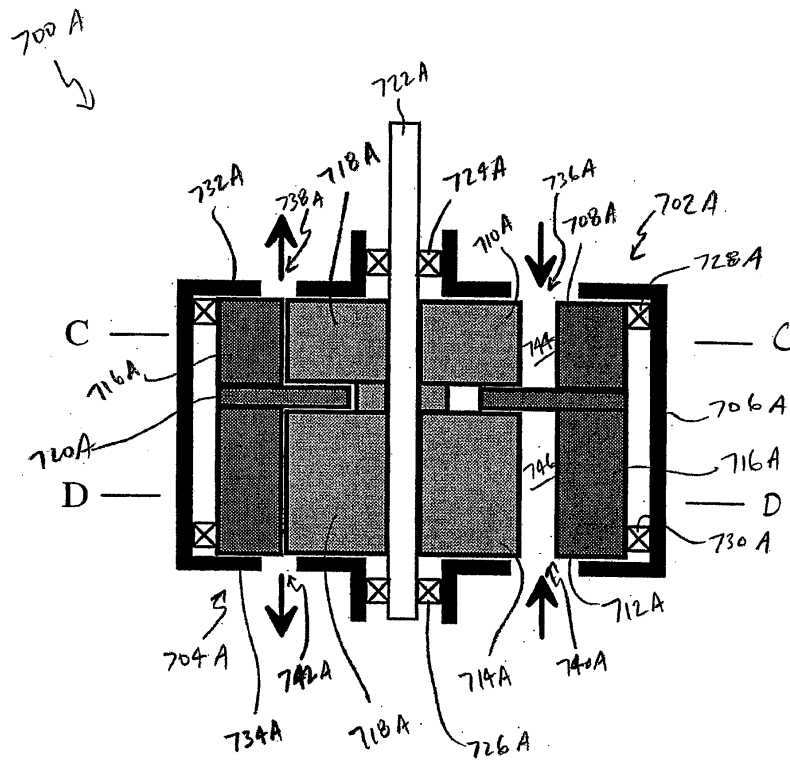
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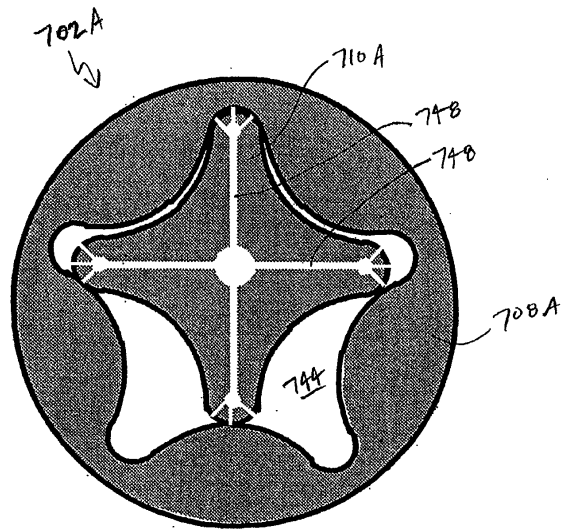
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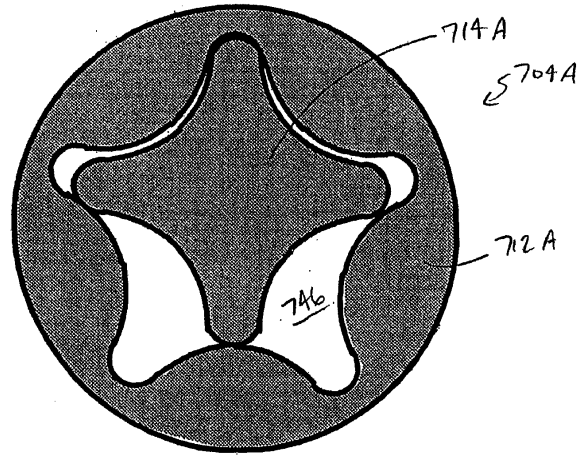
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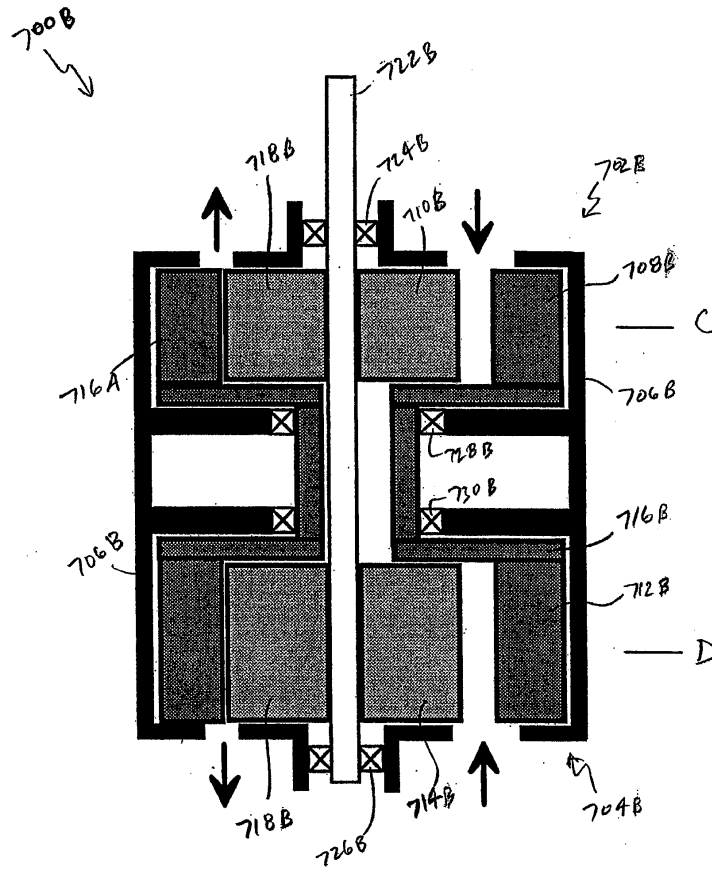
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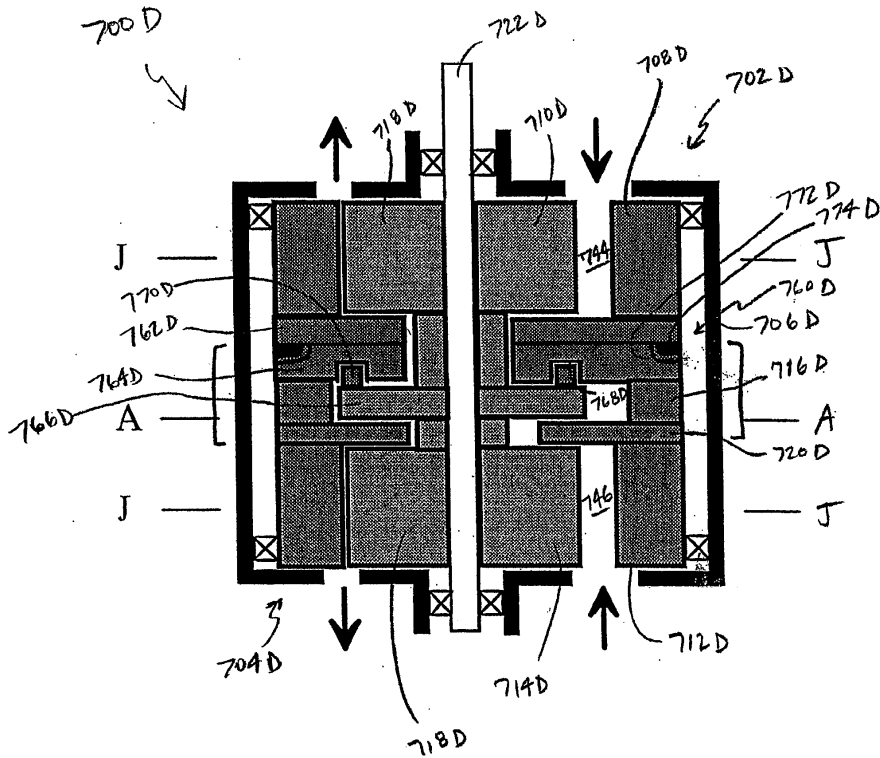
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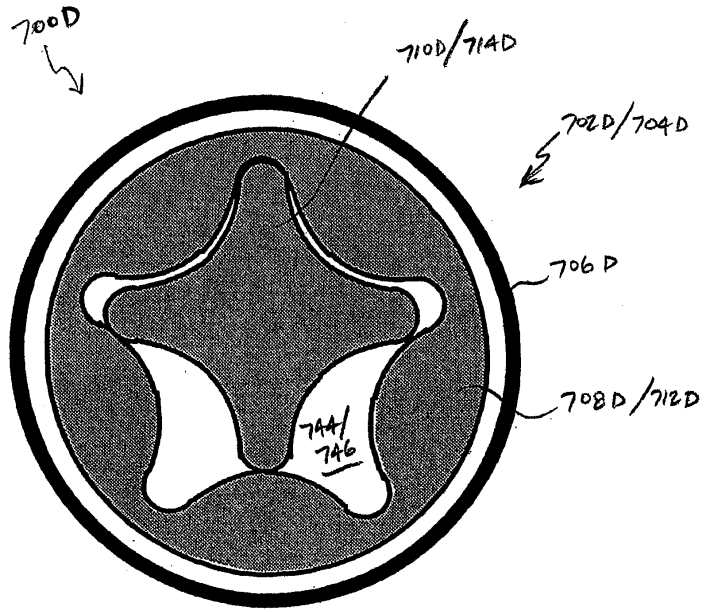
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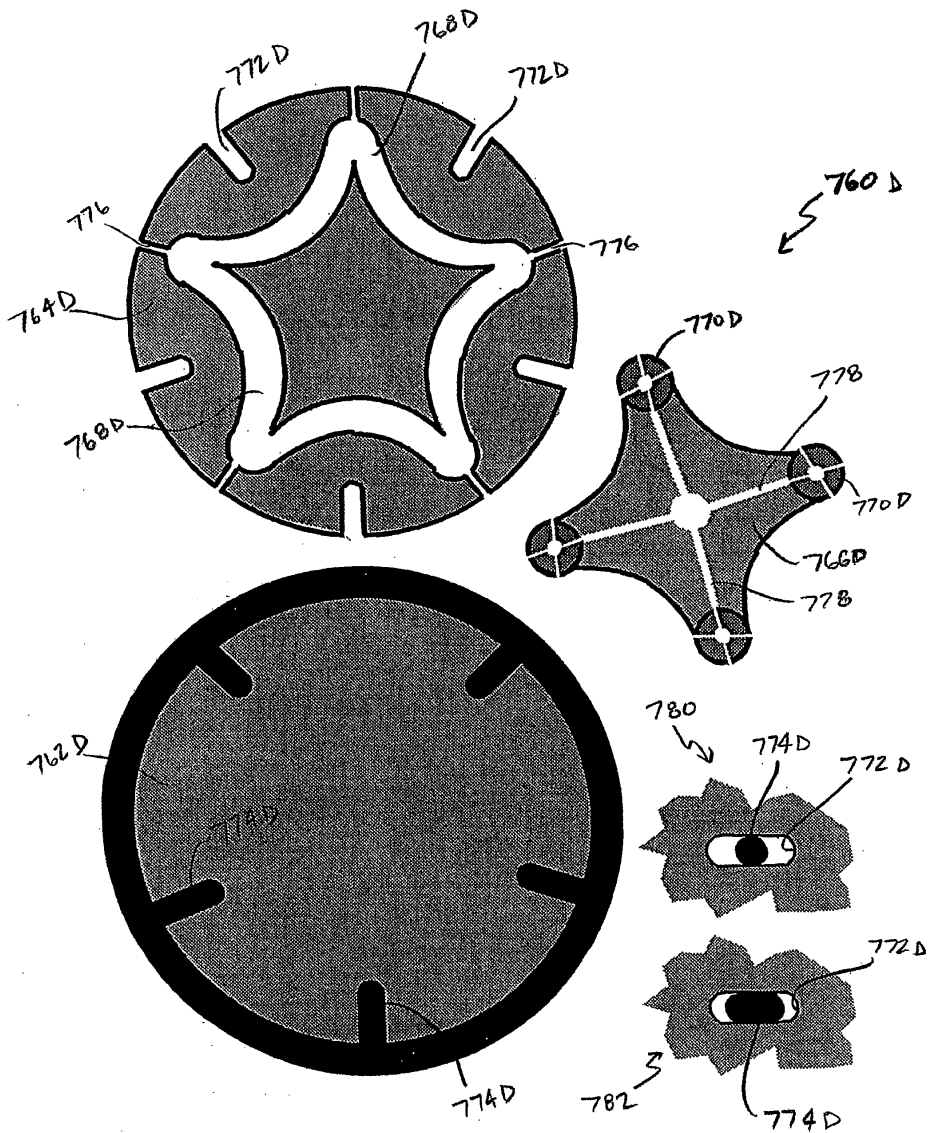
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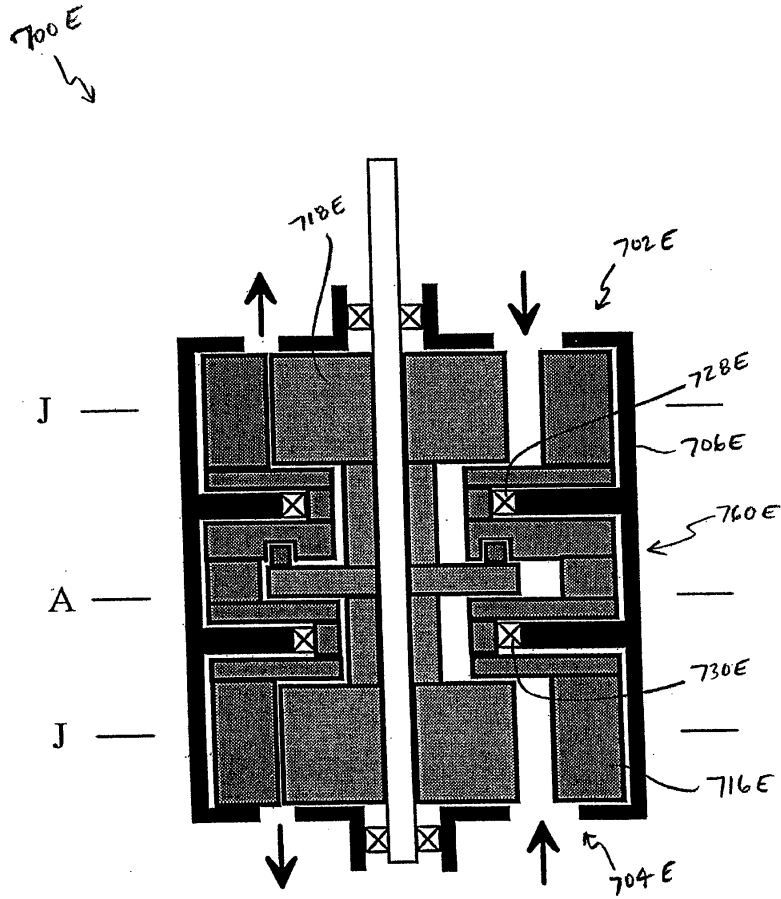
68b



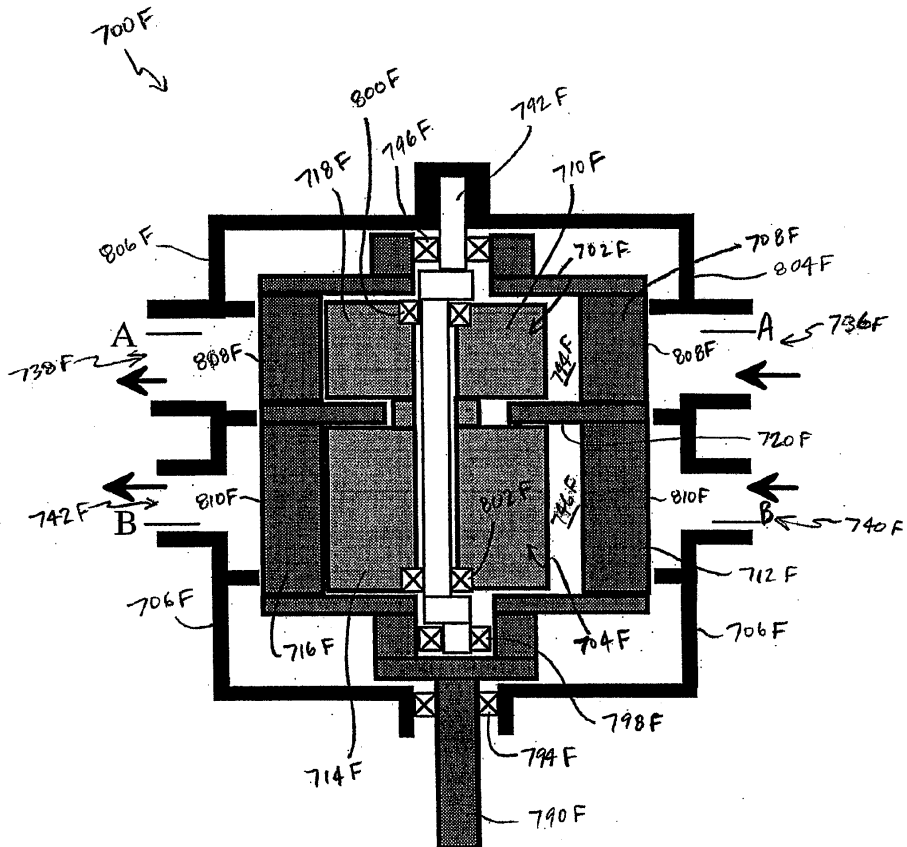
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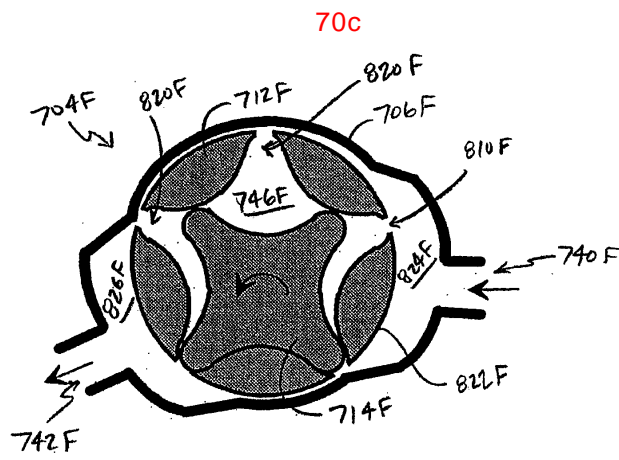
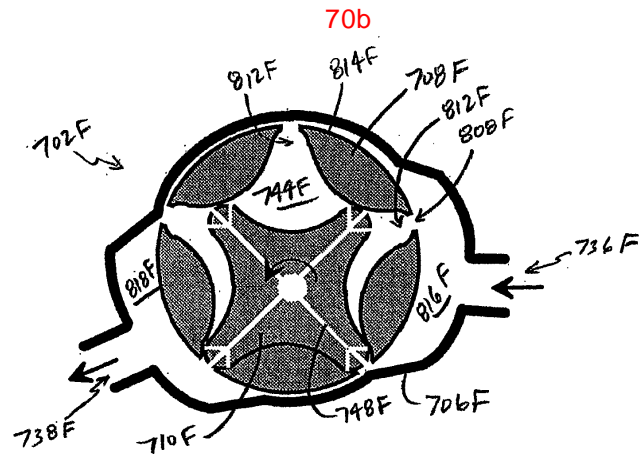


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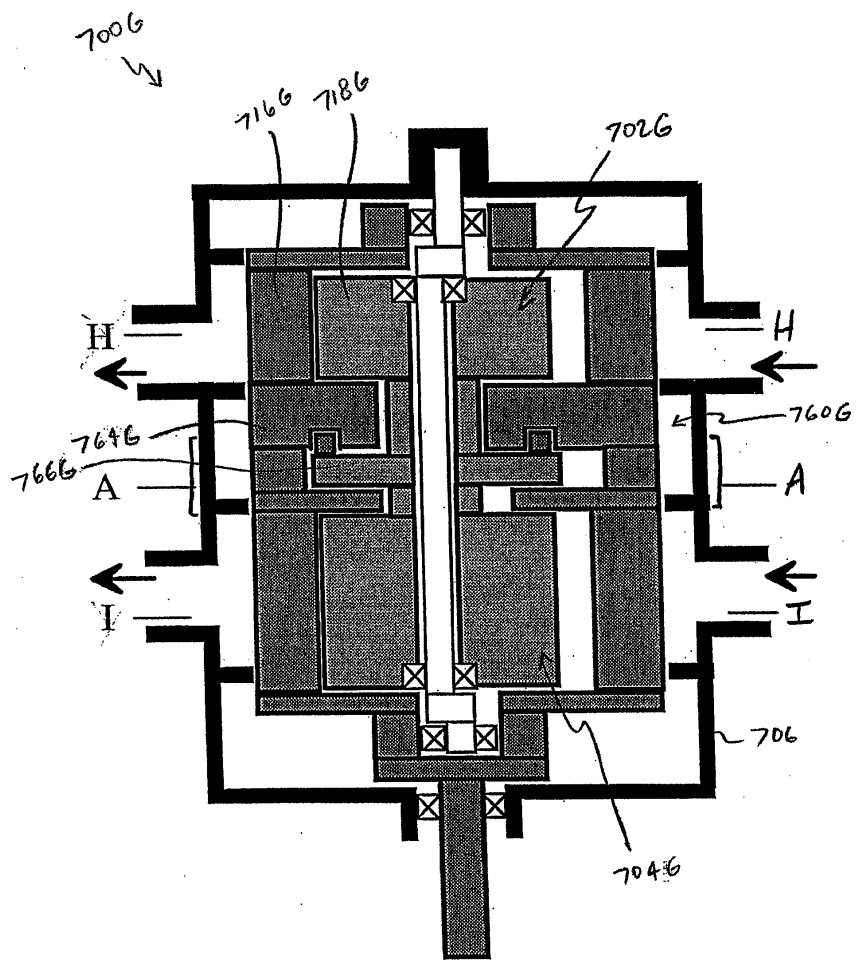


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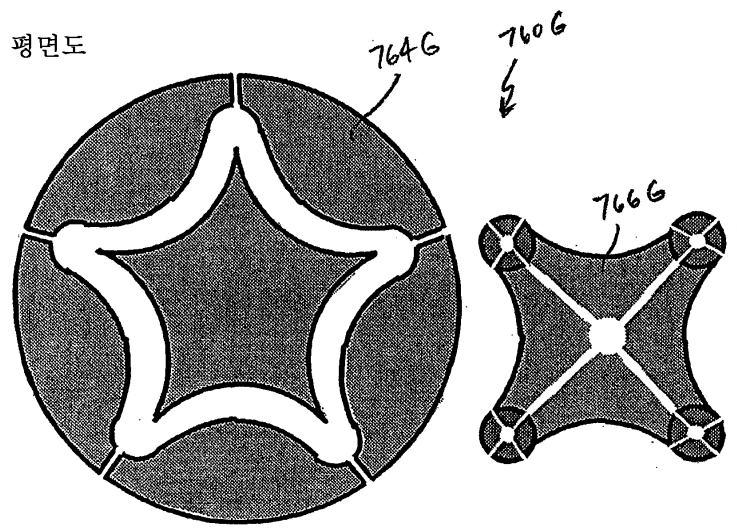




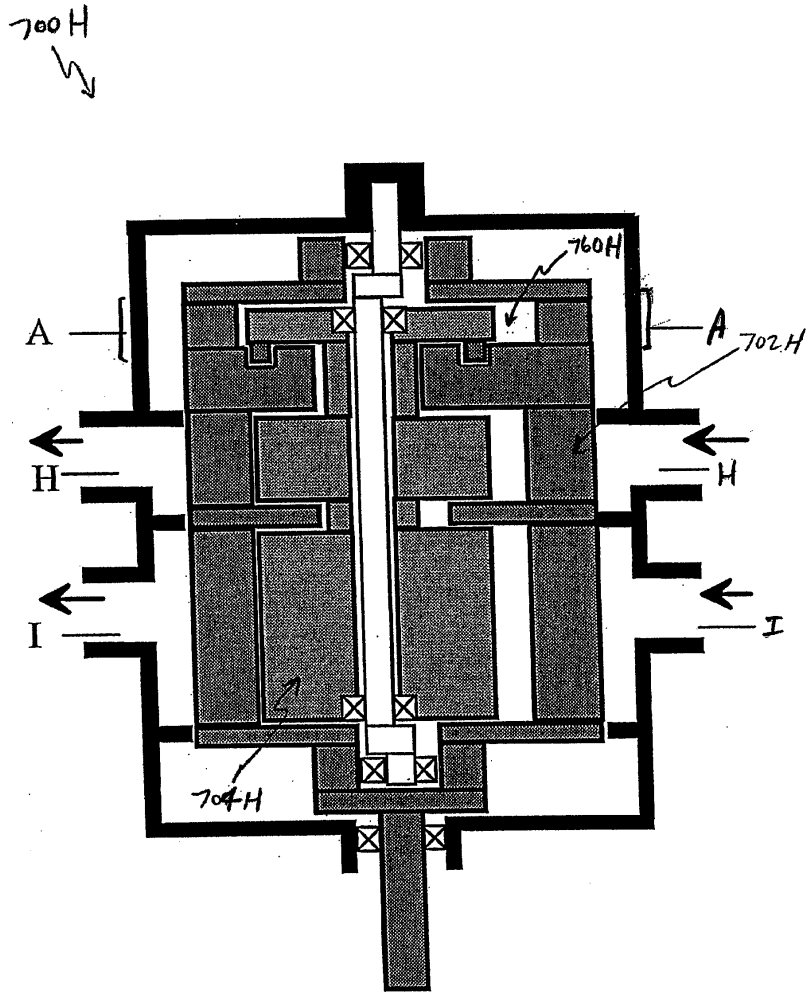
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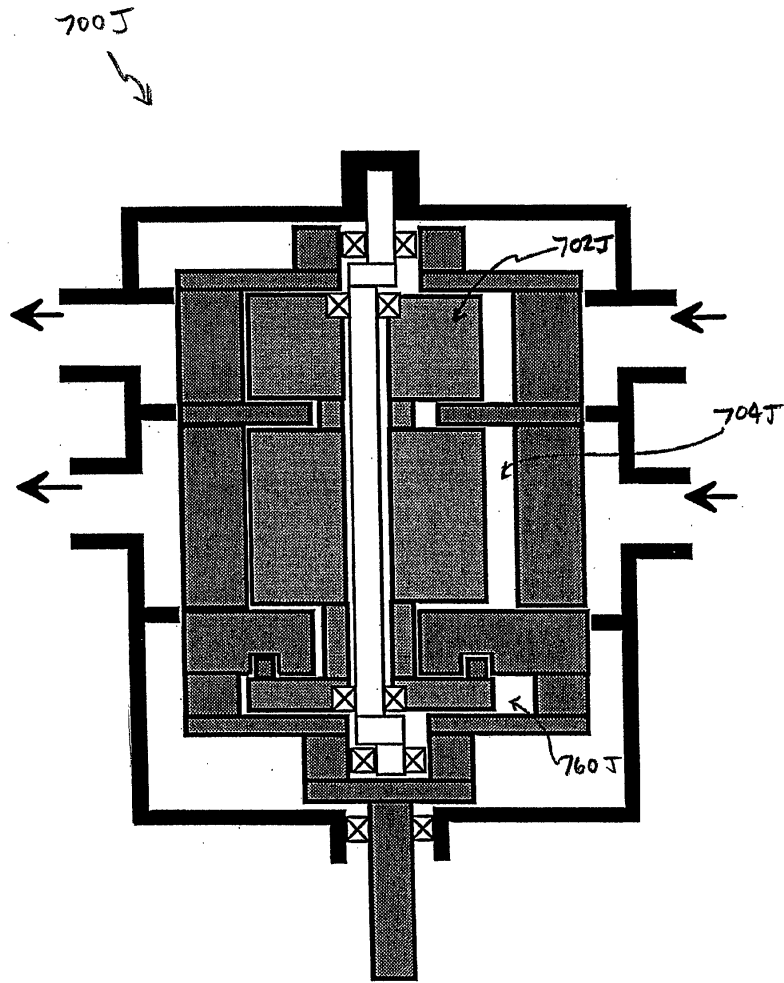
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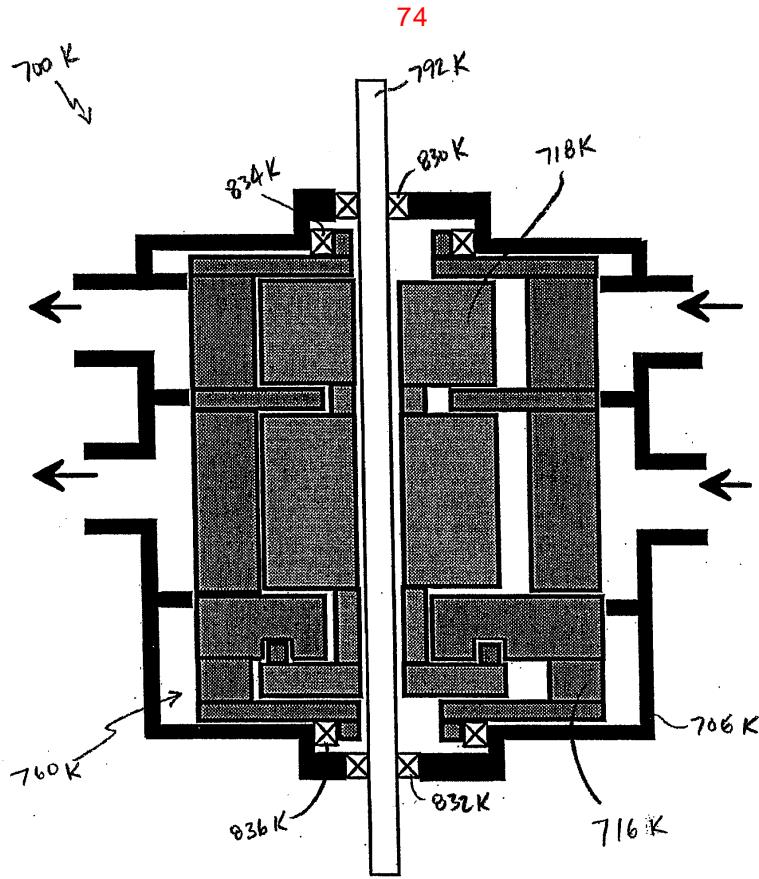


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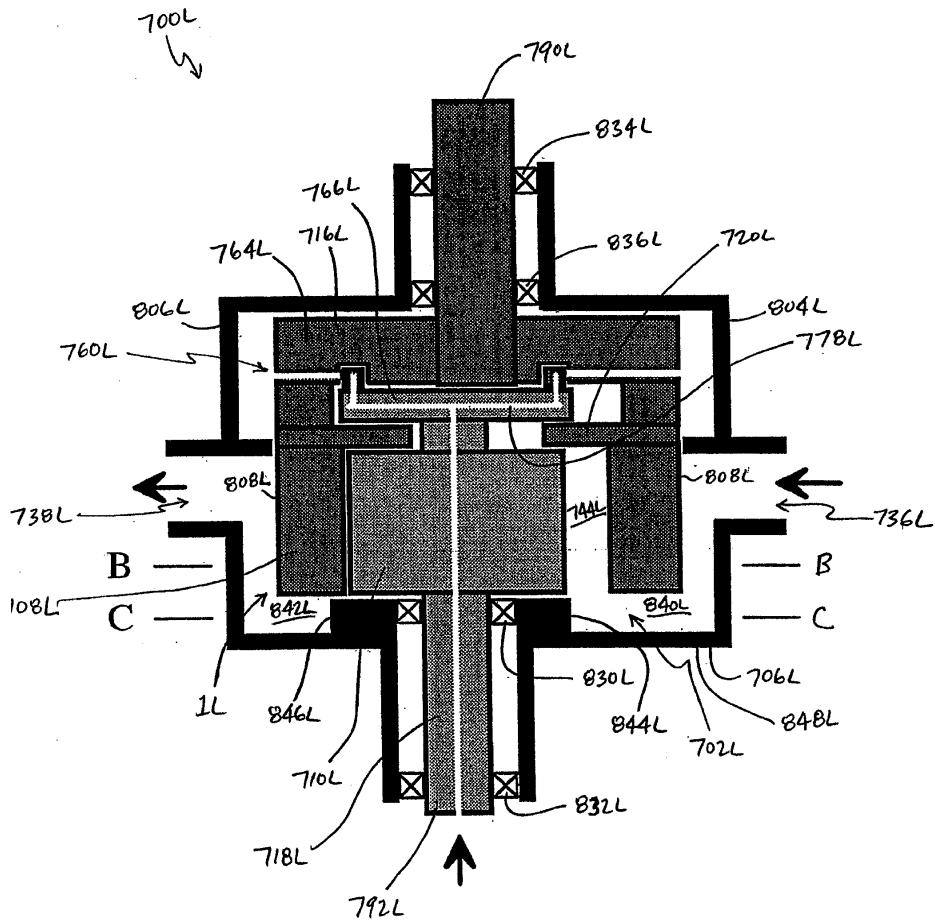


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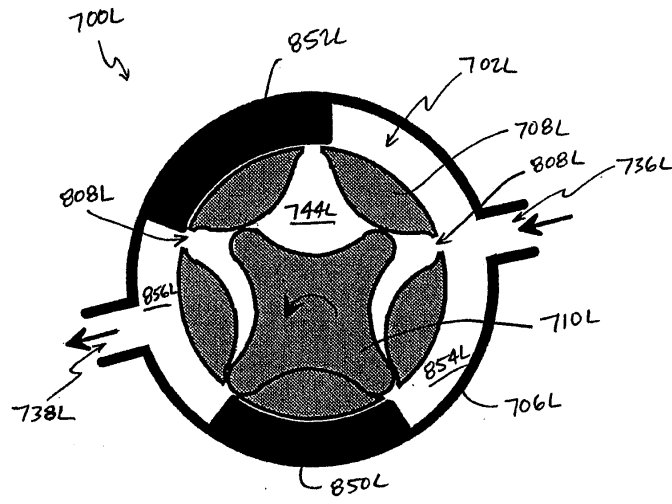




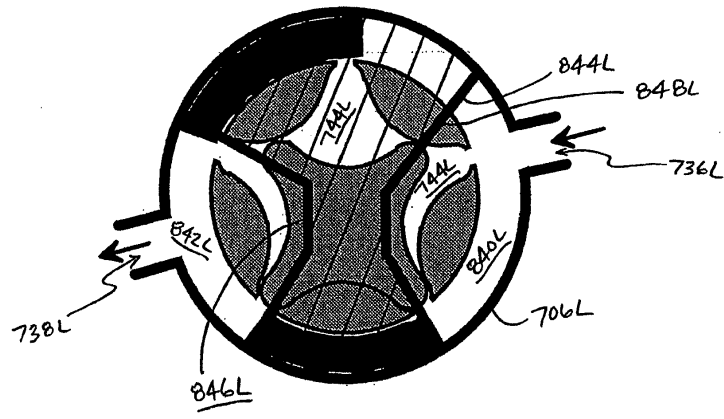
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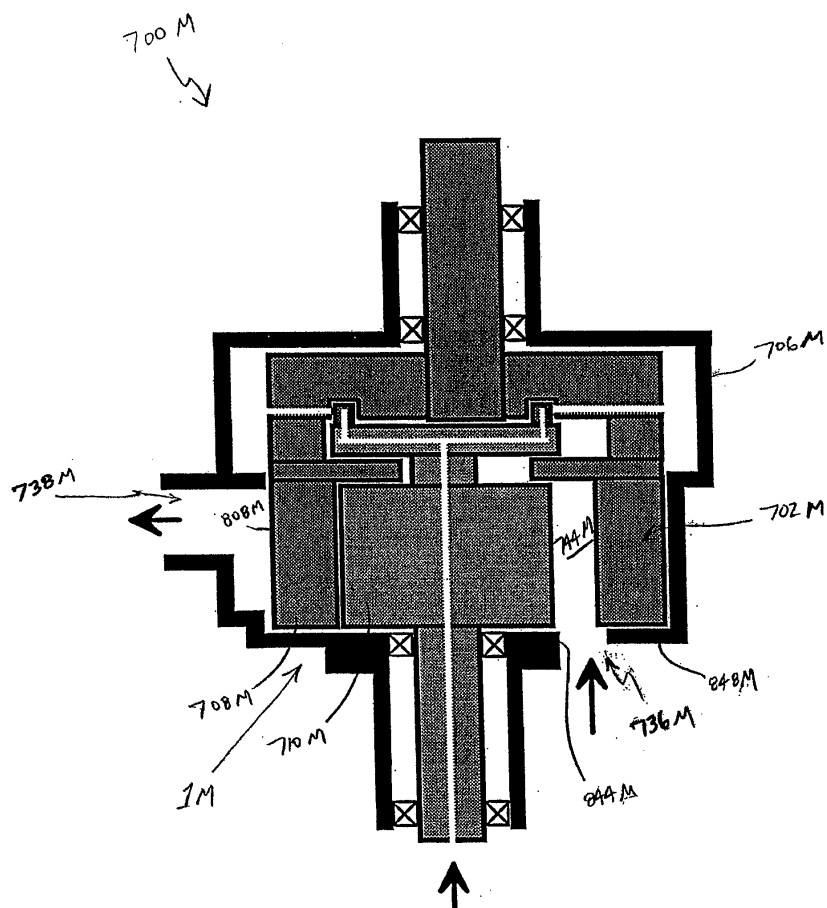
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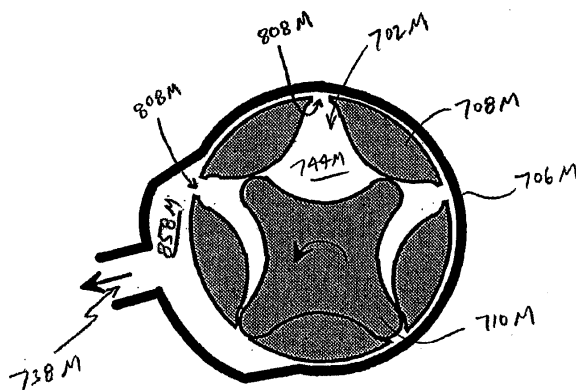
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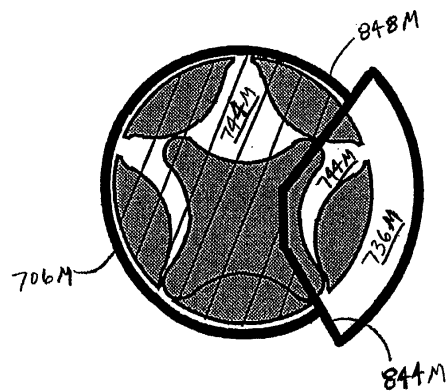
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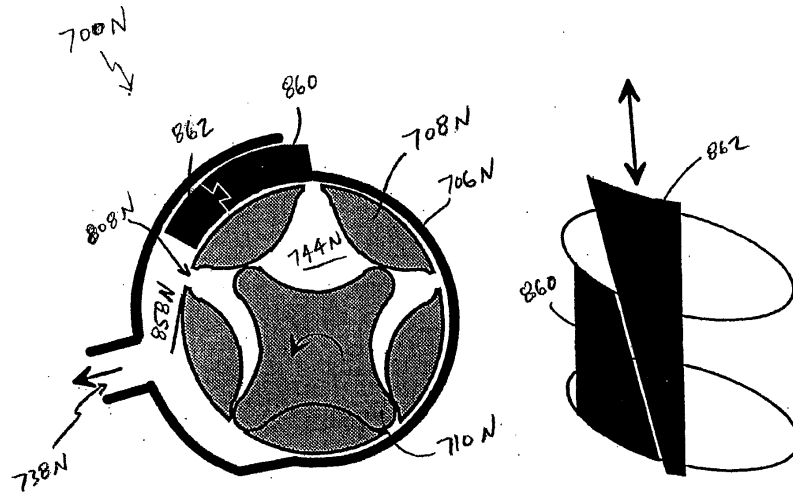
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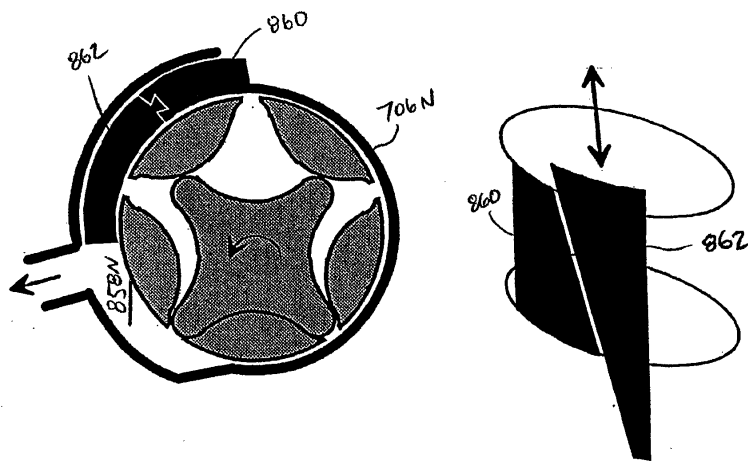
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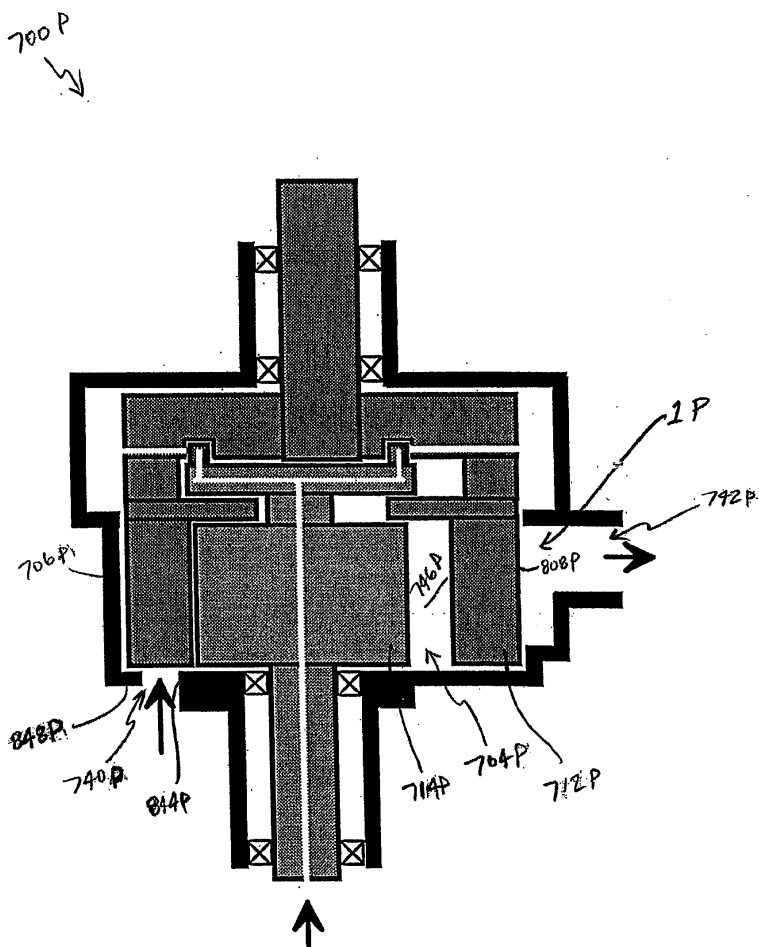
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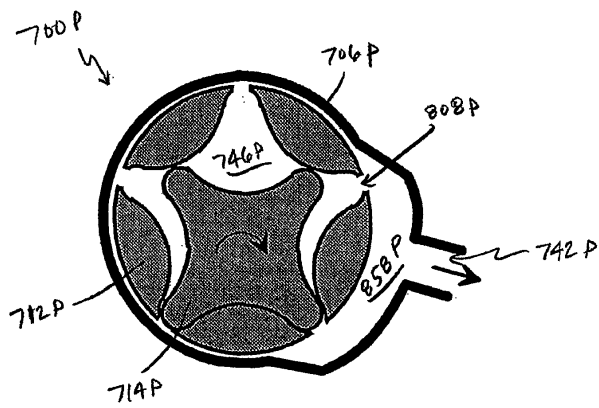
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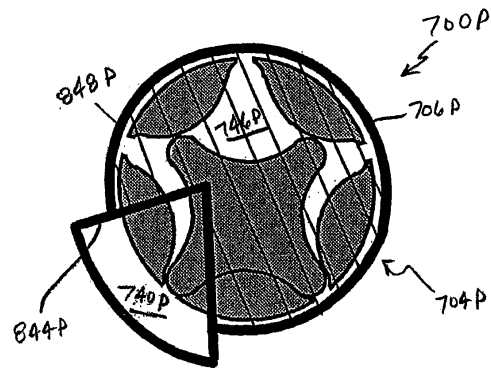
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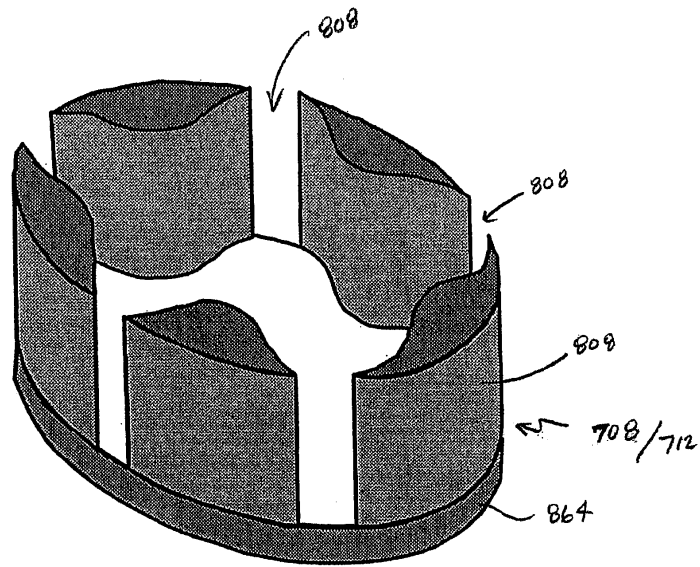
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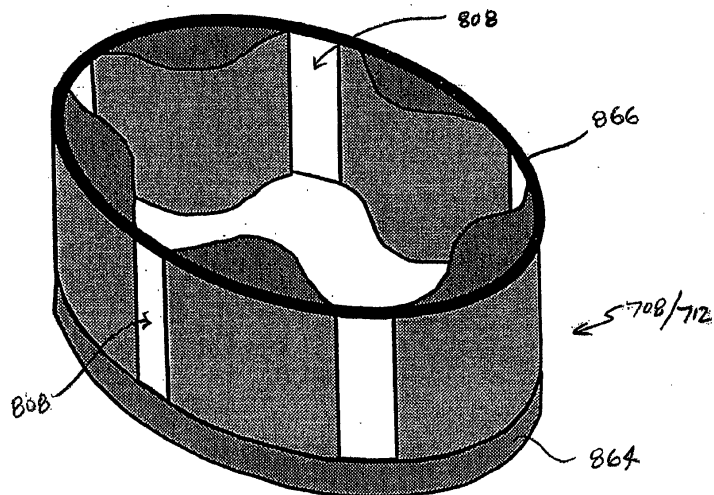
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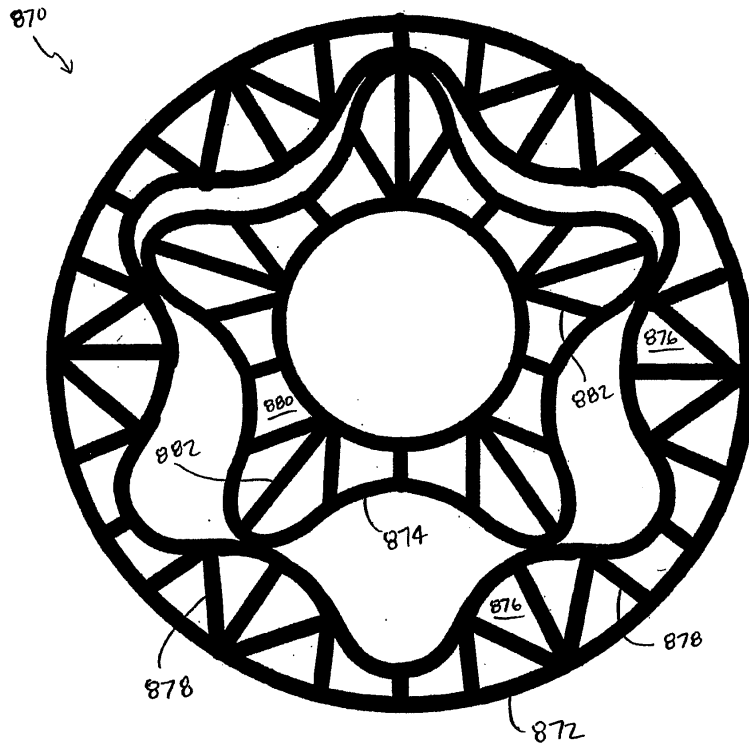
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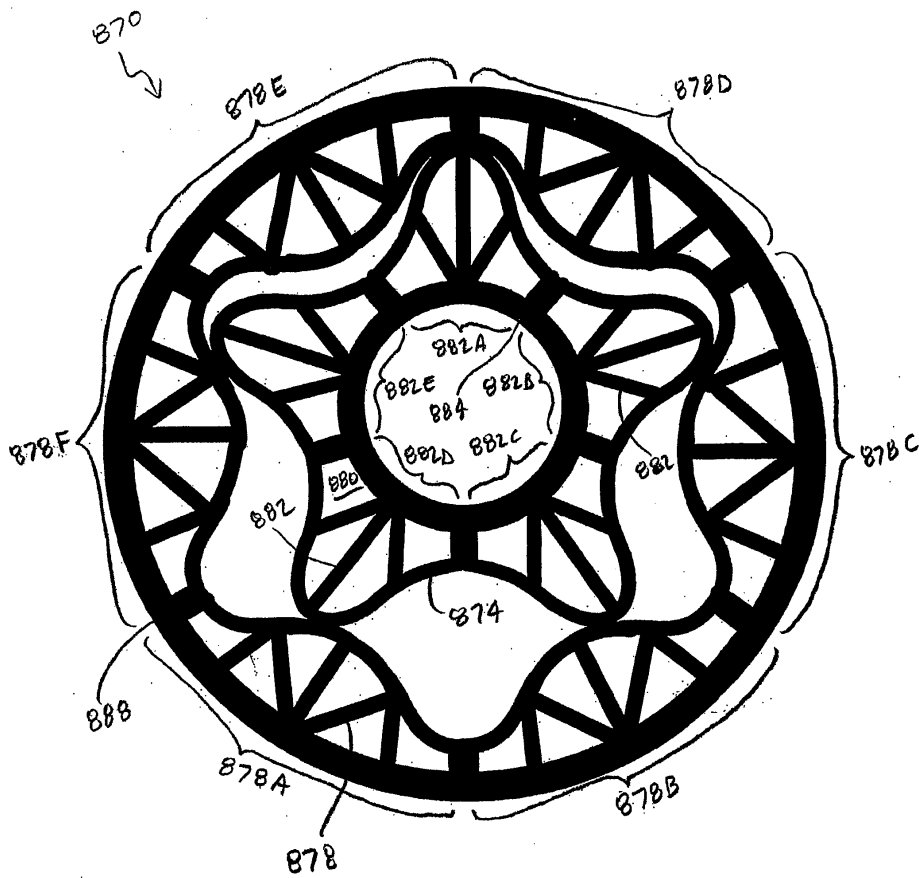
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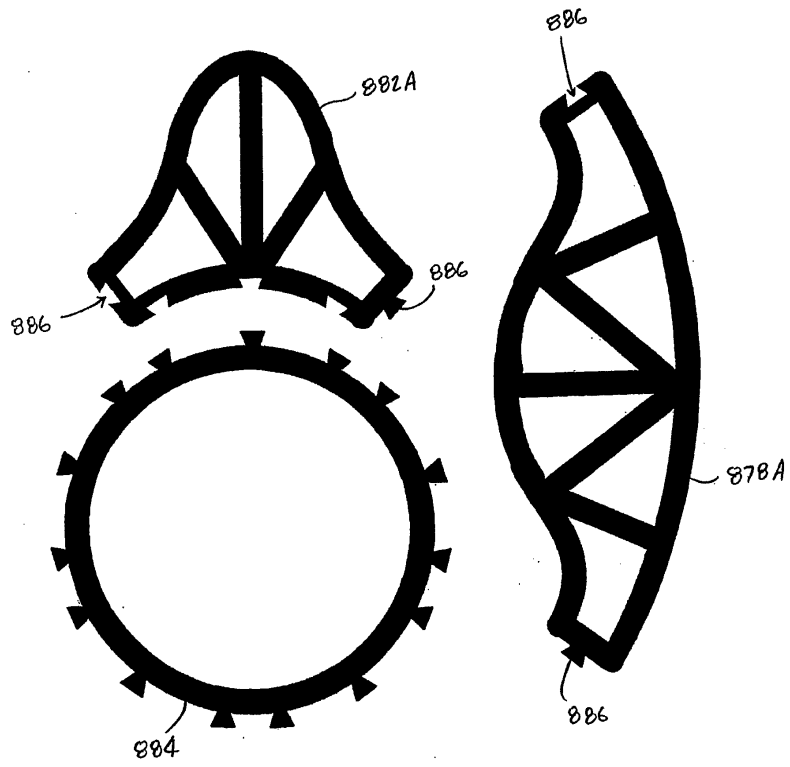
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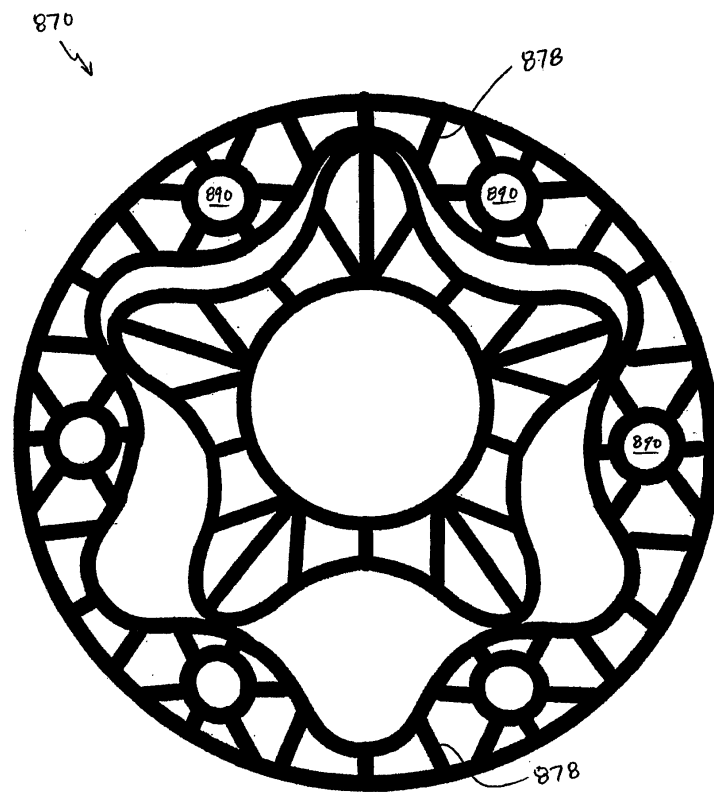
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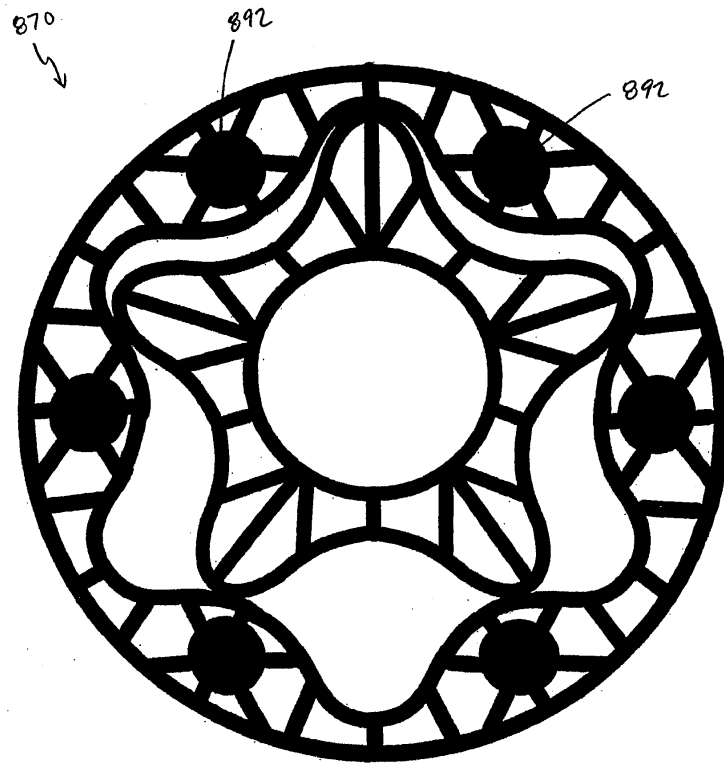
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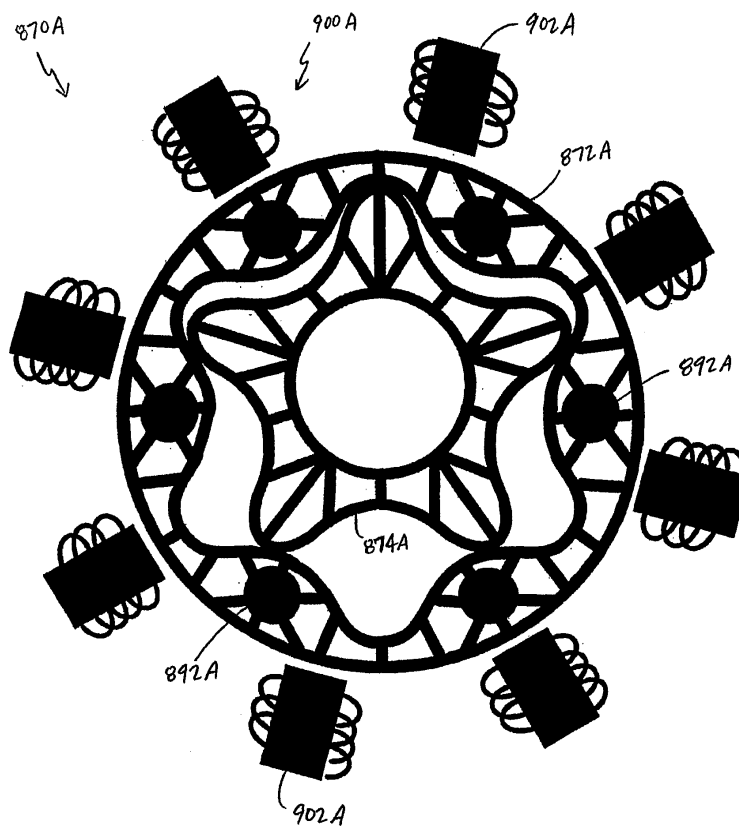
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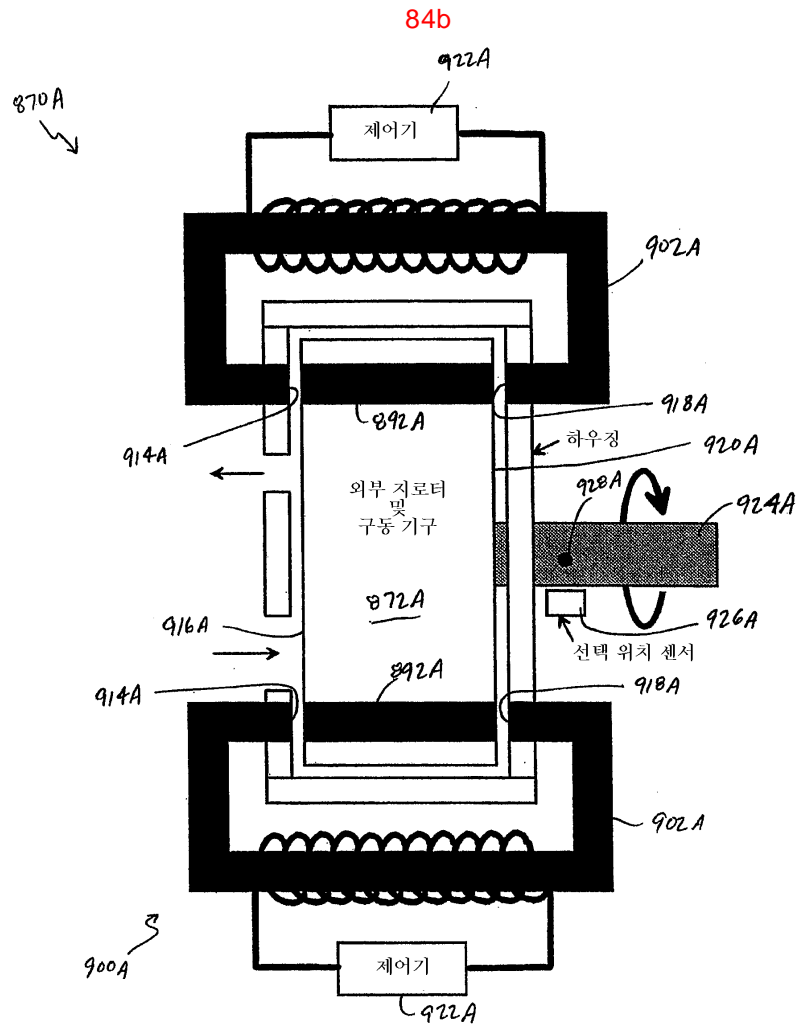


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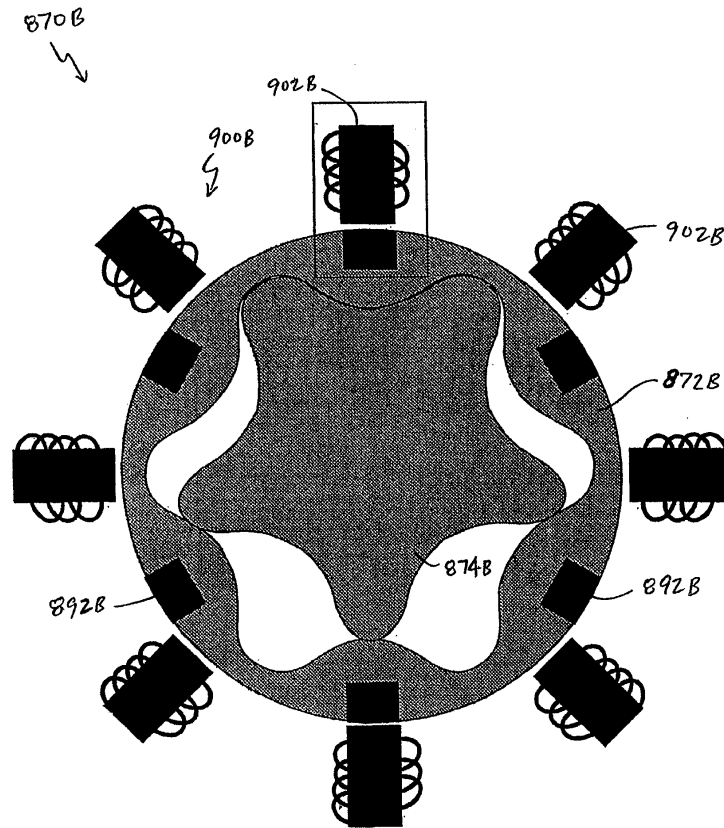


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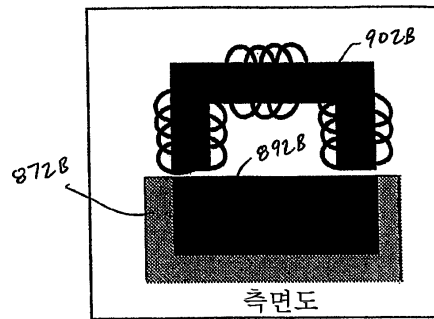




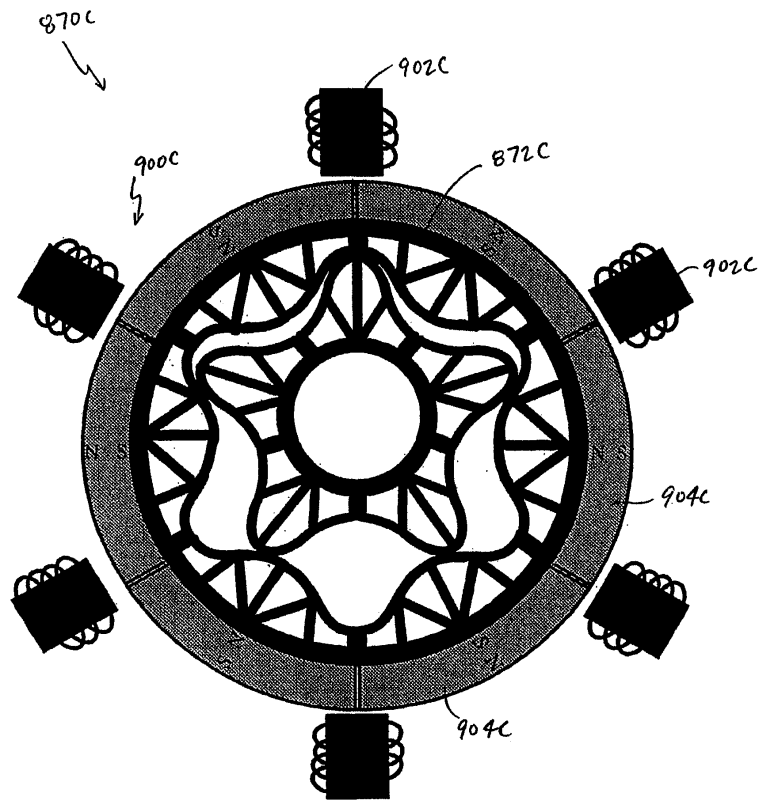
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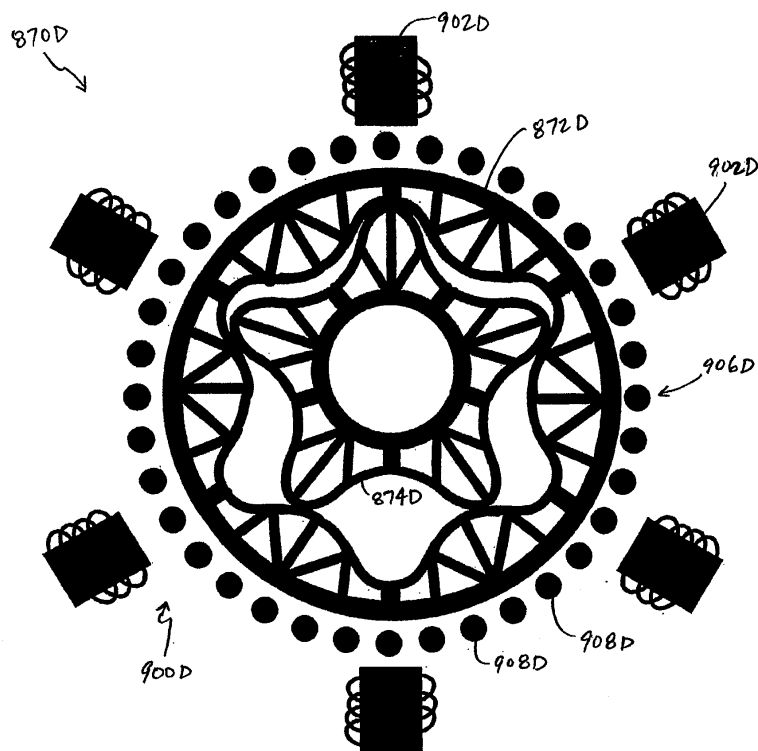
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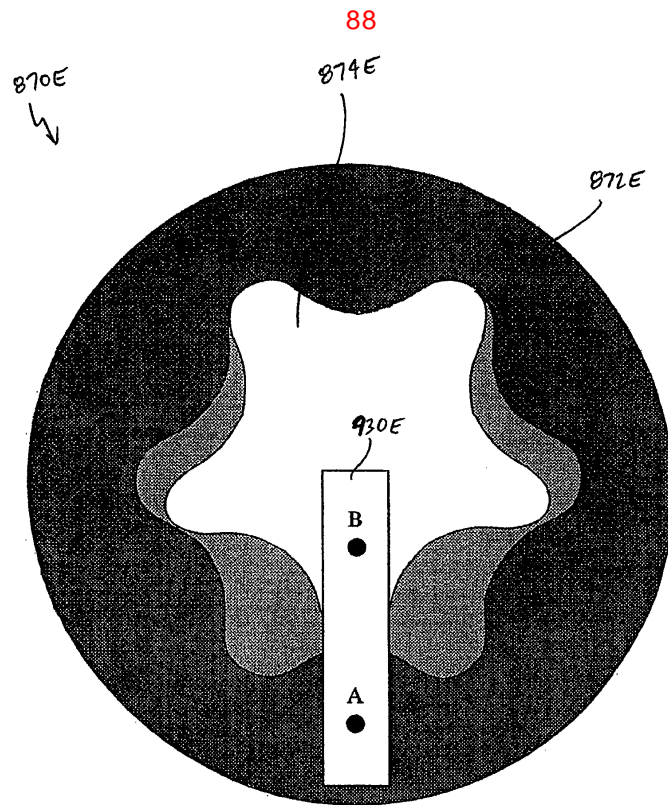
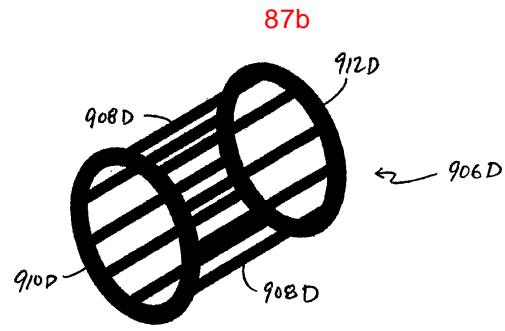


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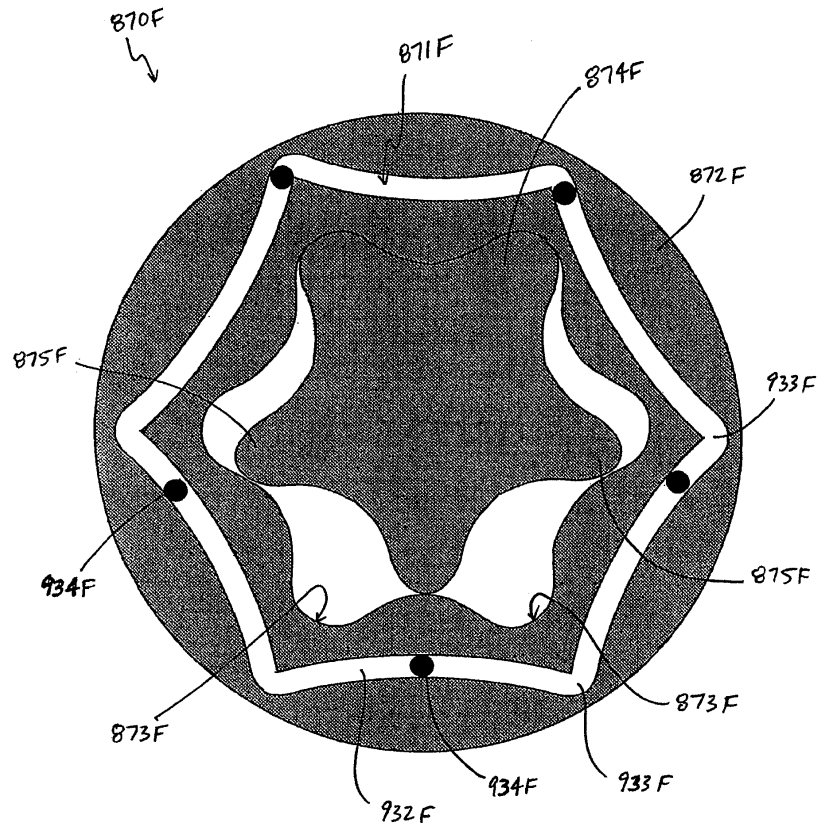


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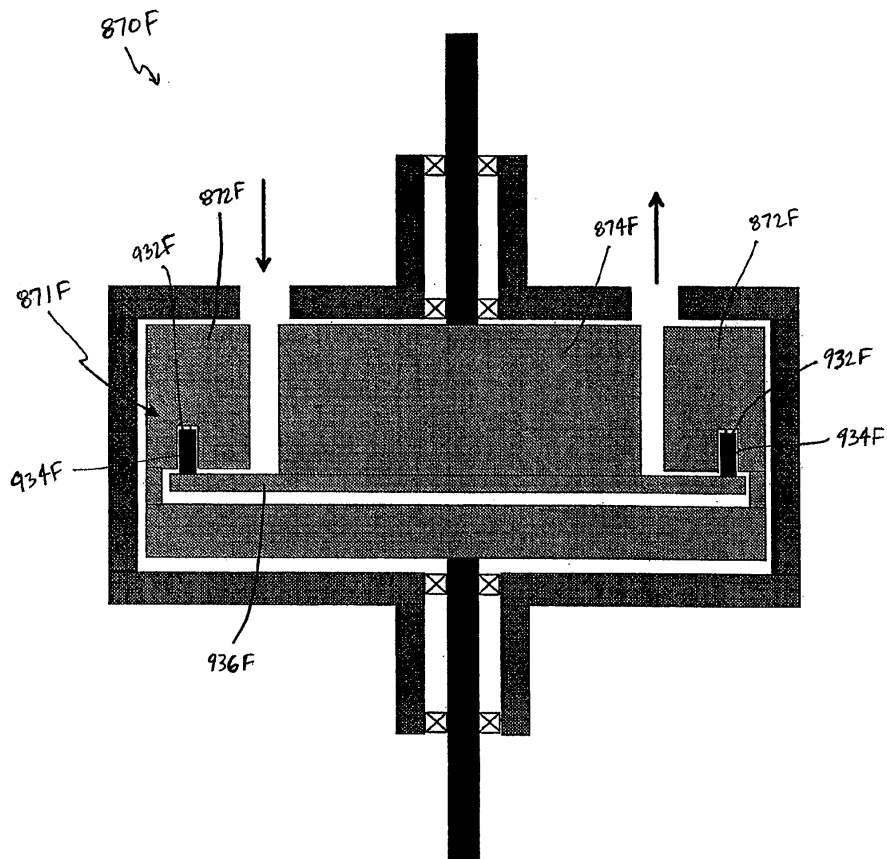




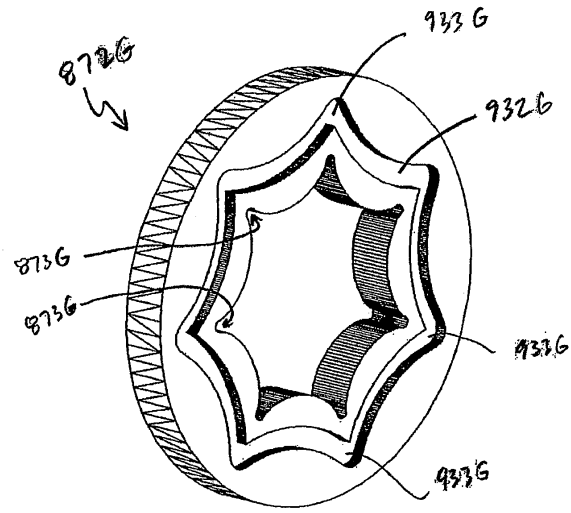
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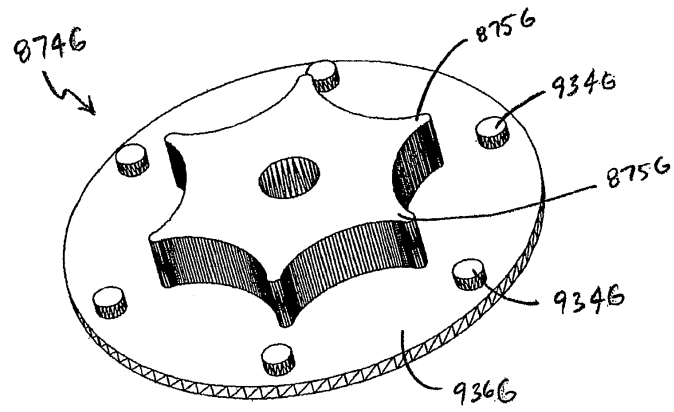
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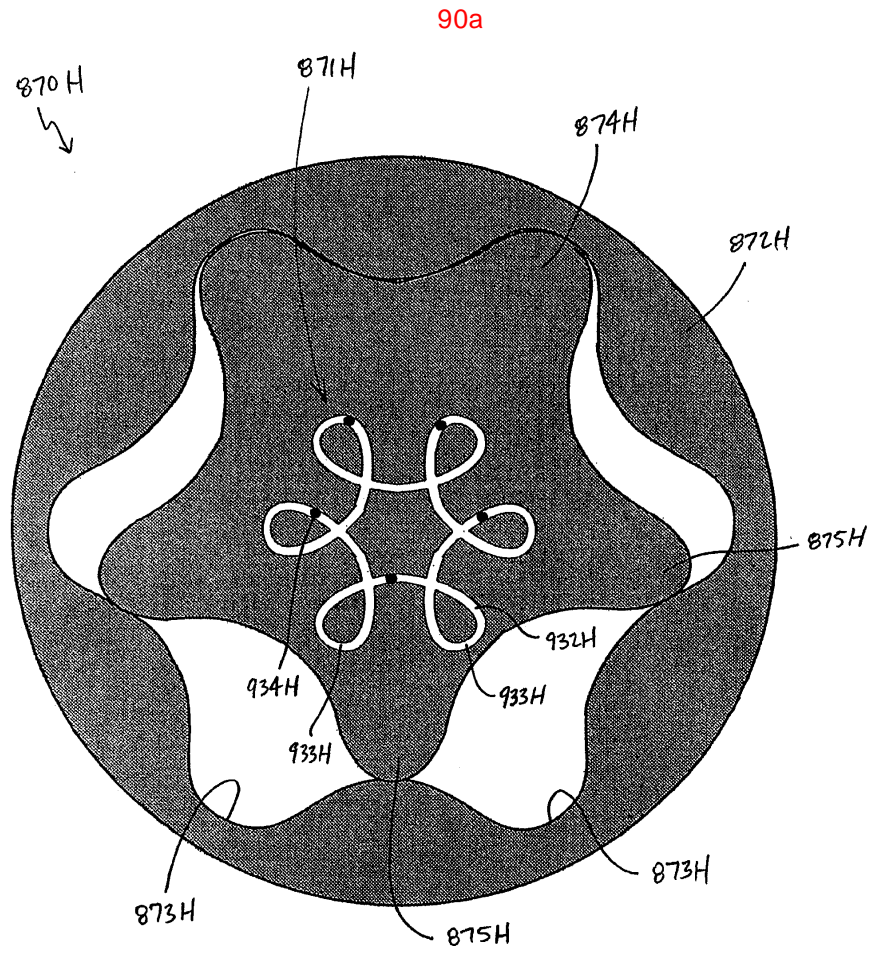


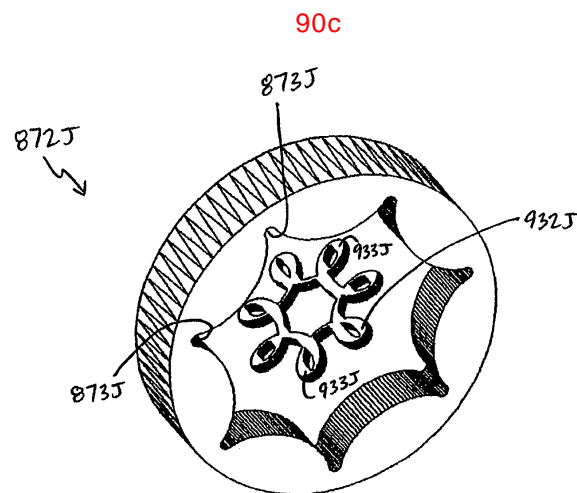
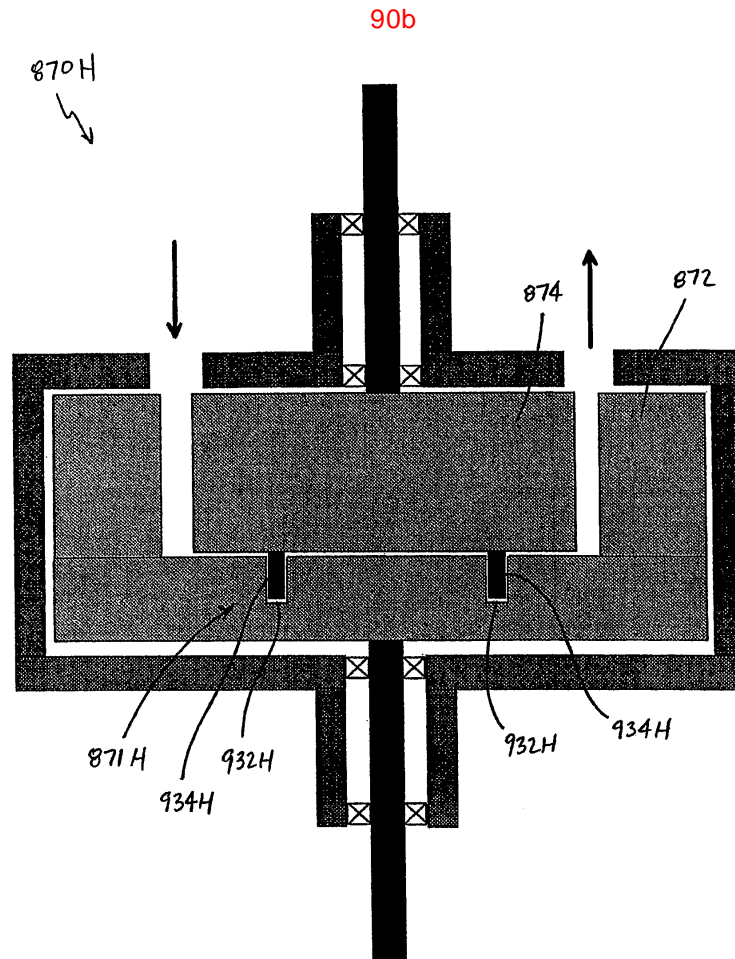
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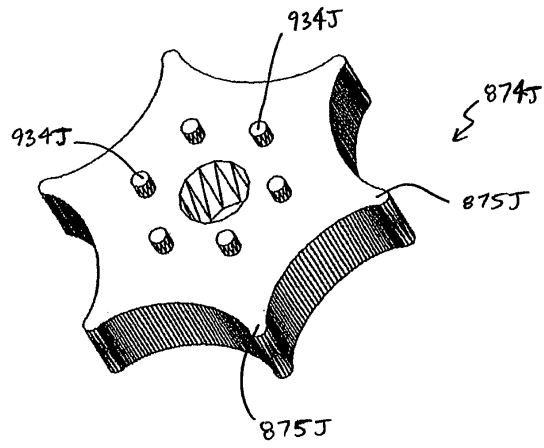
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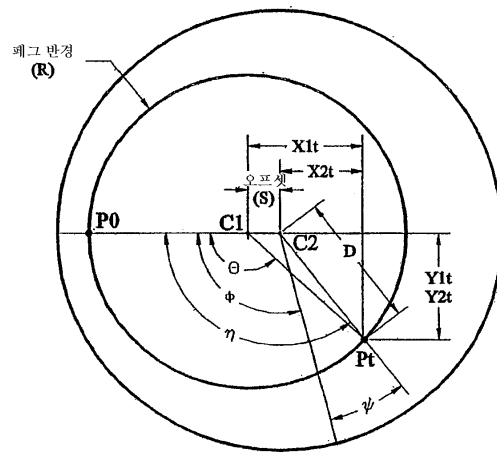




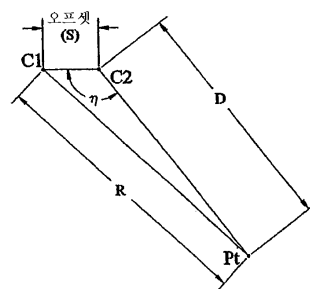
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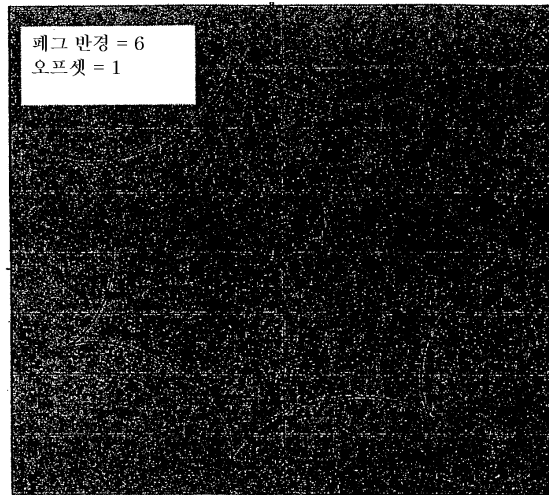


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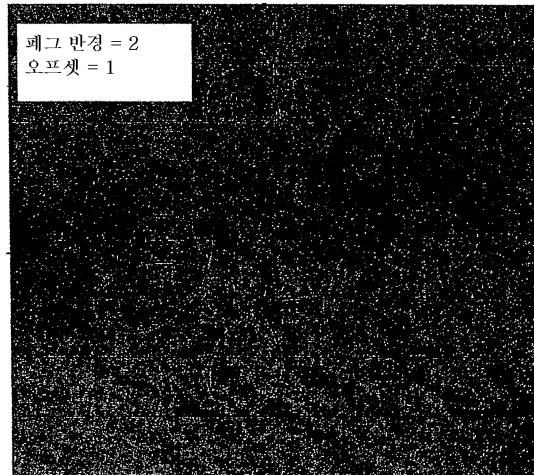
91c

트랙 중심선



91d

트랙 중심선



92

