

(54)

(16, 18, 20, 22) , 가 (96) (88)

(87, 86, 85, 84) (72, 74, 76, 78) (49, 92,

106, 135, 136, 144, 146, 158, 160, 168, 190, 216, 260) (50, 100, 108, 140, 141, 147, 148, 170, 172, 174,

192, 242, 262) 가 .

1

가 (raised)

가 . 2 가 가

가 , 가

가 (Richard P. Beldam) (F.D.Armes) 3,240,268

4,327,802 가

(short-circuit)

3,240,268 ()

1 2 , 1

2 , 2

1 , 1

2 , 1

가 가 1 1 2 2 , 가

1 2 3 3 , 2 EP-A-0 2

1 2 08 957, EP-A-0 709 640 EP-A-0 611 941 ,

1 1
 2 1 가
 3
 4 3 , 3 4-4 , 1
 5 1 (turbulizer) , 1 5-5
 6 5 6 5
 7 5
 8 1
 9 8
 10 9 10-10
 11 9 11-11
 12
 13 12
 14 , 12
 15 14
 16
 17 16
 18 , 16
 19 18
 20
 21 , 20
 22
 23 22
 24
 25 24
 26 23 22 , 23 26-26
 27 25 24 , 25 27-27
 28 25
 29
 30 29
 31 29 30 , 29 31-31
 32 29 31
 33
 34 33 , 33 34-34
 35 33 , 33 35-35
 36 33 , 33 36-36

1 2 , 가 (10) (12), (turbulizer) (14), (10)
 2), (24) (26) (12) 26) (16, 18, 20, 2
 (10)

2) (12) 1mm (10) 1 (26) (12) (26) (26) (10) (28, 30)가 (1)

(26) (10) (10) 2 (34) (36, 38)가 (10) (32)

(10) (36, 38) (12) (28, 30) (fitting) (nipple)()

(10) (short-circuit flow) (bypass flow)

(10) (10) (39) (36, 38)

1, 3 4 (14, 24) (14) (24) (14)

(14) (shim plate) (40) (40) (24) (42)

40) (波狀) (44)가 (40) 4 가 (14) (14)

(45) (12) (14) (44) 3 (50) 가

(46, 48) (44) (16) (dimple, 52)

(49) 1 (14) (16) (14) (54, 56)가

(14) (12) (28, 30) (14) (14)

(58) 가 (10) (14)가 (1) 3

(58) (14) (10) (16, 18) (18, 20)

1 5 7 (60, 62) (60, 62) (64) (staggered) (offset)

(60, 62) (14, 16, 18) (64) 가 (66)

5 7 가 (68, 69) (64) 가 (crimped)

(68, 69) (60) (62) (68)

1 (60)가 (64) (16, 18) (62)

(64) (18, 20) (62) (62)

(64) (low pressure drop direction) (60) 가

1 8 11 (16, 18, 20, 22) 가 8 (16, 20)

9 (10) (18, 22) 9 8 8

(water side) (10)가 9 (oil side) 8

(16) 22) (70) (70) 8

1 (72, 74) 2 (76, 78)

(70) 8 9 (72

2 (76, 78) (80) (82) (80, 82) (84,

78) (88)(9) 1 (72, 74) (80)

85, 86, 87)가 (88) 9 (72, 74, 76, 78)

(88)가 2 (76, 78) (82) (70)

(16) 22) 1 (72, 74) (82)

(70) (90)

1 , (88) (88) (70) 1
(88)가 (16, 18)가 , , (back-to-back)
1 가 (16, 18)가 2 (76, 78)
(82)가 (85, 84) (84, 85) , , (90)가
(90) 1 (90)가
(18, 20)가 1 (72, 74) (82)가
(87, 86) (86, 87) , ,
1 가 3 가
8 3 , T (92)가 (70) 3 가 (90)
(96) , T (94) (76, 78) , T (90)
(92) 2 (76, 78) , T
(92) 9 (80) (88)가 8 가 T
(98) 가 T (100) . T (92) (84, 85) 9 (98)
T (100) . T (100) (76, 78) (82)
(10)
9 , (60) (102) . 8 , (104) (62)
(62) 1 5 7
(68, 69) T (92) (96) (68, 69) , 8 , (105)
(76, 78) (76, 78) (80)
(92) (16 22) 1 (72, 74)
9 (106) 8 (108) (106) (8)
6, 87) (72, 74) , (106) (108) 8 (76, 78)
(82) , T (92)
(90) (72, 74) (82) , 가 (8) , U (92), (9)
62) , (68, 69), (90) U 가 (8) , T (92), (9)
), (106) (88) U 가
1 , (26) (24) (24) (10)가
(24) (24) 가 (26) (44) (44)가 (40) (22)
(8) (24) (22)가 (26) (54, 56) , (22)
(26) (36, 38) 가 (54, 56) (72, 74)
(22) (22) (84, 85) 가
(24) (44) , (24) (48)가 (54, 56)
(22) (108) (72, 74) 가 (72, 74)
. 가 가 U (22) , (20) 가
, (18) , 1 가
(10) , 가 (10) (12) .
(16) (14) (14) (14) (14) (42)
(14) (90) (12) (14) (28, 30)
(14) (14) (54, 56) (16)
(12) (30) (48) (14) (108)
U (14) (14) (14) (44)
(16, 18) (16) (28)
(84 85) (84 85) (18 20) U
(12) (84 85) (84 85) 가
2) (28 30) (56) 가 U (1)

1 가 (60 62) (26) (36 38) U , (20 22)
 가 24) (60 62) (14 24) (14, (60
 62) (70) (12 26)가 (16
 22) 8 9 (70) (70) (112) (70)
) (114) 가 (110)가 (70) 가 (98
 (112) , (114) 가
 (112) (116) (70) 가 (118)
 12 15 , (118 119) (118)
 (120 122) (119) (124 126) (120, 122)
 (120, 122, 124, 126) 12 13 (124, 126) 12 , (118)
 14 15 (120, 122)가 (128) , 14 , (119)
 (124, 126) (129) 가 8 9 , 1 2
 (120 126) , 가 8 9 , 1 2
 , (72, 74 76, 78) (130) (132) (133)
 (120)가 (122) (132, 133) (124)가 (126)
 12 15 , 1
 12 8 9 , 12 , 8
 9 , 9 8 , 14
 12 15 가 (13 138) 가 (134 138) 2 (76, 78) (13
 4, 135, 136, 137, 138) (84 85) 가 (98) (139, 140, 141, 142, 143)(14) (139
 143) (76 78) (134 138) (120 126)가 , (139
 1 (12 26) ()가 ,
 16 19 , 12
 15 (144 146)가 2 (76, 78) (84, 85) (98)
 147, 148) (144, 146) (76 78) (86 87) (,
 가 20 21 , (150, 152, 154, 156) (150, 152) 21
 가 20 (158) (154, 156) (,
 150 156) 1 11 가 20 21 11 (,
 20 21 , 1 (76, 78) (88) 1 (74, 72)
 2 (72 78) , (74 76)
 (158 160) (86 87)
 가 20 가 (158, 160) (76, 78)
 (88) (76, 78), (158, 160) (88)
 (74, 76 72, 78) (158, 160)가 , ,
 (158, 160) , ,

(158, 160) (88) (76, 78) (82)

(162, 164) (70)

1 (88) (90) (162, 164)

2 (162) (162, 164)

(20) (162, 164)

(158, 160) 1 20

(166) (60)가

21 (154, 156) (168)가

(72, 74) 1 (168) (84, 85)

(168)

(158, 160) (170, 172) (170, 172)

(168) 가 (174)

22, 23 26

가 22 (176) 23 (178)

(176, 178) 가 22 (178)

3 (178) (179)가

176)가 (26) (178)가 (176) (176)

가 가 (176, 178) 가 22 23

(176, 178) (72, 74) 1 (176, 178)

(180) (180) (90)

(182) 12 19 (184) (182) (184) (88)

188) (70) (186) (186)

(186, 188)

1 (72, 74)가 (180) (split flow)

(86) (180) (87) (84 2

(76, 78) (85)

(180) U

(190)(23) (74) 1 (76, 78)

(98) (190) (84, 85) (192)

22 (190)

(192) (86, 87)

24, 25 27 22 23 (194, 196)

(194, 196) , 1 (72, 74)가

(86, 87) (180)

(198) (72, 74) (76, 78) (184)

(88) (198) (86, 87) (198)

25 (200)

(198) 가 (202 204)가

(200) (202, 204) (72, 74)

(90) (72, 74) (82) (76, 78) (80)

(206, 208) (202, 204) 24 27 (80) (76,

78) (82) (86, 87) (76, 78) (72, 74)

, 74) (80) 24 25 , 1 (198) 1 (72)

(200) (80) 2 (76, 78) (76, 78) (82)

(72, 74) (82) (76, 78) (80) 1

28 24 25 (194, 196) (206) (206

) (84, 85) (202, 204) (206

(208, 210)

1
22 23

29 32 , 가 ,

29 1 32 (16, 20) (212) , 30 1 (18, 22) (214) (212) , 2 (76, 78) U (216) (76, 78) 2 (76, 78) (218) U (216)

24, 226, 228, 230, 232) (224, 226, 228, 230, 232) (220, 222) (2) (218) (220, 222) (98) (234, 236, 238, 240)

(224 240)가 (98) (108) (234) (218) (241) (90) (241) (stagnation) (241) 가 , U (216) 30 (242) (242) (212, 214)

244, 246) (76, 78) , 30 (60) (218)가 (234, 236, 238, 240) 가

33 36 , (250) (250) (76, 78) (252) (254)(35)가 (252) (250)가 (90) (86, 87) (256) (254) (72, 74) (84, 85) (88) 1 (258) (258) (250)가 (88) (84, 85) (258) (84, 85) 1 (256) (258) (260)가 (258) (250) (262) (252) 가 (264) (262) (260)가 (260)가 (72, 74) (258) (258) (260)가 (260) (250) (258)

33 가 1 (256) (104) 36 (26) 6) (256) (252) 가 (84, 85) 2 (266) (86, 87) 1 (256) 36 (256) , 가 (84, 85) 2 (266) (84, 85) 1 가 (84 87) 가 가

가 . , 가 .

(57)

1.
 - 1(18) 2(20) (18, 20) (70), (70) 1 (7
 - 6, 78) (82) , (72, 74), (70) 2 (87, 86, 85, 84) (7
 - (70) (18, 20) 2 (76, 78) (82) (80), (87, 86, 85, 84)
 - (72, 74) 1 (72, 74) (82) (80)
 - (76, 78) (82) (82) (70)
 - (72, 74) (82)
 - (90) ,
 - (88)가 (88) (90)가 (90) 1(18) 2(20) 2 (76, 78)
 - (87, 86, 85, 84)가 , 1 (72, 74) 2 (76, 78)
 - 3 (16) 3 (16) (18) (70) 2
 - 1(18) 2(20) (70) (92, 106) (100, 108) , (92, 106)
 - (short-circuit flow) (72, 74, 76, 78)
 - (80) (100, 108)
 - (72, 74, 76, 78)
2.
 - 1
 - 1(18) 2(20) (70) (62)
3.
 - 1
 - (70) (132) (133) , (132) (133)
 - (72, 74, 76, 78) (87, 86, 85, 84)
4.
 - 1
 - (70) (88) (90)
 - (162, 164) , (162, 164) 1(18) 2(20)
5.
 - 1
 - (70) (216, 218, 220, 222, 224, 226, 228, 2
 - 30, 232, 234, 236, 238, 240) , (87, 86, 85, 84) (72, 74, 76, 78)
6.
 - 1
 - (88) 1(72, 74) 2(76, 78)
7.
 - 1
 - (106) 1 (72, 74) , (106) (
 - 88)
8.
 - 1
 - (92) 2 (76, 78) , (92) (9
 - 0)
9.
 - 2
 - 1(18) 2(20) (88)가 , (62) 1
- 10.

- 2
1(18) , 2(20) (90)가 , (62) 1
11.
- 1
1(18) , 2(20) (90)가 ,
(18, 20) 1 (72, 74) (82)가 1(18) 2(20)
가 , (72, 74, 76, 78) 가
12.
- 11
3(16) , 1(18) 2(20) 3(16) (88)
(82) (88) , 3(20) 2 (76, 78) (82)
(87, 86) 가 2 (76, 78)
13.
- 12
(16, 18, 20) 1 2 (62)가
14.
- 6
(16, 18, 20) , 1(72, 74) 2(76, 78)
2(76, 78)
15.
- 14
(96) 2 T (76, 78) , T (94) (16, 18, 20) T
16.
- 6
(16, 18, 20) , (72, 74, 76, 78)가 (16, 18,
20) (134, 135, 136, 137, 138) , ()
134, 135, 136, 137, 138) 2 (76, 78)
17.
- 6
(150, 152, 154, 156) , 1 (72, 74)
(88) , 2 (76, 78)
, 76)(72, 78) 1 (72, 74) , (72
0) (74, 76)(72, 78) , (158, 16
18.
- 17
(70) (88) (90)
(162, 164) , (162, 164) 1(18) 2(20)
19.
- 6
(176, 178, 194, 196) , 1 (72, 74) 가
(180) , 2 (76, 78) 가
, (190, 198)가 2 (76, 78)
20.
- 19
(198) (72, 74)(76, 78)
21.
- 20
,

10) (198) 2 (76, 78) (208, 2)

22.

5 ,

16) 2 1 , 2 (76, 78) (80) (2)

23.

22 ,

2 (216) 2 (218) , U

2 (76, 78) (80)

24.

23 ,

U (98) (224, 226, 228, 230, 232)

(220, 220)

25.

23 ,

(218) (234, 236, 238, 240)

26.

24 ,

(234, 236, 238, 240) (90)

가 , (234, 236, 238, 240) (98)

27.

25 ,

(234, 236, 238, 240) (90)

가 , (234, 236, 238, 240) (98)

28.

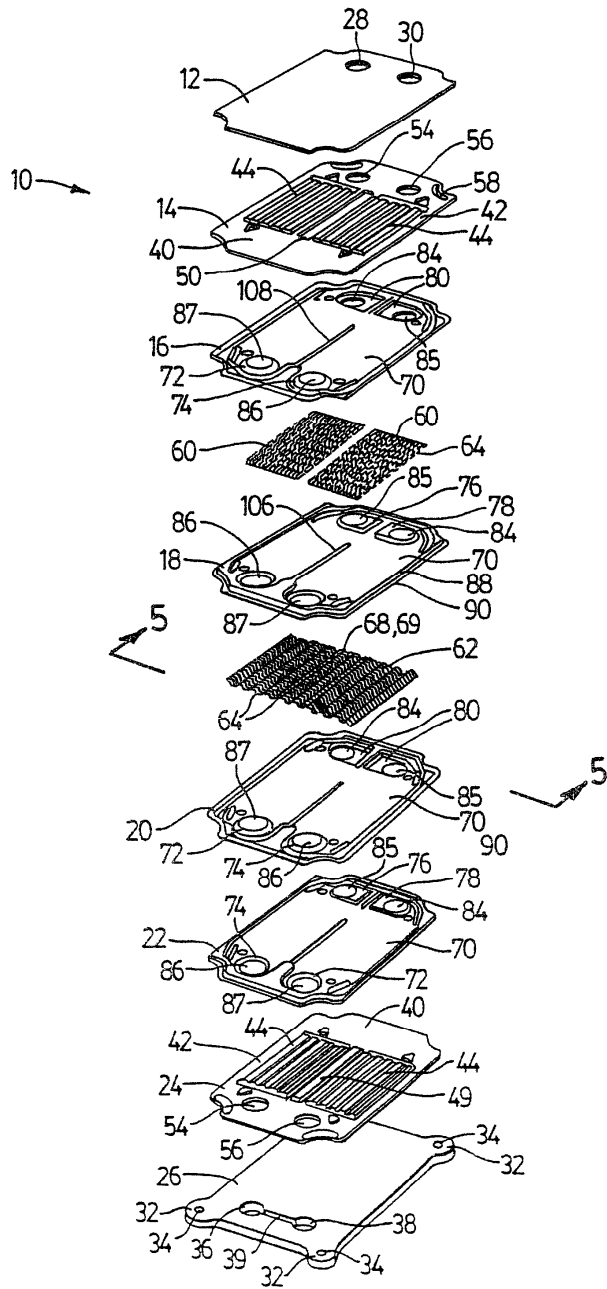
1 ,

1(18), 2(20) 3(16) (12)(26)

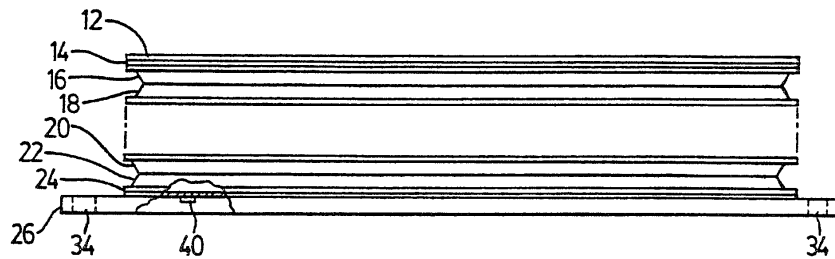
(12, 26) (84, 85, 86, 87) (28, 30, 36, 38)

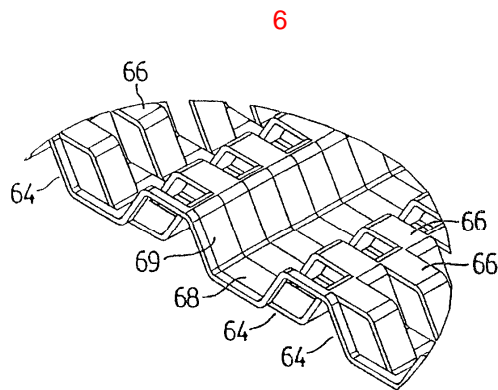
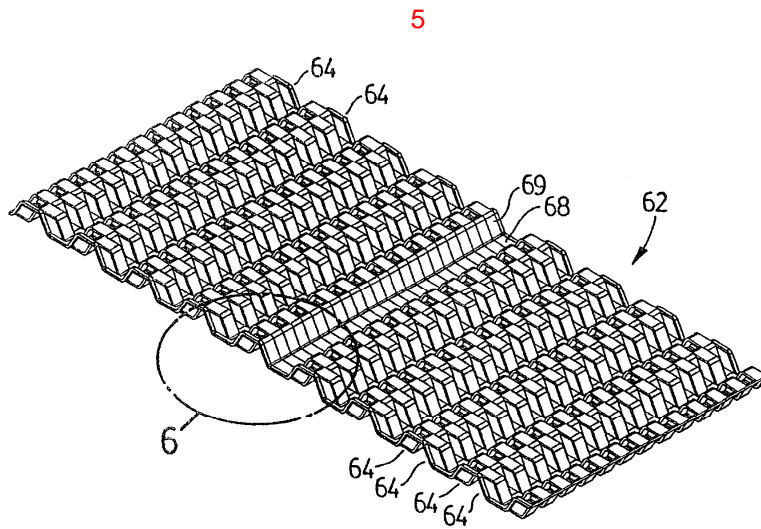
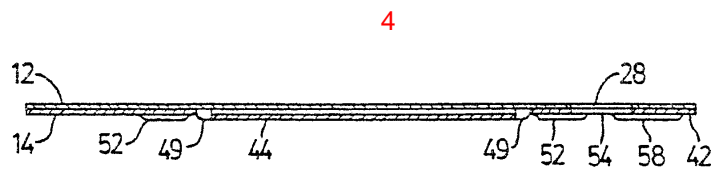
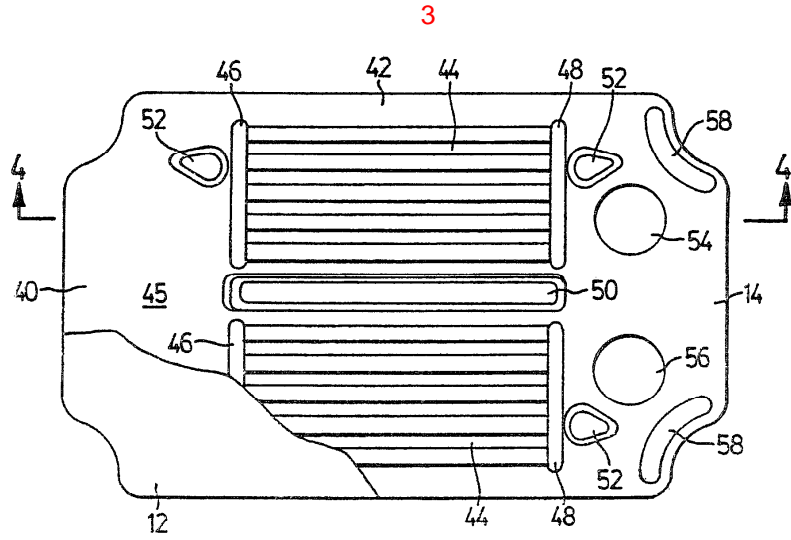
) 가 , (26) (36, 38) (39)

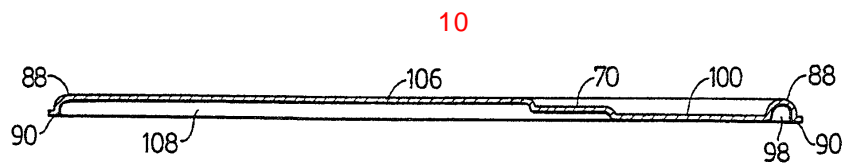
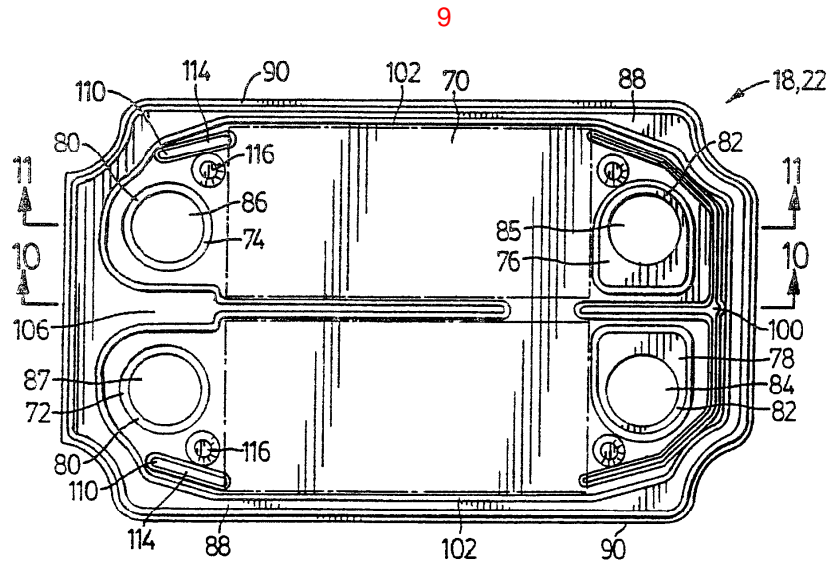
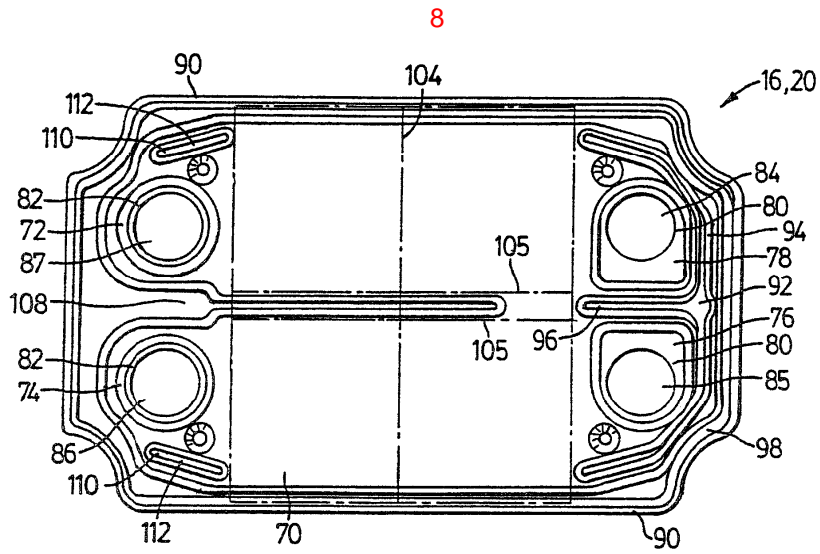
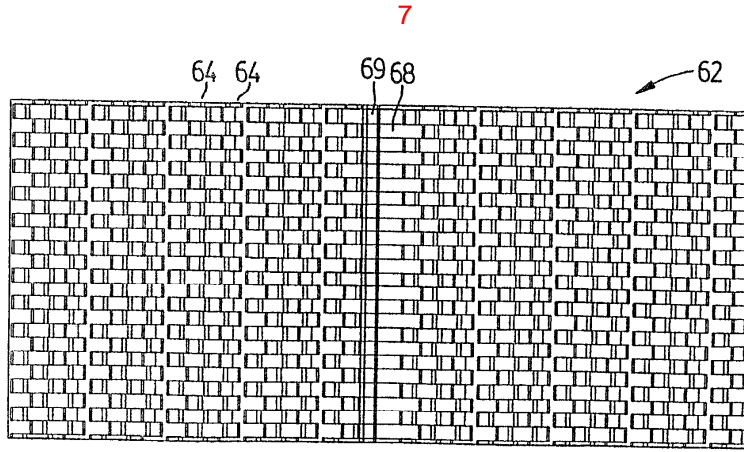
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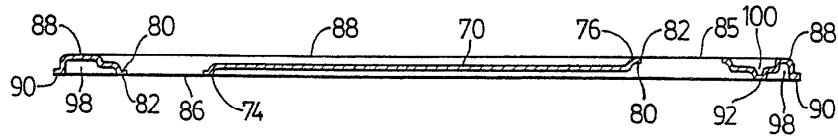
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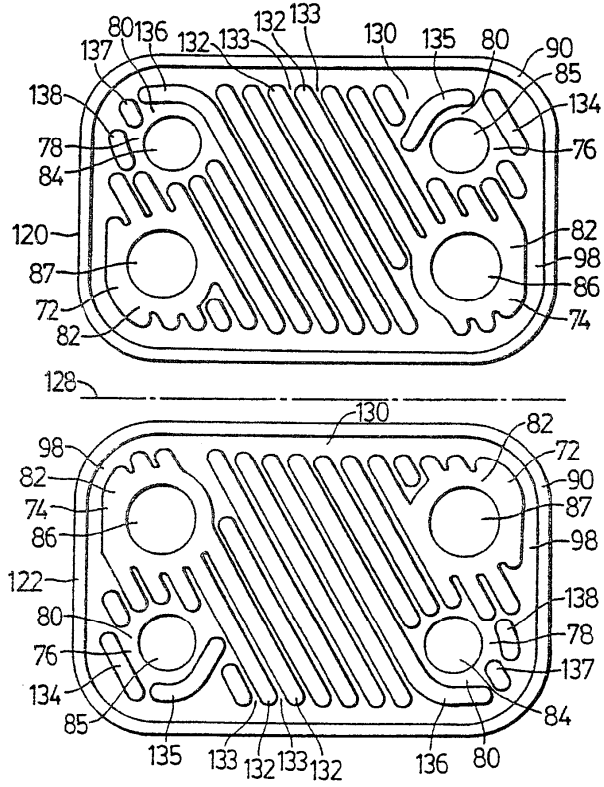




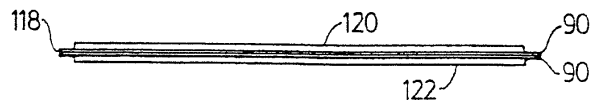
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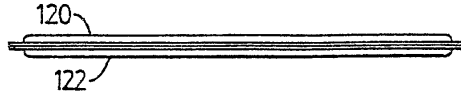
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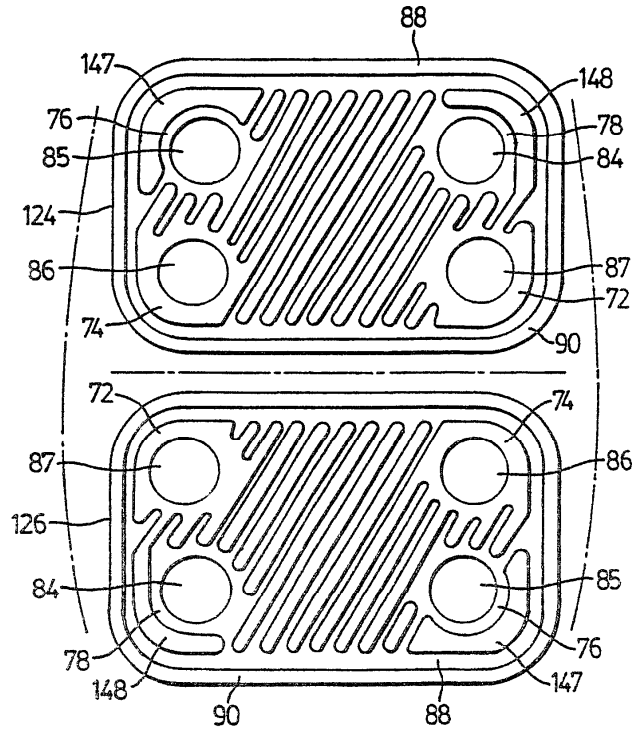
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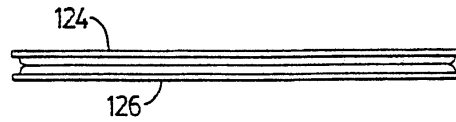
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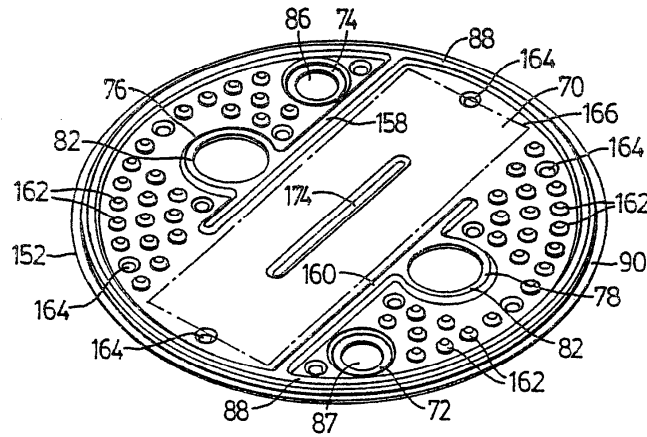
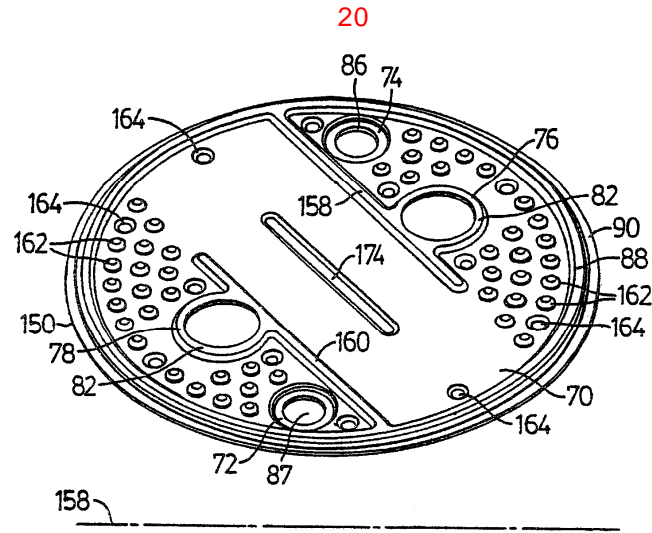


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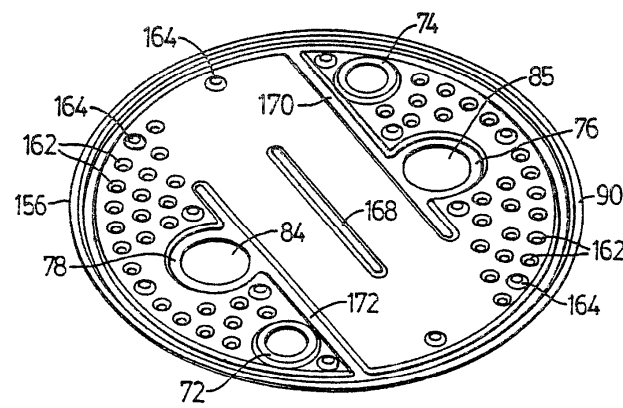
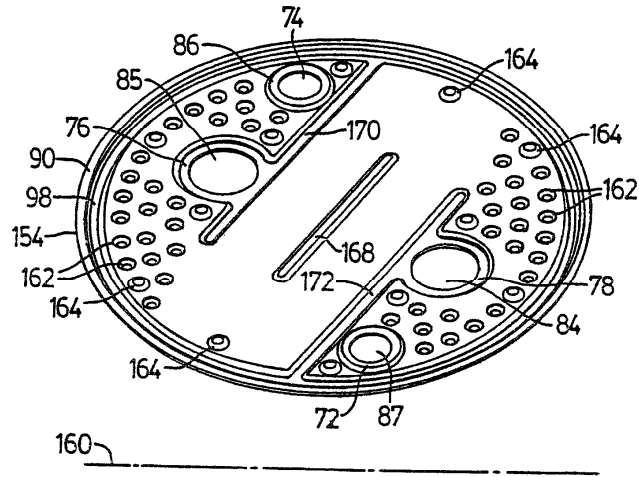


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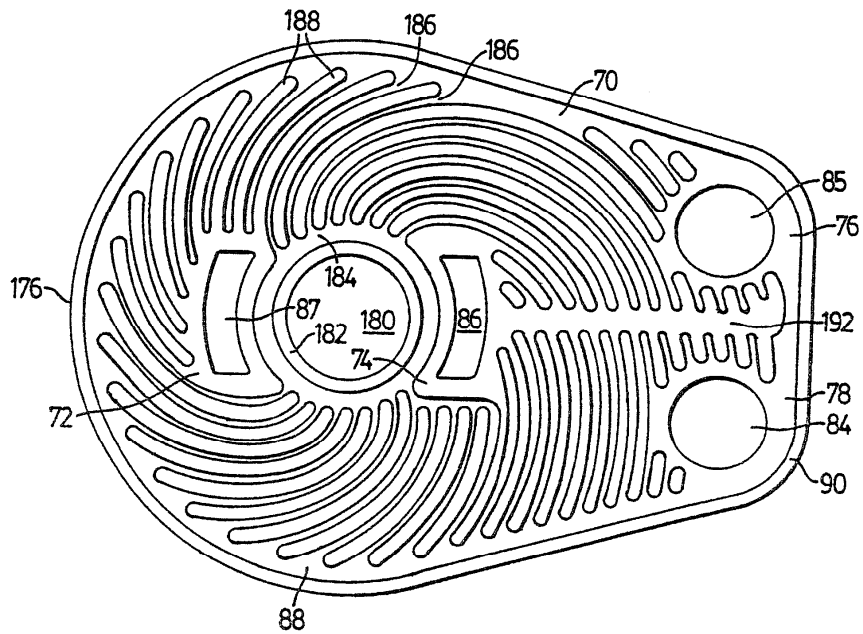




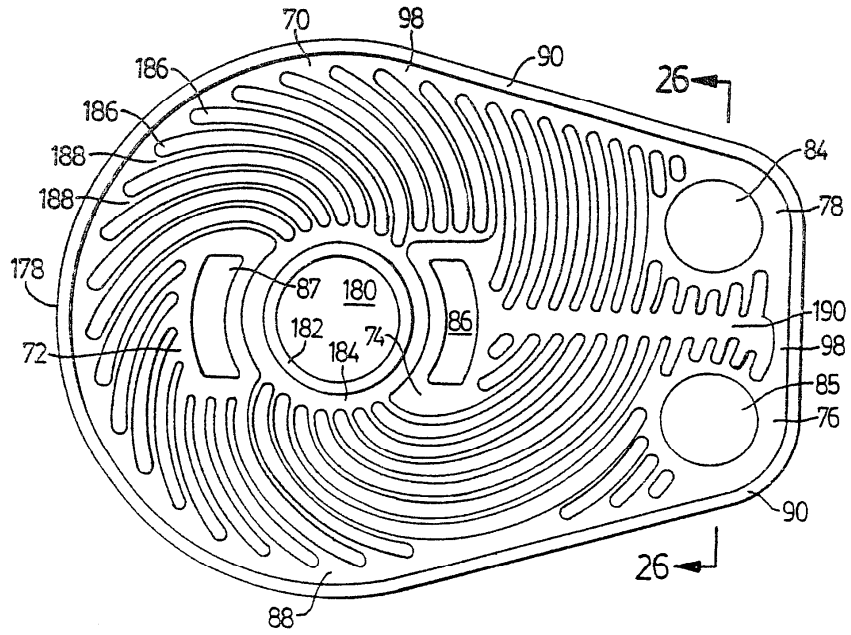
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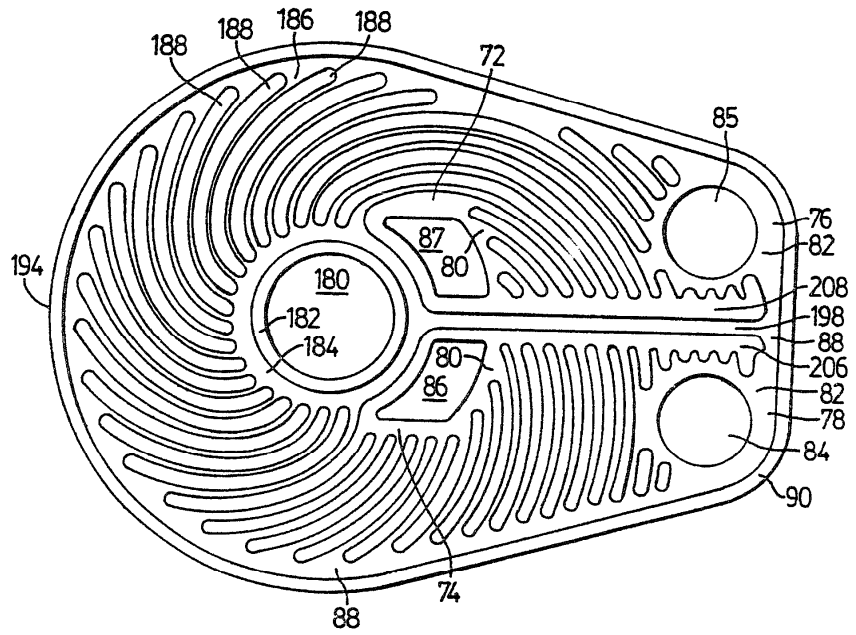
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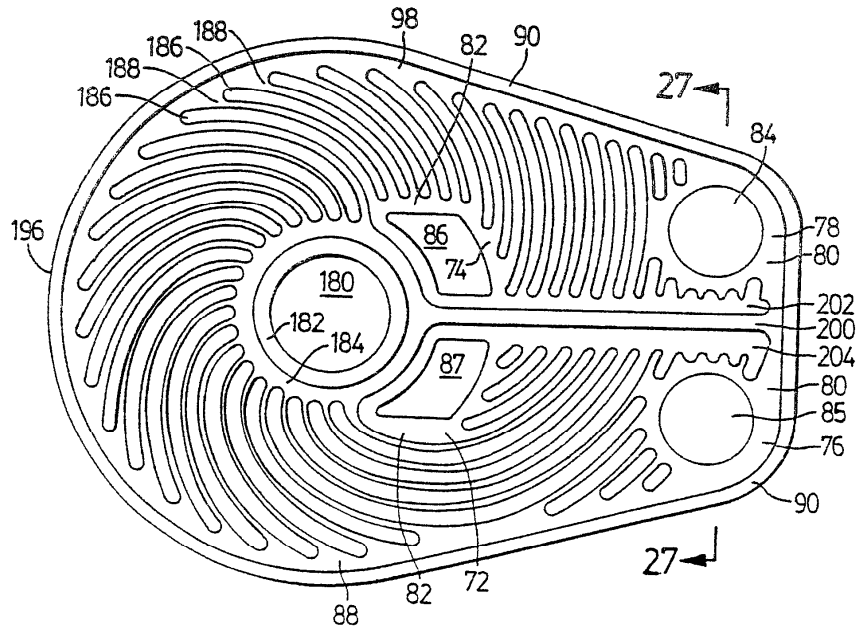
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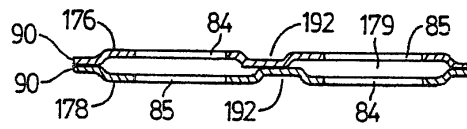
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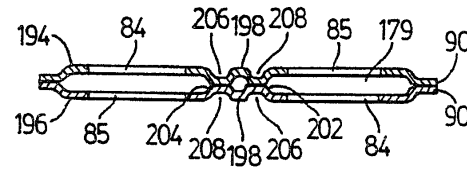
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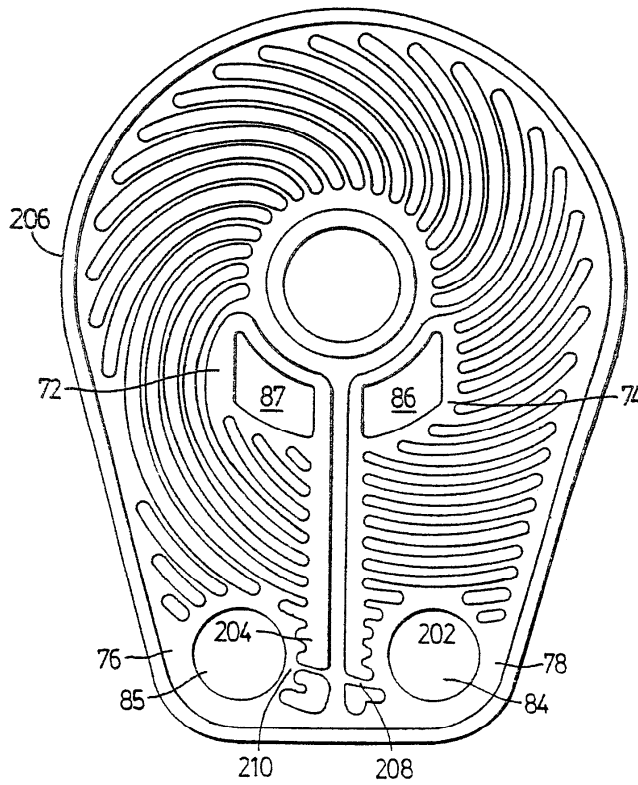
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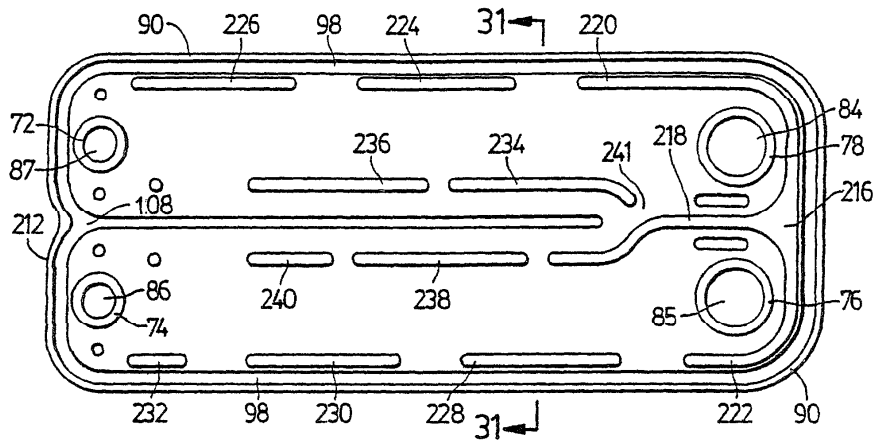
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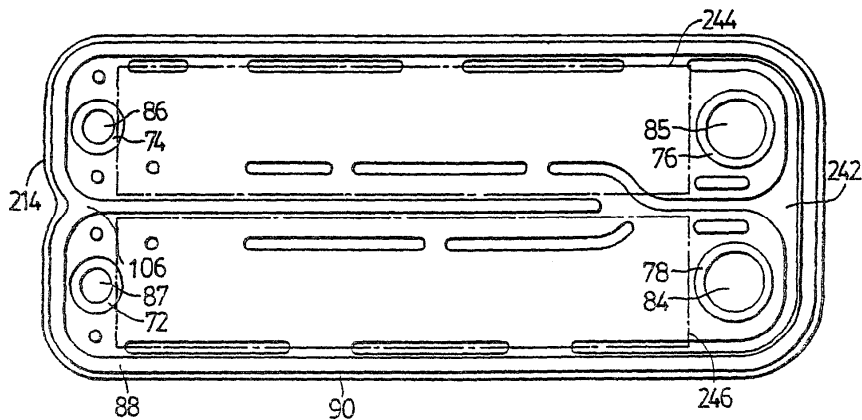
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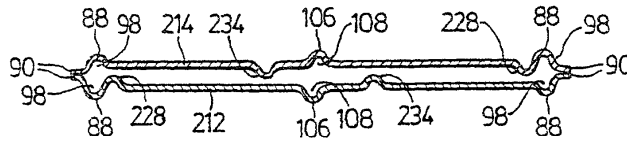
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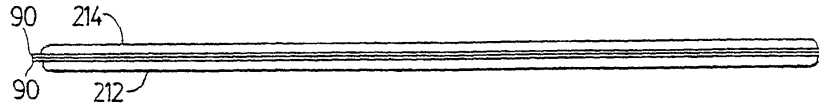
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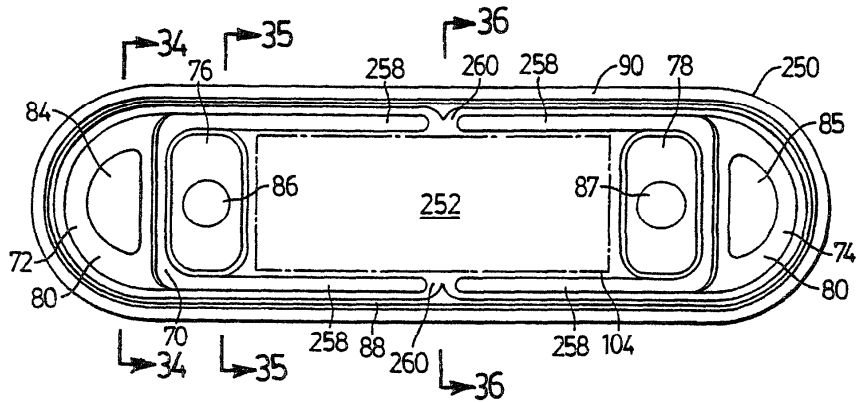
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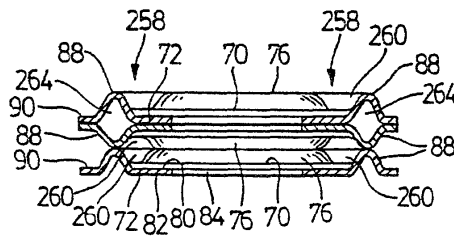
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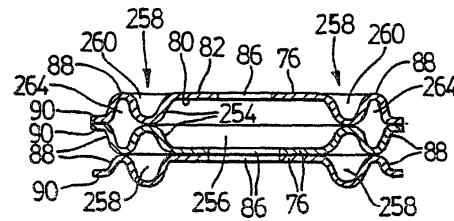
33



34



35



36

