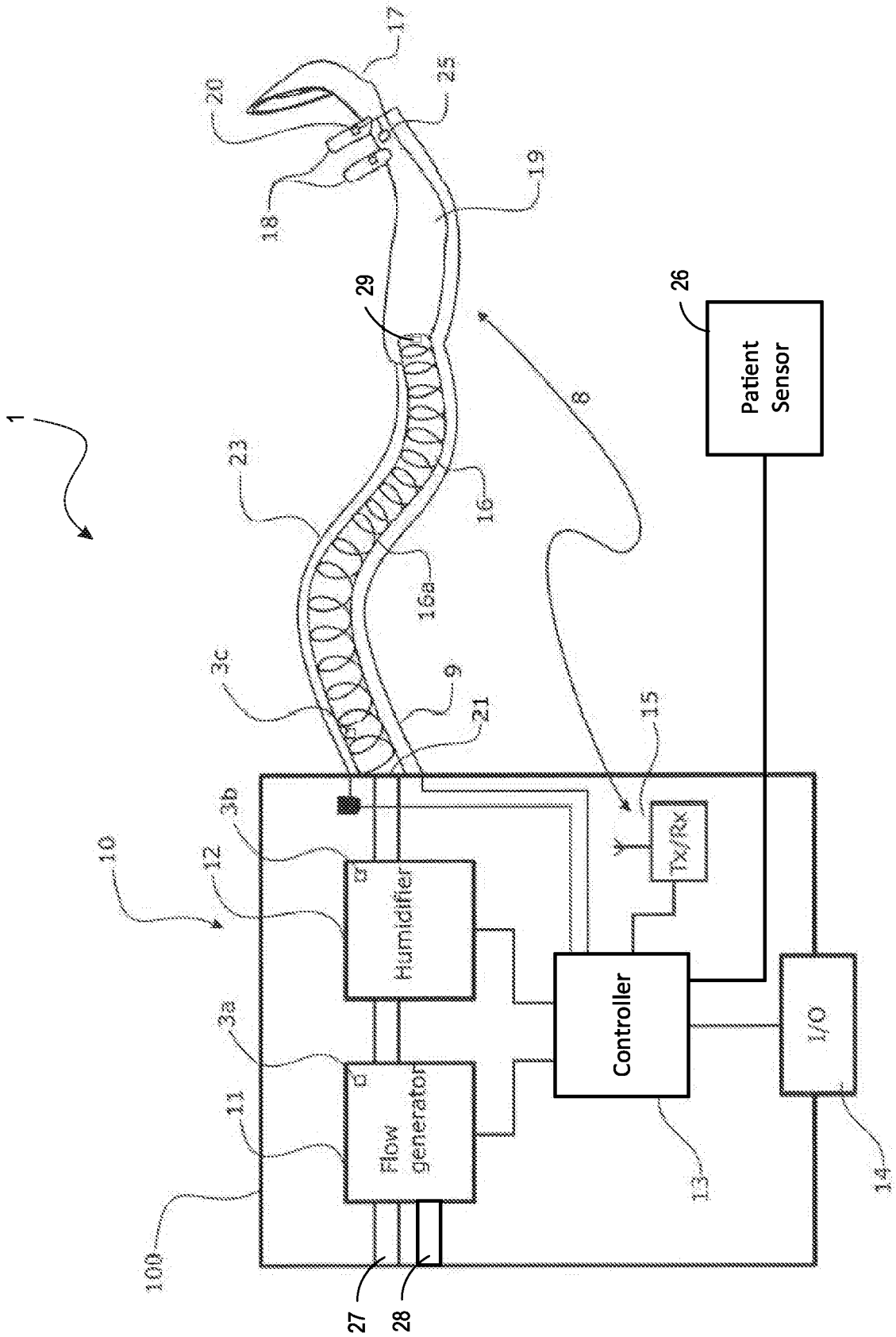

1
17
20
25
18
19
29
26
Patient Sensor
8
23
16
16a
3c
9
21
15
10
12
3b
Humidifier
Tx/Rx
3a
11
Flow generator
Controller
I/O
13
14
100
27
28

Figure 1A

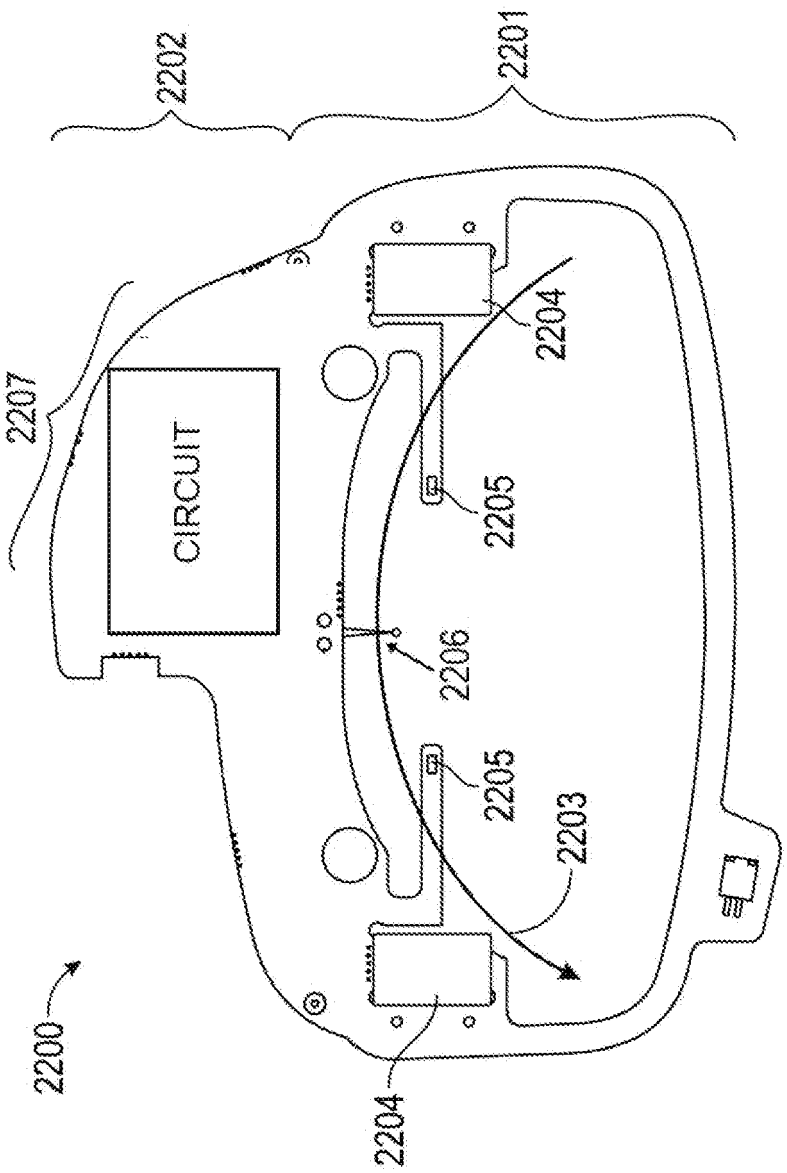


Figure 1B

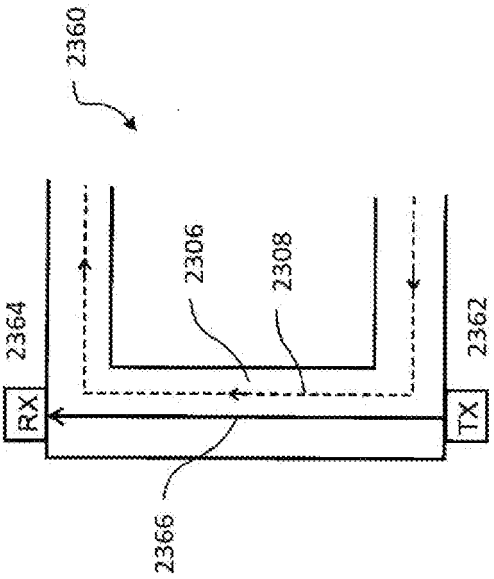


Figure 1E

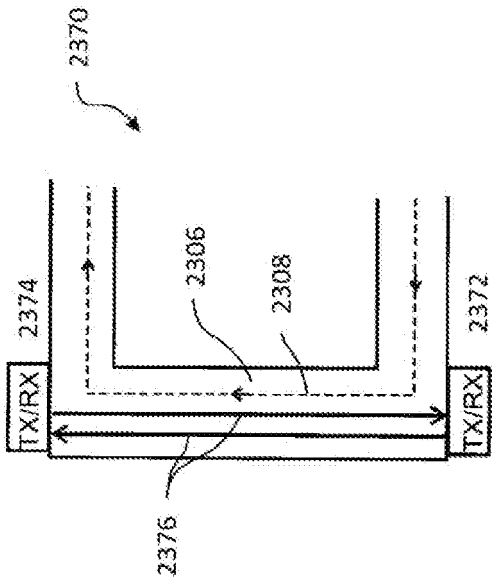


Figure 1F

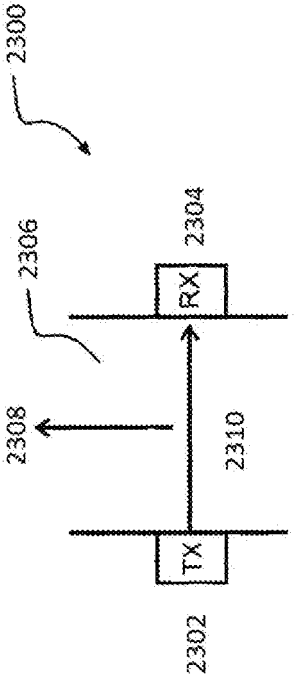


Figure 1C

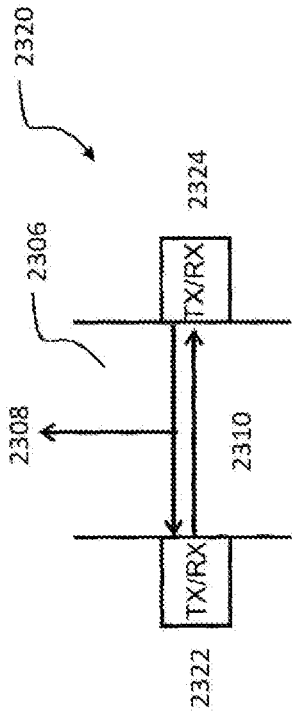


Figure 1D

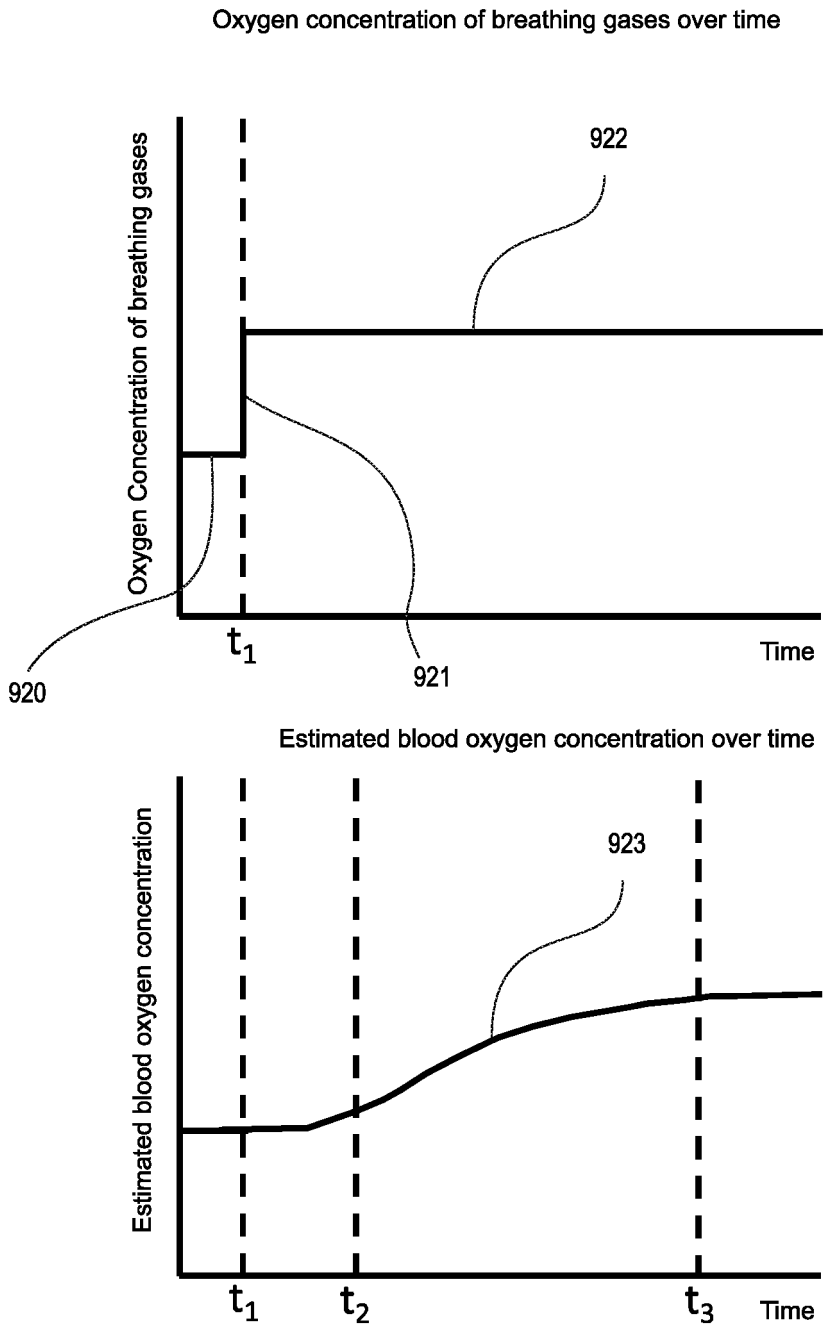

Oxygen concentration of breathing gases over time
Oxygen Concentration of breathing gases
922
920
921
t_1
Time
Estimated blood oxygen concentration over time
Estimated blood oxygen concentration
923
t_1
t_2
t_3
Time

Figure 2A

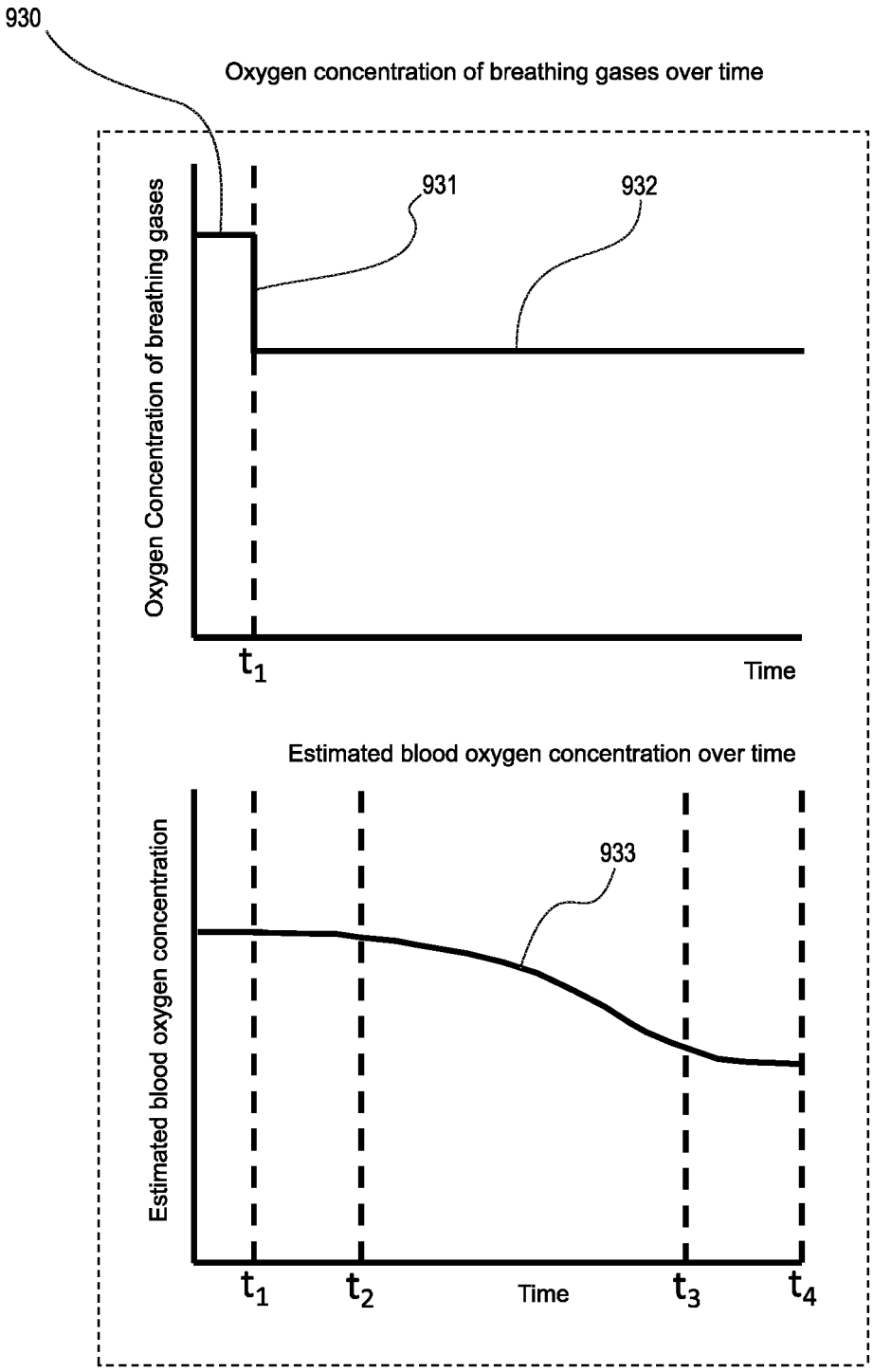

930
Oxygen concentration of breathing gases over time
931
932
Oxygen Concentration of breathing gases
t1
Time
Estimated blood oxygen concentration over time
933
Estimated blood oxygen concentration
t1
t2
Time
t3
t4

Figure 2B

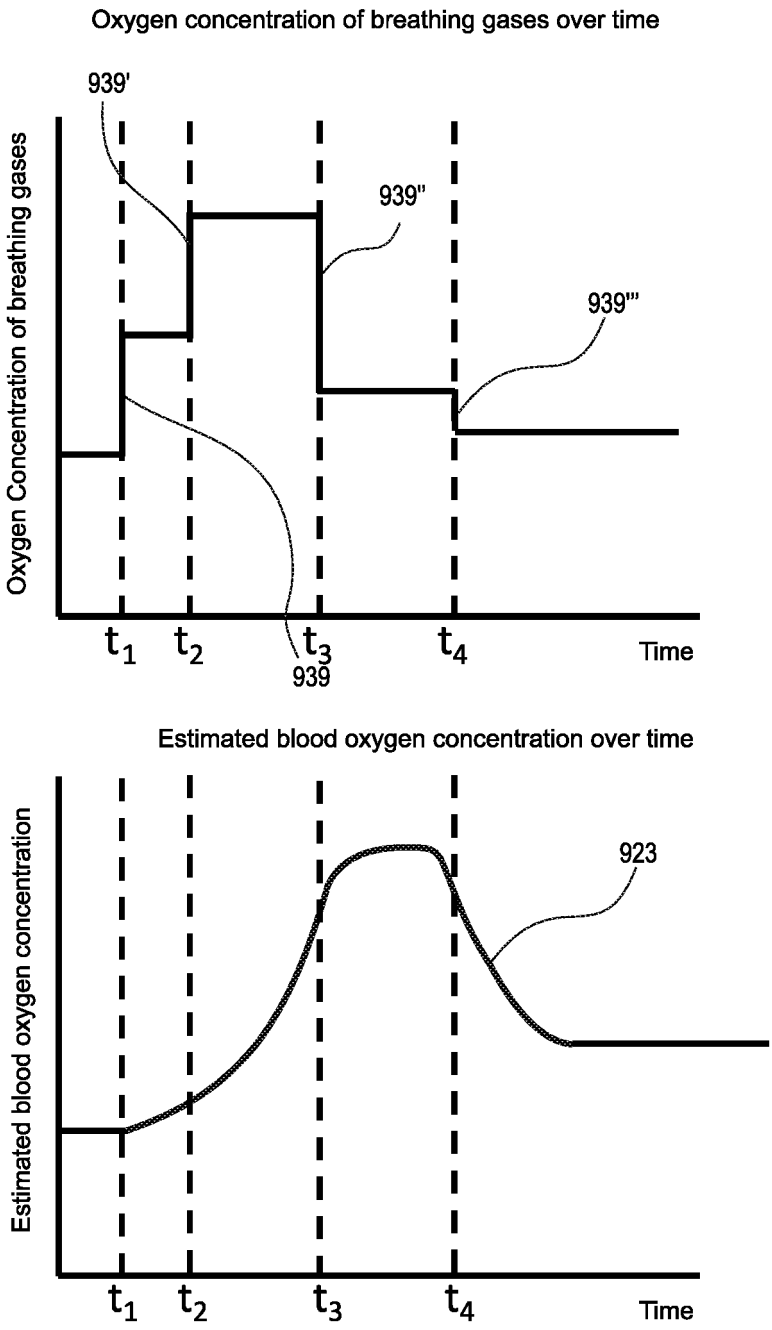

Oxygen concentration of breathing gases over time
939'
939"
939"'
Oxygen Concentration of breathing gases
t1
t2
t3
939
t4
Time
Estimated blood oxygen concentration over time
923
Estimated blood oxygen concentration
t1
t2
t3
t4
Time

Figure 3

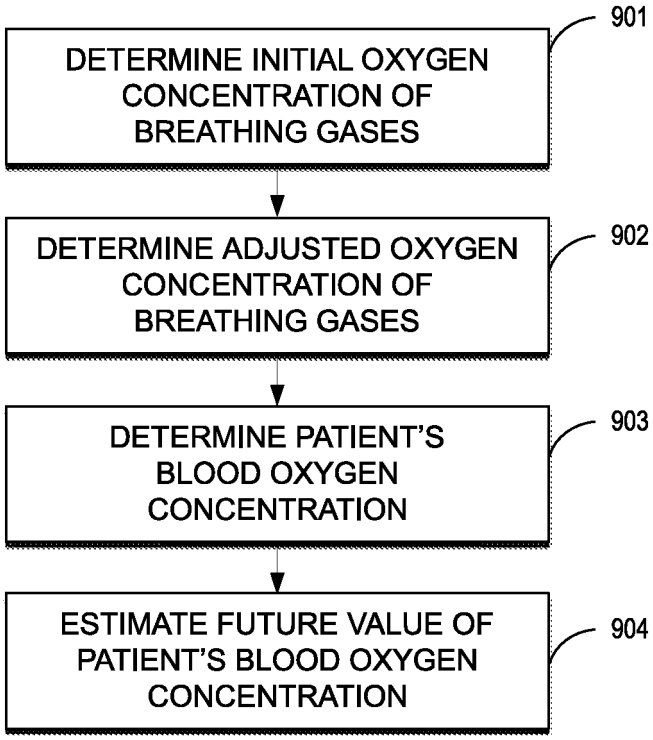

DETERMINE INITIAL OXYGEN CONCENTRATION OF BREATHING GASES
901
DETERMINE ADJUSTED OXYGEN CONCENTRATION OF BREATHING GASES
902
DETERMINE PATIENT'S BLOOD OXYGEN CONCENTRATION
903
ESTIMATE FUTURE VALUE OF PATIENT'S BLOOD OXYGEN CONCENTRATION
904

Figure 4A

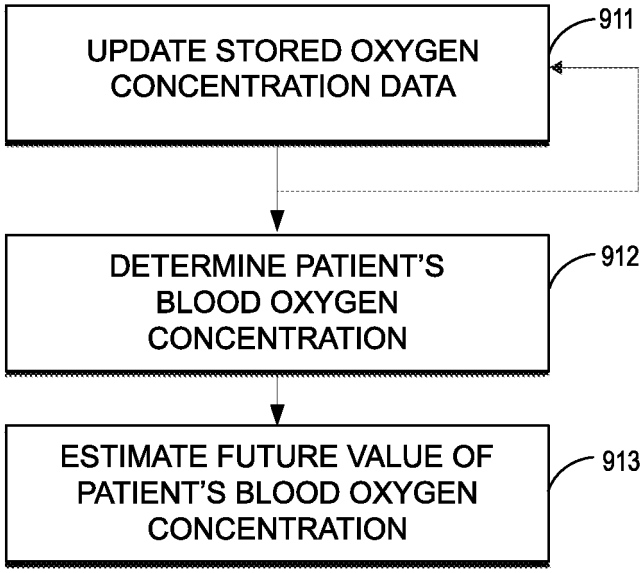

UPDATE STORED OXYGEN CONCENTRATION DATA
911
DETERMINE PATIENT'S BLOOD OXYGEN CONCENTRATION
912
ESTIMATE FUTURE VALUE OF PATIENT'S BLOOD OXYGEN CONCENTRATION
913

Figure 4B

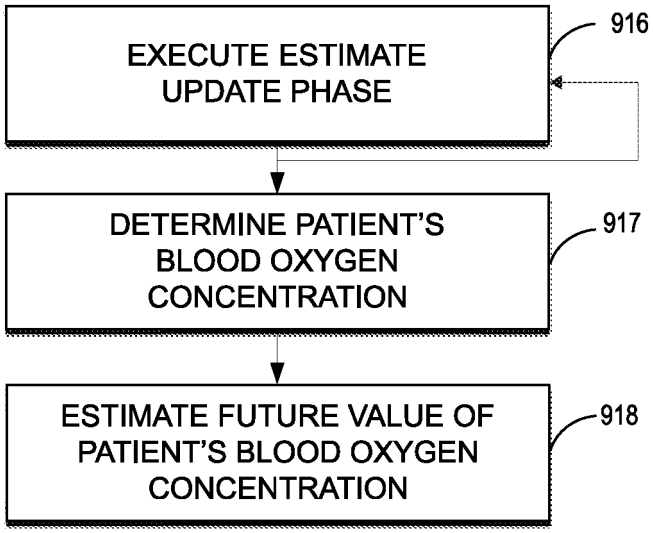

EXECUTE ESTIMATE UPDATE PHASE
916
DETERMINE PATIENT'S BLOOD OXYGEN CONCENTRATION
917
ESTIMATE FUTURE VALUE OF PATIENT'S BLOOD OXYGEN CONCENTRATION
918

Figure 4C

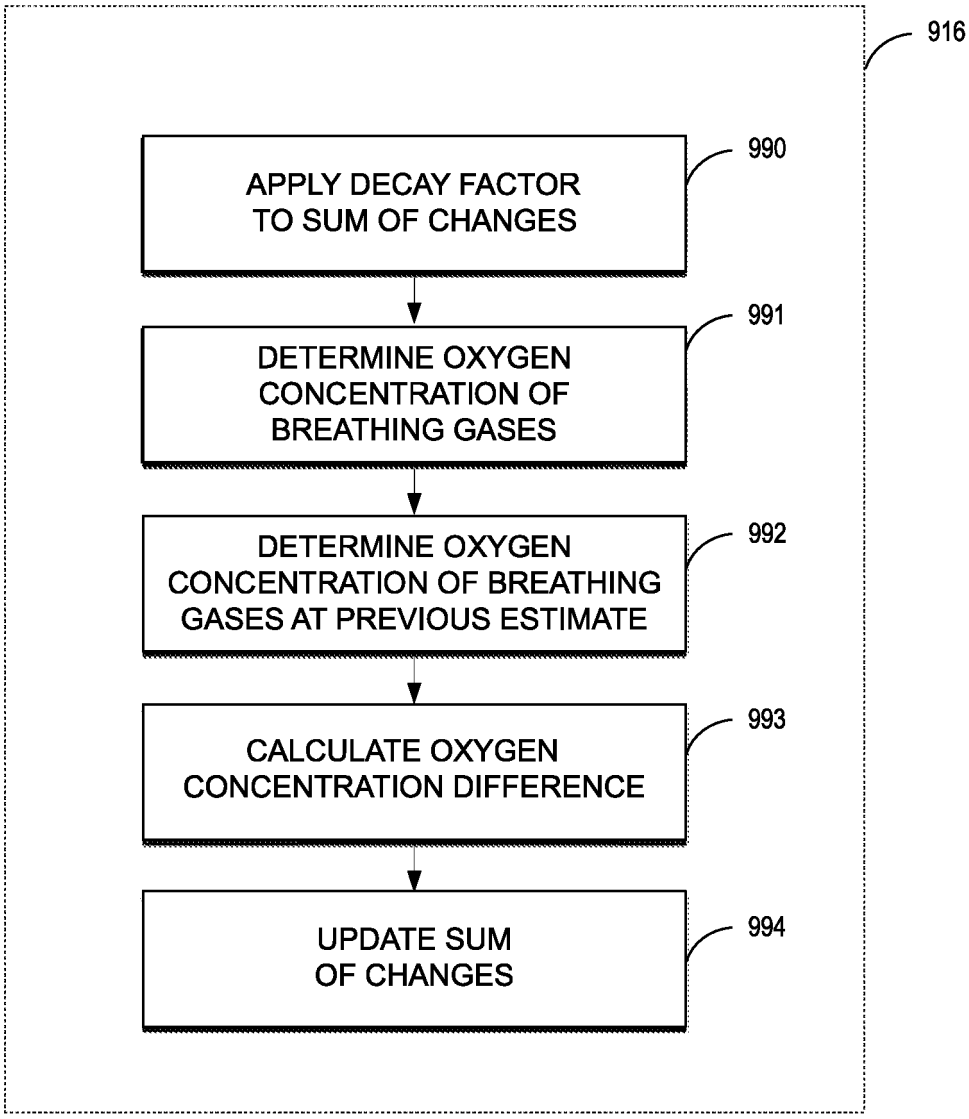

916
APPLY DECAY FACTOR TO SUM OF CHANGES
990
DETERMINE OXYGEN CONCENTRATION OF BREATHING GASES
991
DETERMINE OXYGEN CONCENTRATION OF BREATHING GASES AT PREVIOUS ESTIMATE
992
CALCULATE OXYGEN CONCENTRATION DIFFERENCE
993
UPDATE SUM OF CHANGES
994

Figure 4D

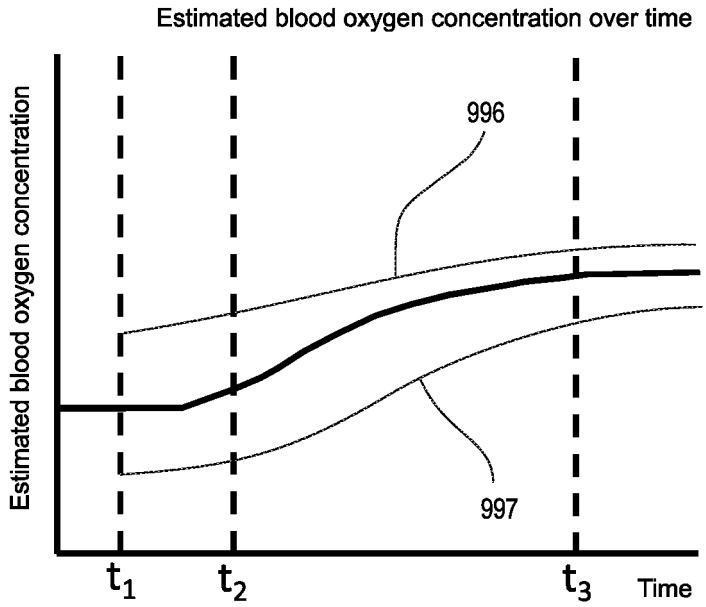


Figure 5A

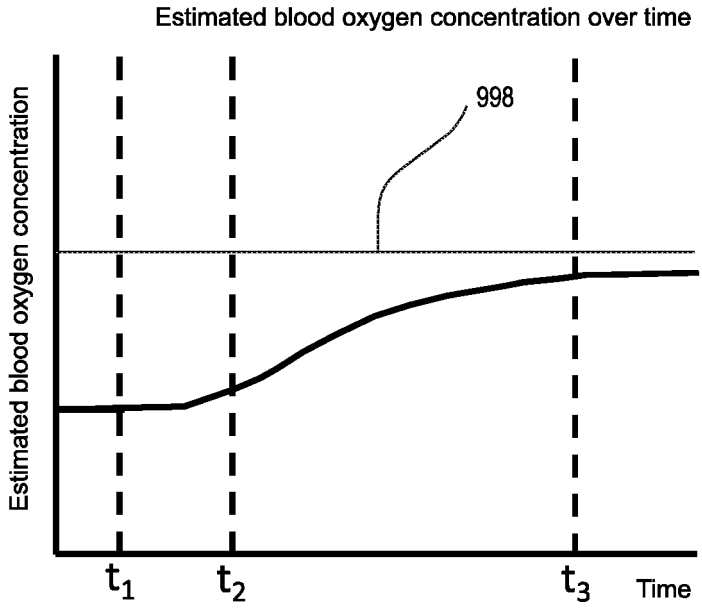


Figure 5B

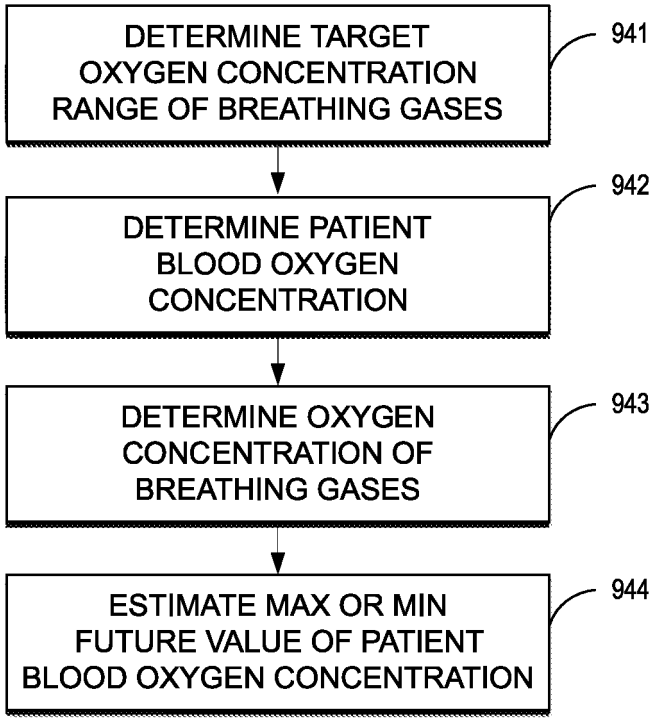

DETERMINE TARGET OXYGEN CONCENTRATION RANGE OF BREATHING GASES
941
DETERMINE PATIENT BLOOD OXYGEN CONCENTRATION
942
DETERMINE OXYGEN CONCENTRATION OF BREATHING GASES
943
ESTIMATE MAX OR MIN FUTURE VALUE OF PATIENT BLOOD OXYGEN CONCENTRATION
944

Figure 6

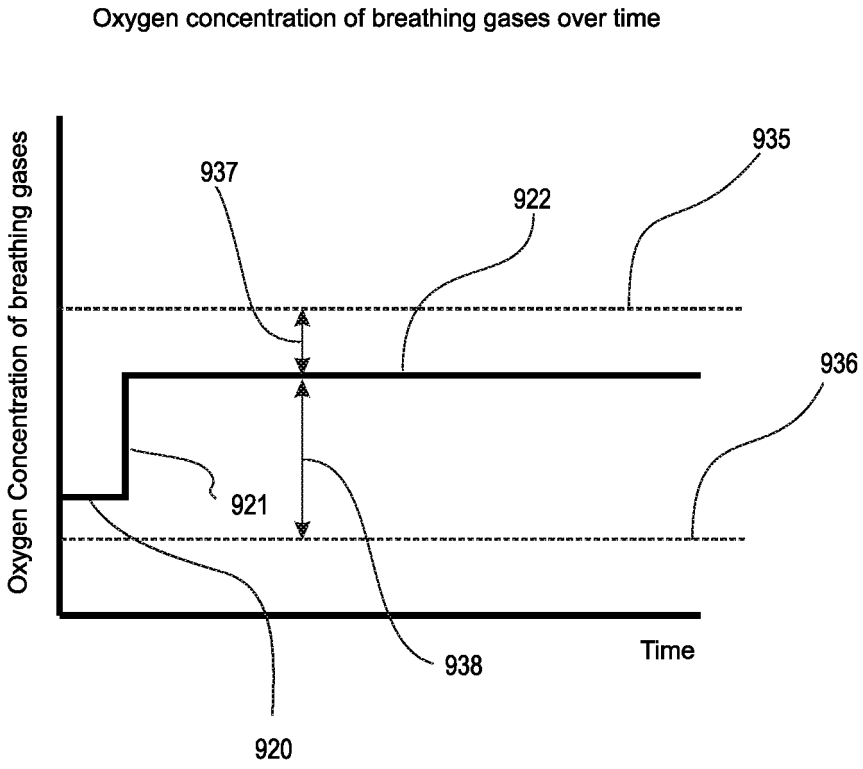

Oxygen concentration of breathing gases over time
Oxygen Concentration of breathing gases
937
922
935
936
921
938
Time
920

Figure 7

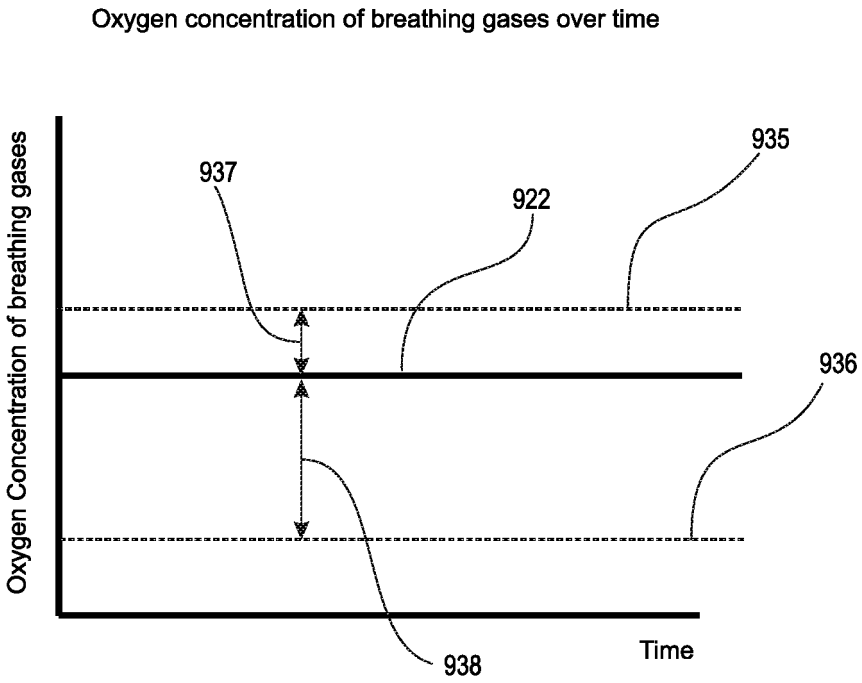


Figure 8A

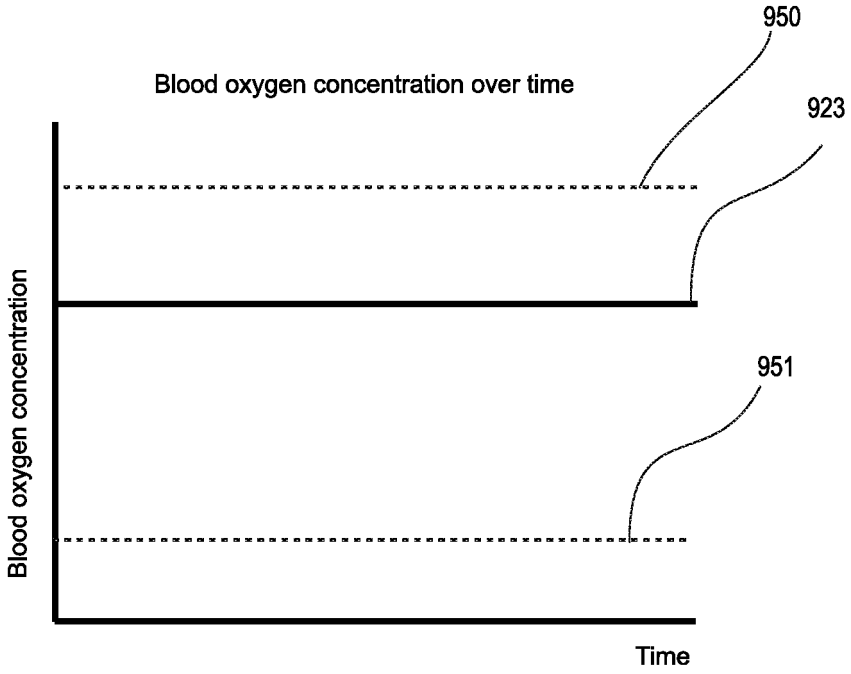


Figure 8B

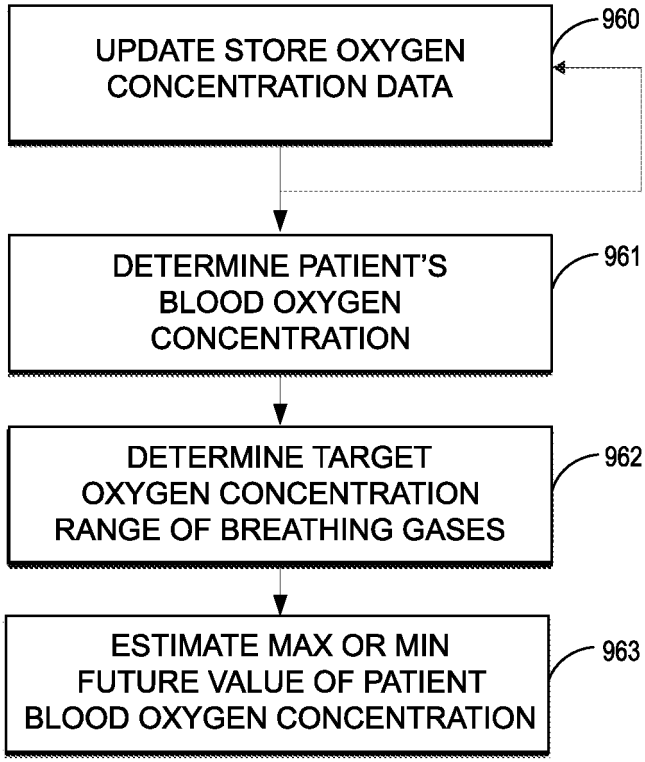

UPDATE STORE OXYGEN CONCENTRATION DATA
960
DETERMINE PATIENT'S BLOOD OXYGEN CONCENTRATION
961
DETERMINE TARGET OXYGEN CONCENTRATION RANGE OF BREATHING GASES
962
ESTIMATE MAX OR MIN FUTURE VALUE OF PATIENT BLOOD OXYGEN CONCENTRATION
963

Figure 9A

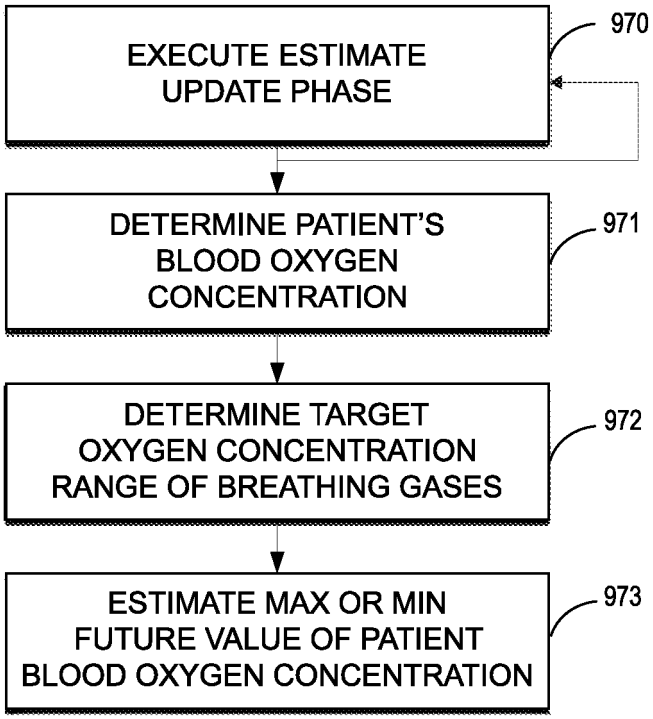

EXECUTE ESTIMATE UPDATE PHASE
970
DETERMINE PATIENT'S BLOOD OXYGEN CONCENTRATION
971
DETERMINE TARGET OXYGEN CONCENTRATION RANGE OF BREATHING GASES
972
ESTIMATE MAX OR MIN FUTURE VALUE OF PATIENT BLOOD OXYGEN CONCENTRATION
973

Figure 9B

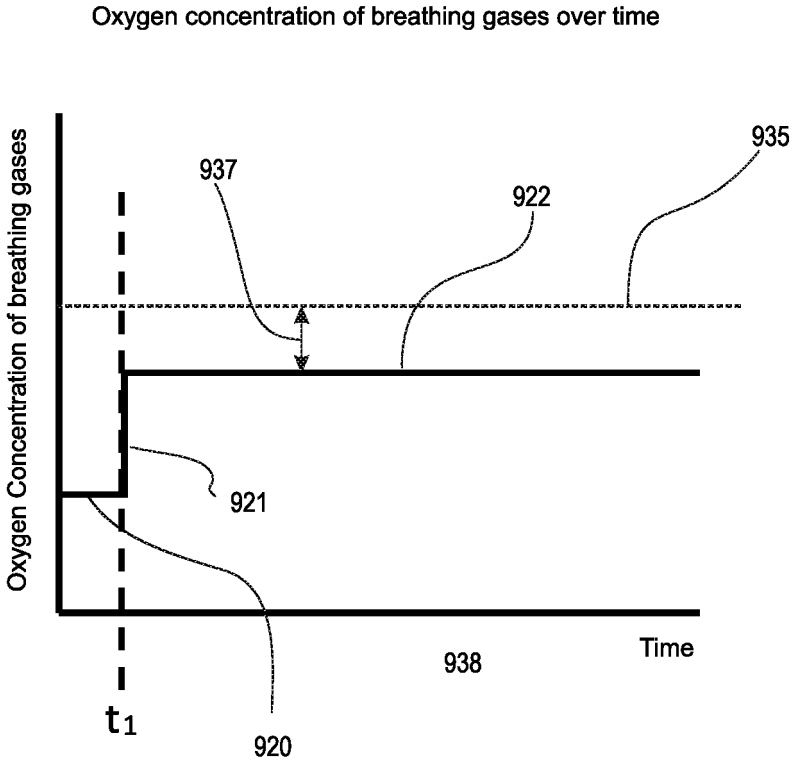


Figure 10

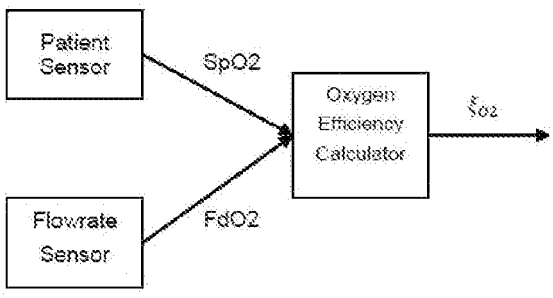


Figure 10A

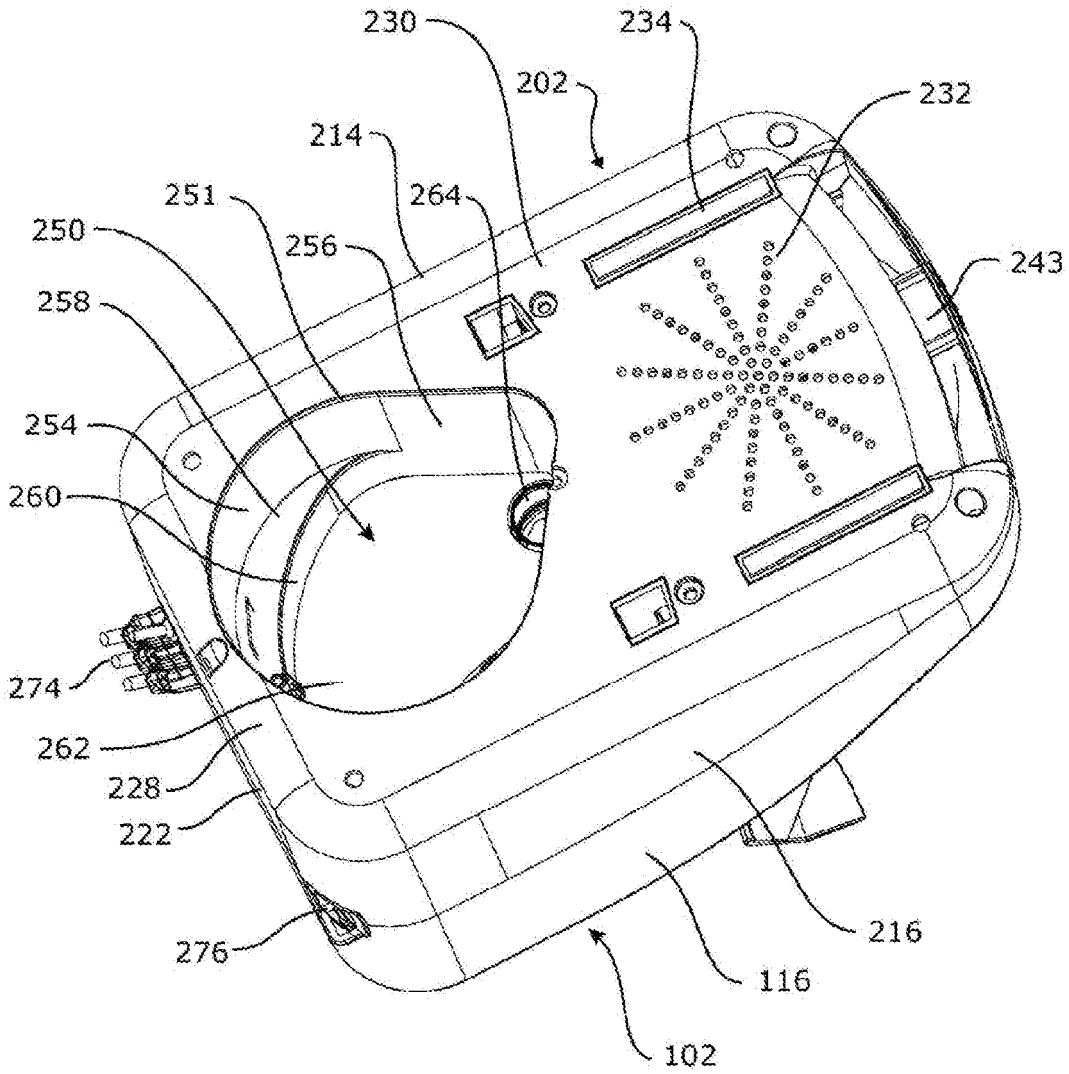

230
234
202
232
214
251
264
250
256
243
258
254
260
274
262
228
222
276
216
116
102

Figure 11

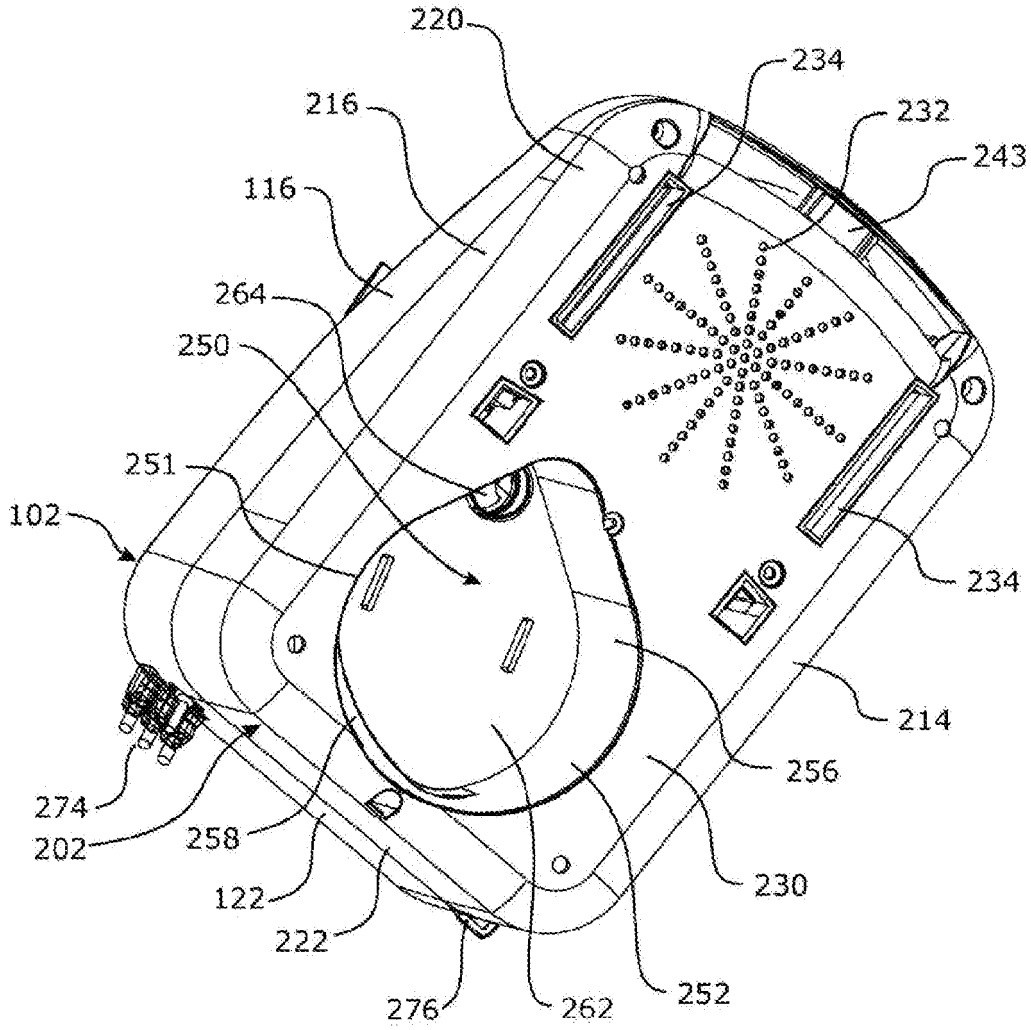

220
234
216
232
243
116
264
250
251
102
234
214
256
274
202
258
230
122
222
276
262
252

Figure 12

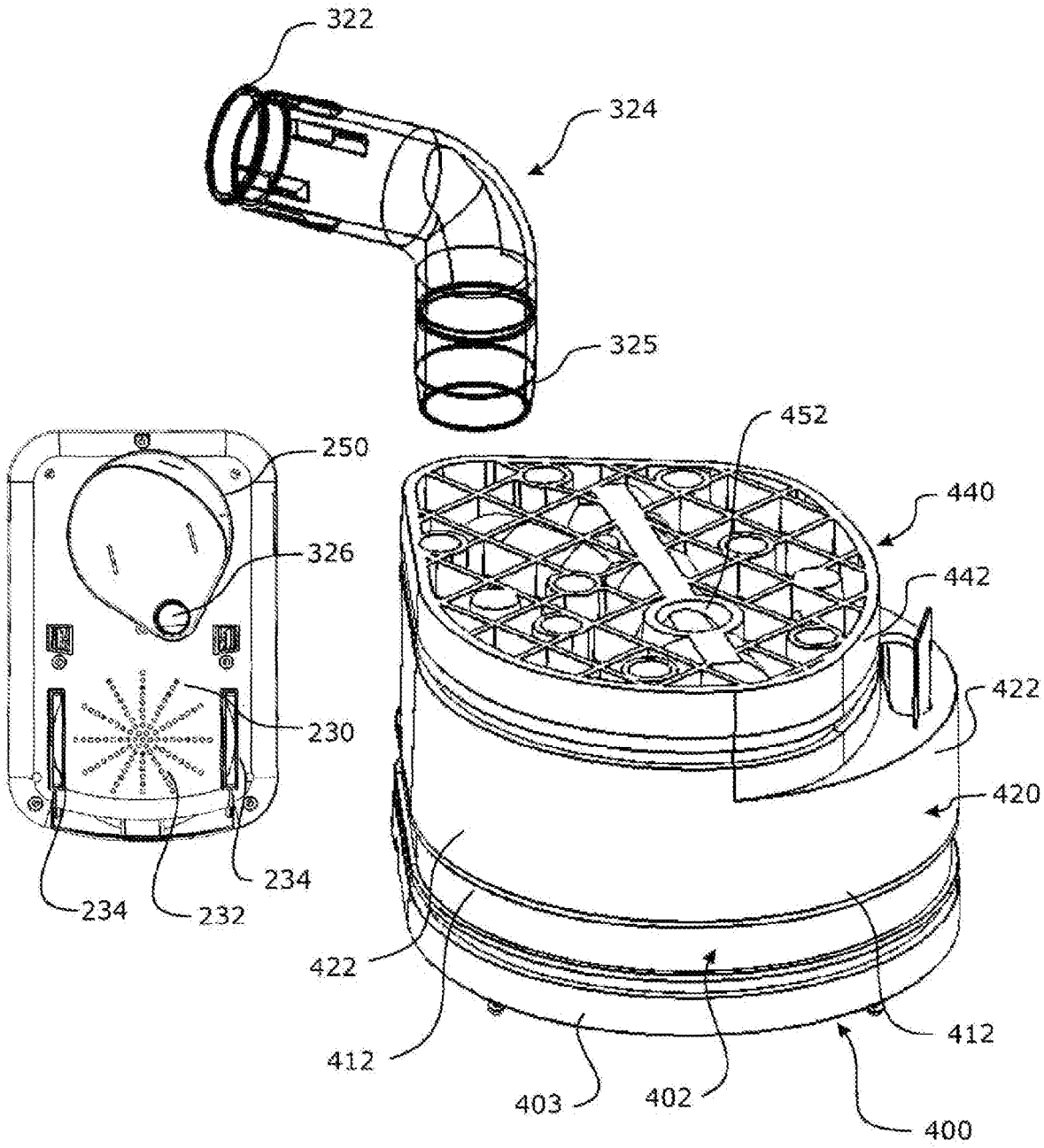
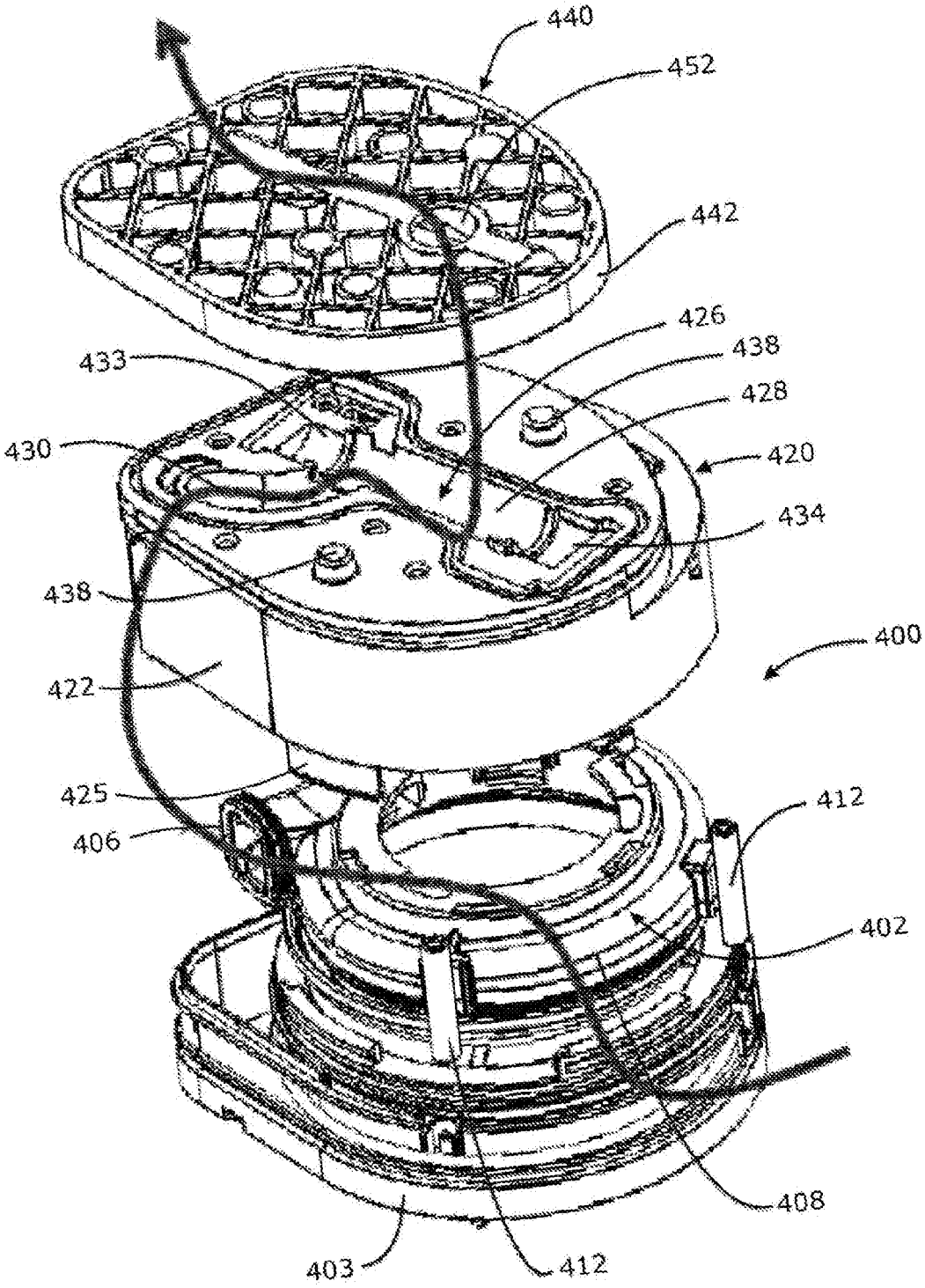

322
324
325
452
250
440
326
442
422
230
420
234
234
232
422
412
412
403
402
400

Figure 13


440
452
442
426
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428
433
430
420
434
438
400
422
425
412
406
402
408
403
412

Figure 14

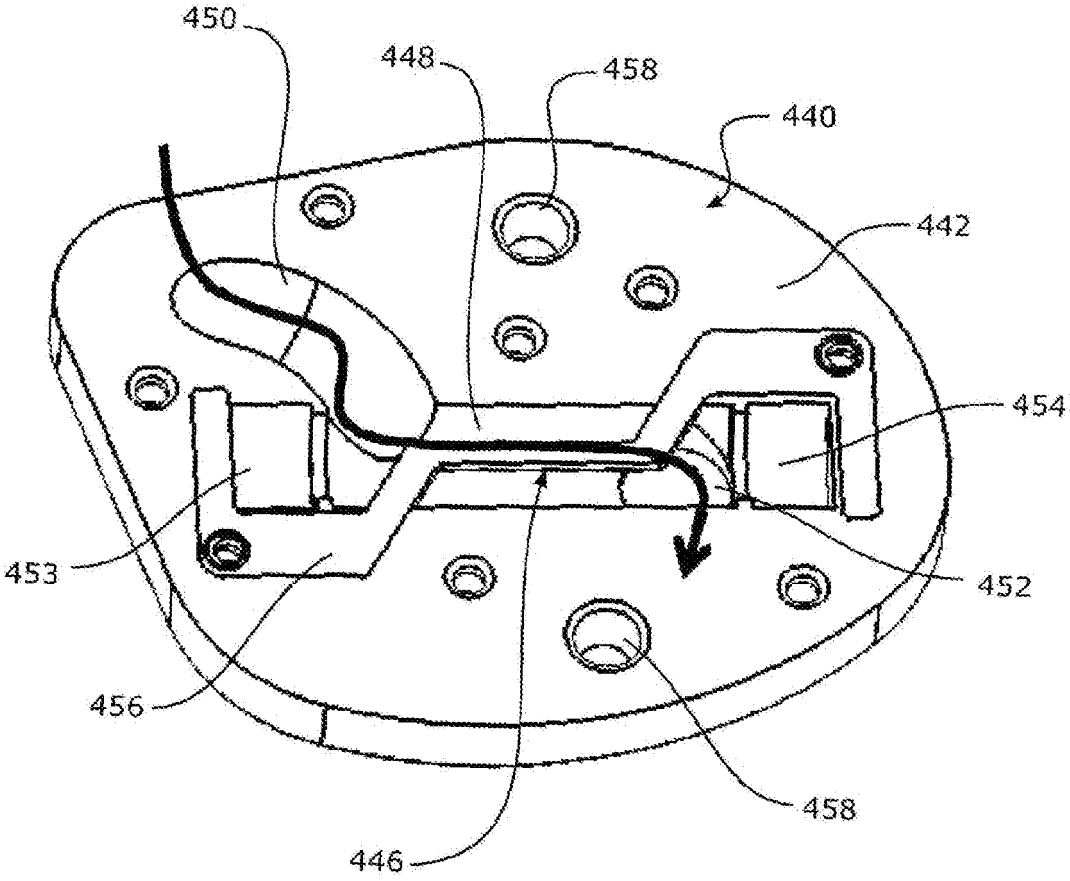


Figure 15

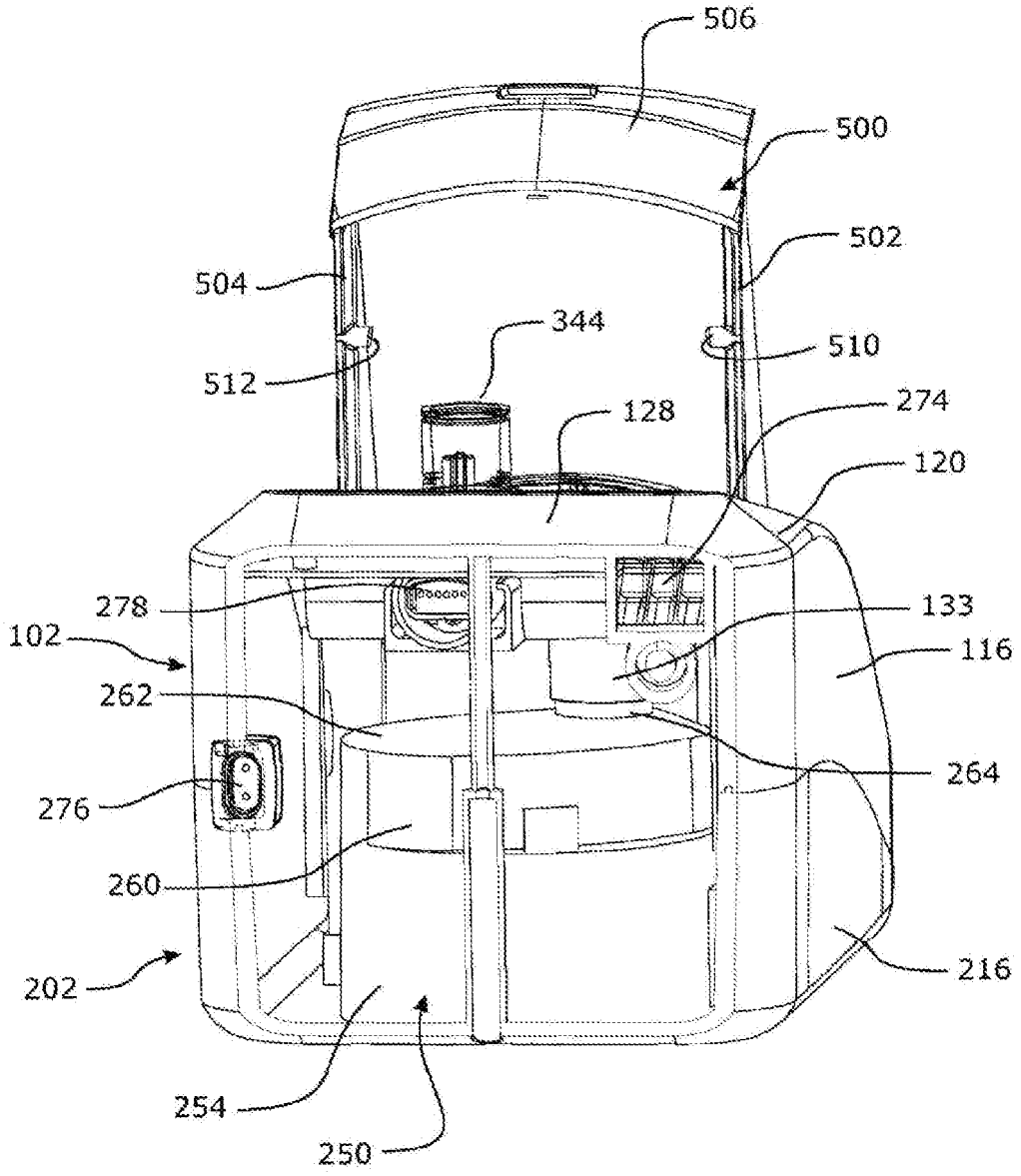

506
500
502
504
344
510
512
128
274
120
278
133
102
116
262
264
276
260
216
202
254
250

Figure 16

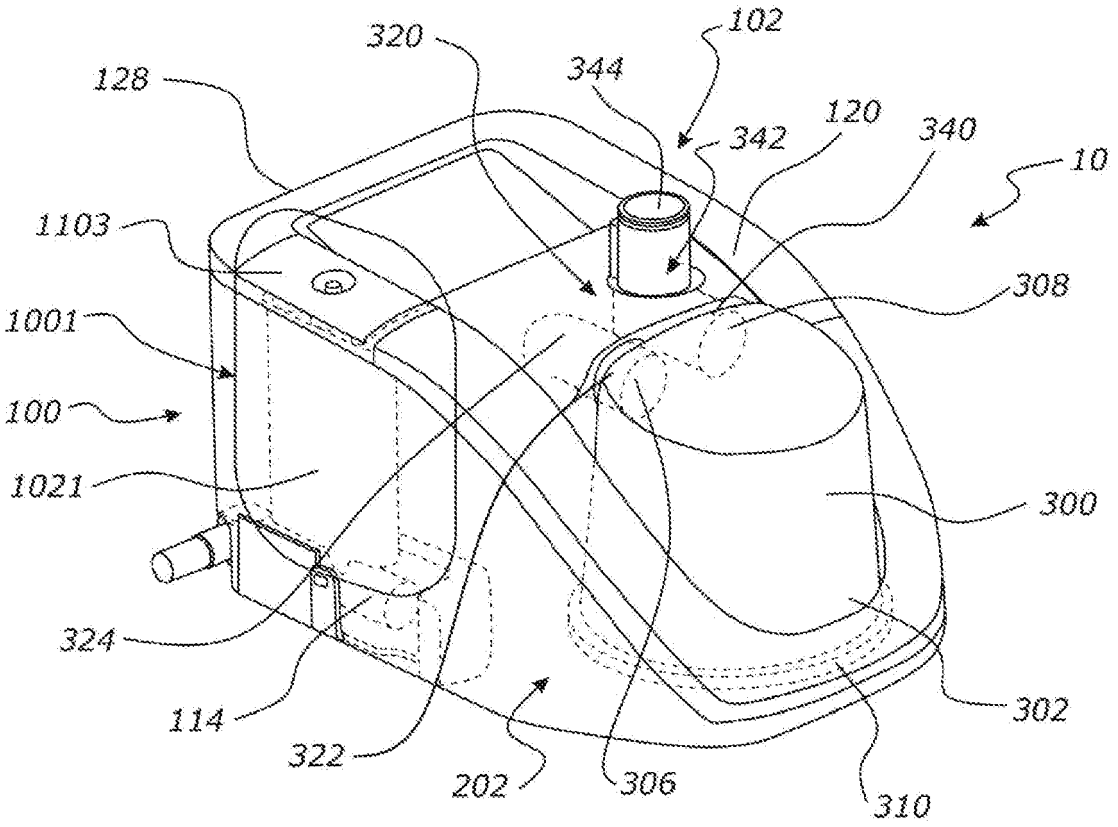


Figure 17A

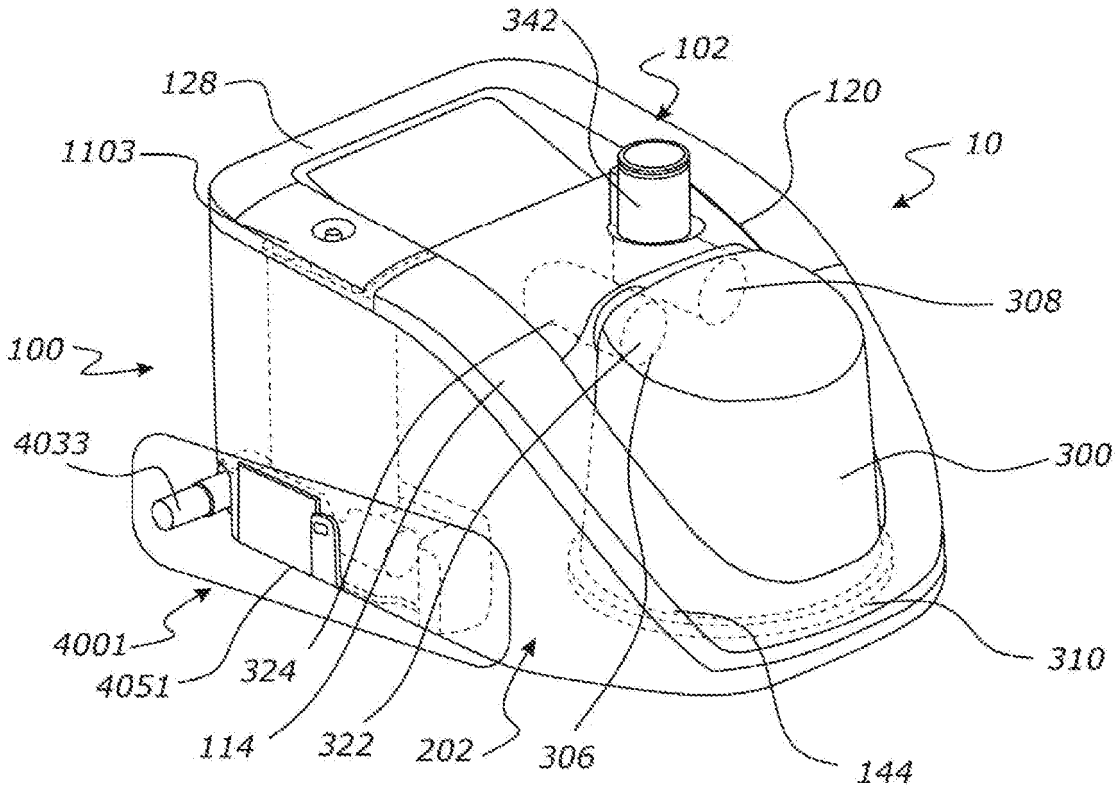


Figure 17B

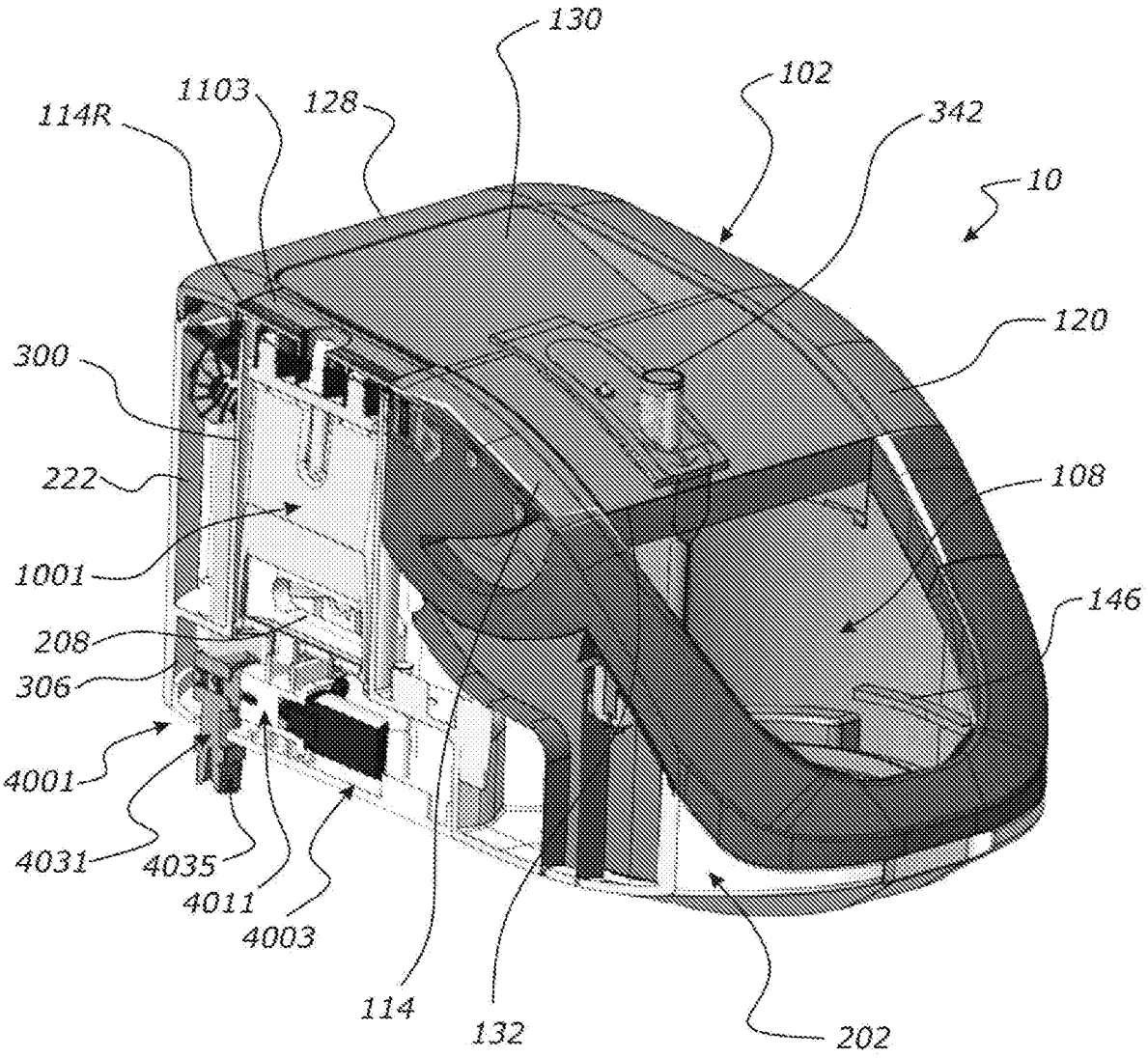

130
102
1103
128
342
114R
10
120
300
108
222
1001
146
208
306
4001
4031
4035
4011
4003
114
132
202

Figure 18

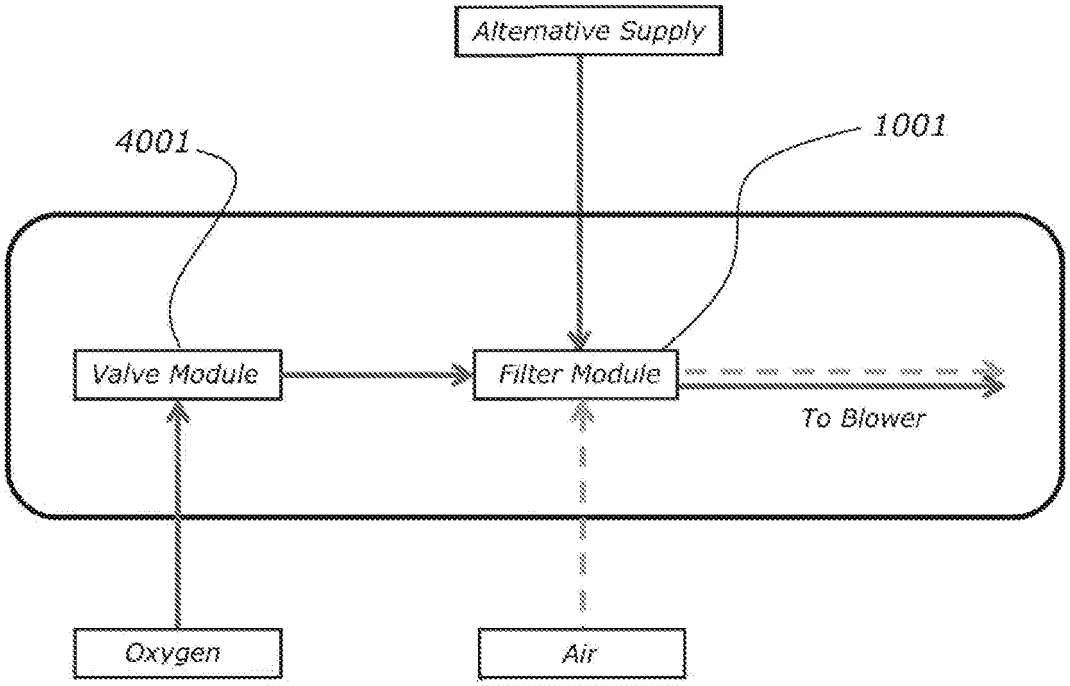
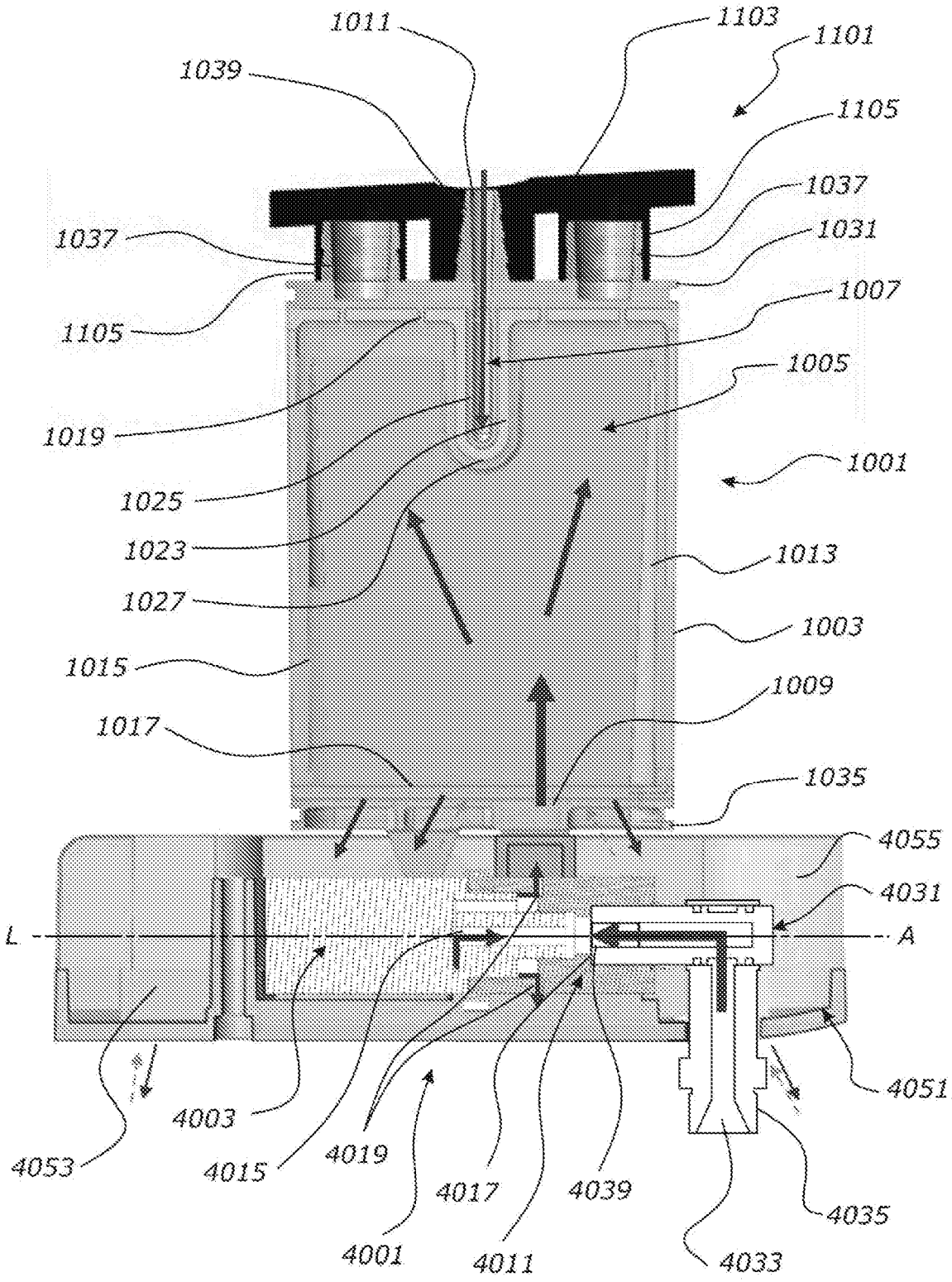

Alternative Supply
4001
1001
Valve Module
Filter Module
To Blower
Oxygen
Air

Figure 19


1011
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1105
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1031
1105
1007
1005
1019
1001
1025
1023
1013
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1003
1015
1009
1017
1035
4055
4031
L
A
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4003
4053
4015
4019
4017
4039
4035
4001
4011
4033

Figure 20

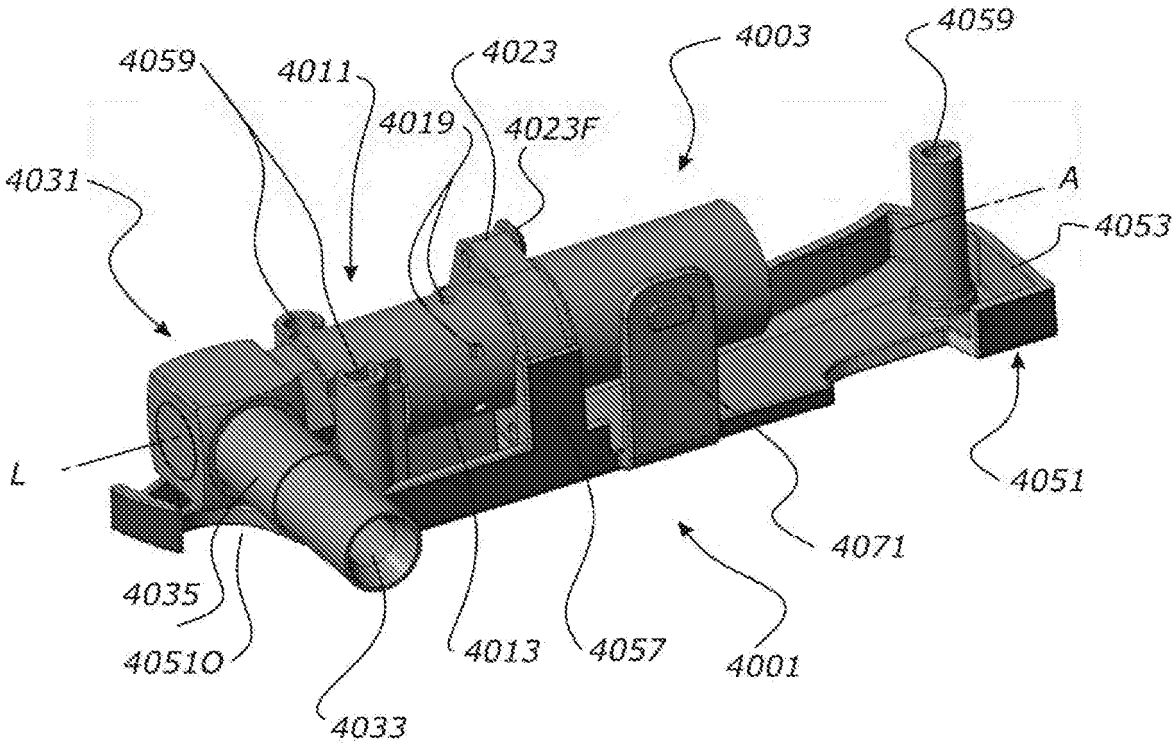
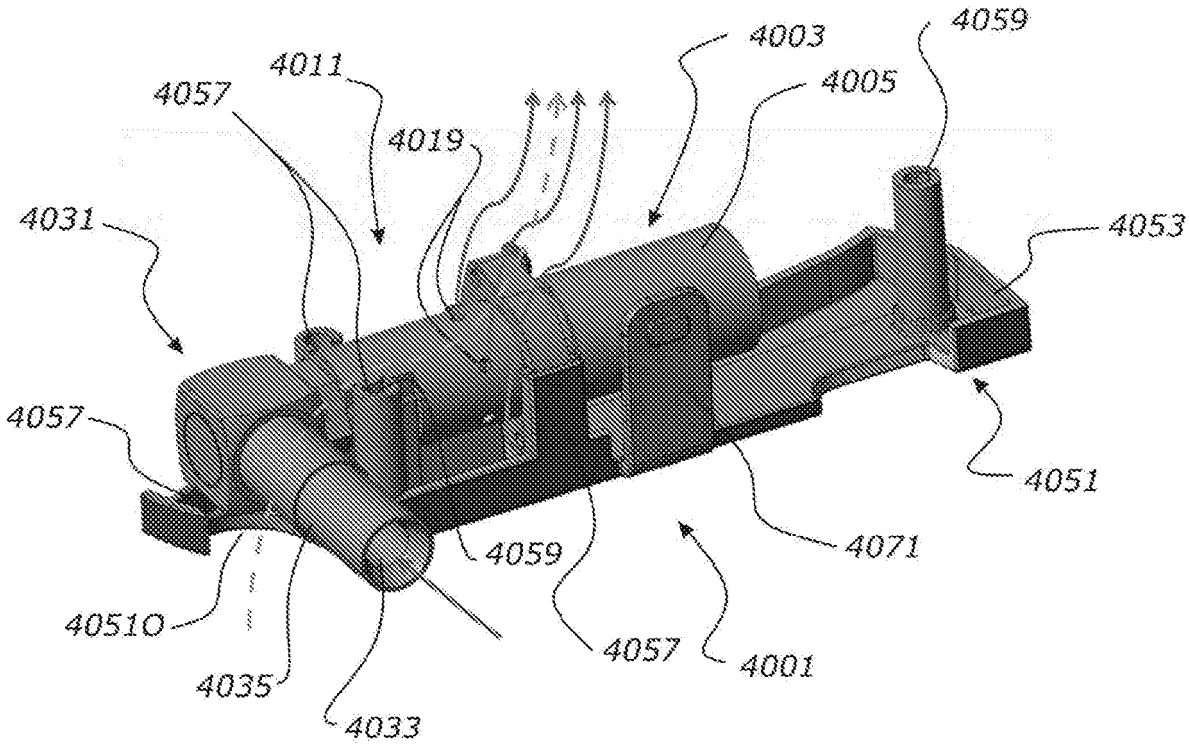

4059
4011
4023
4003
4059
4019
4023F
4031
A
4053
L
4051
4071
4035
40510
4013
4057
4001
4033

Figure 21


4059
4003
4011
4005
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4053
4031
4057
4051
4071
4059
40510
4057
4001
4035
4033

Figure 22

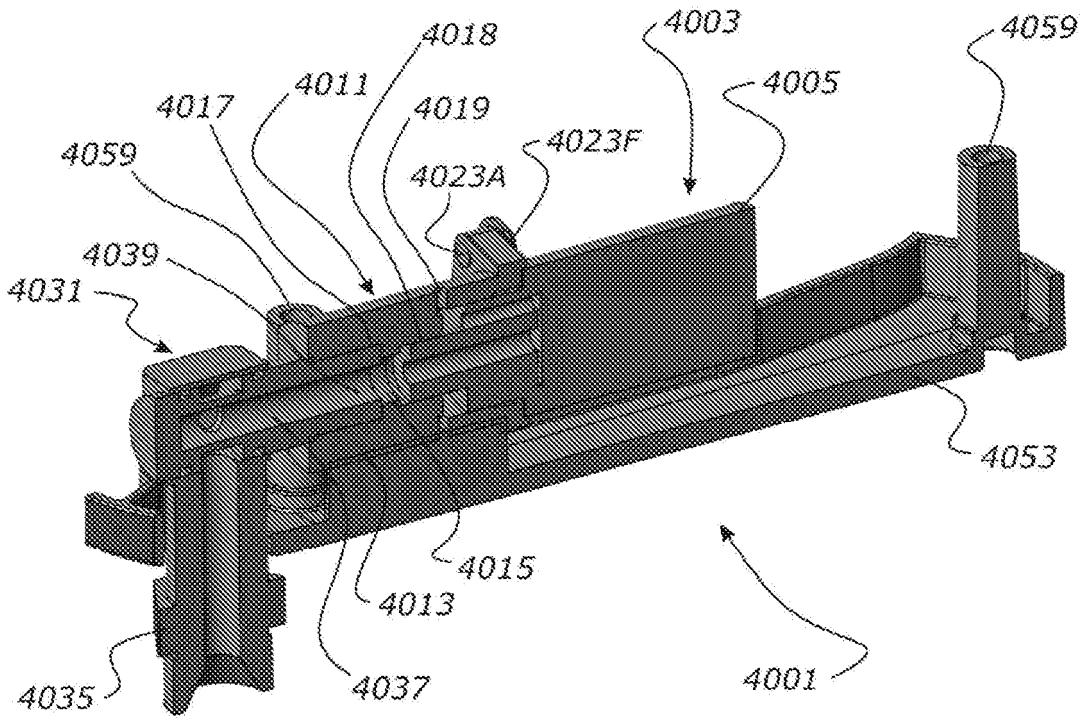
4018
4003
4059
4017
4011
4019
4005
4059
4023F
4023A
4039
4031
4053
4015
4013
4035
4037
4001

Figure 23

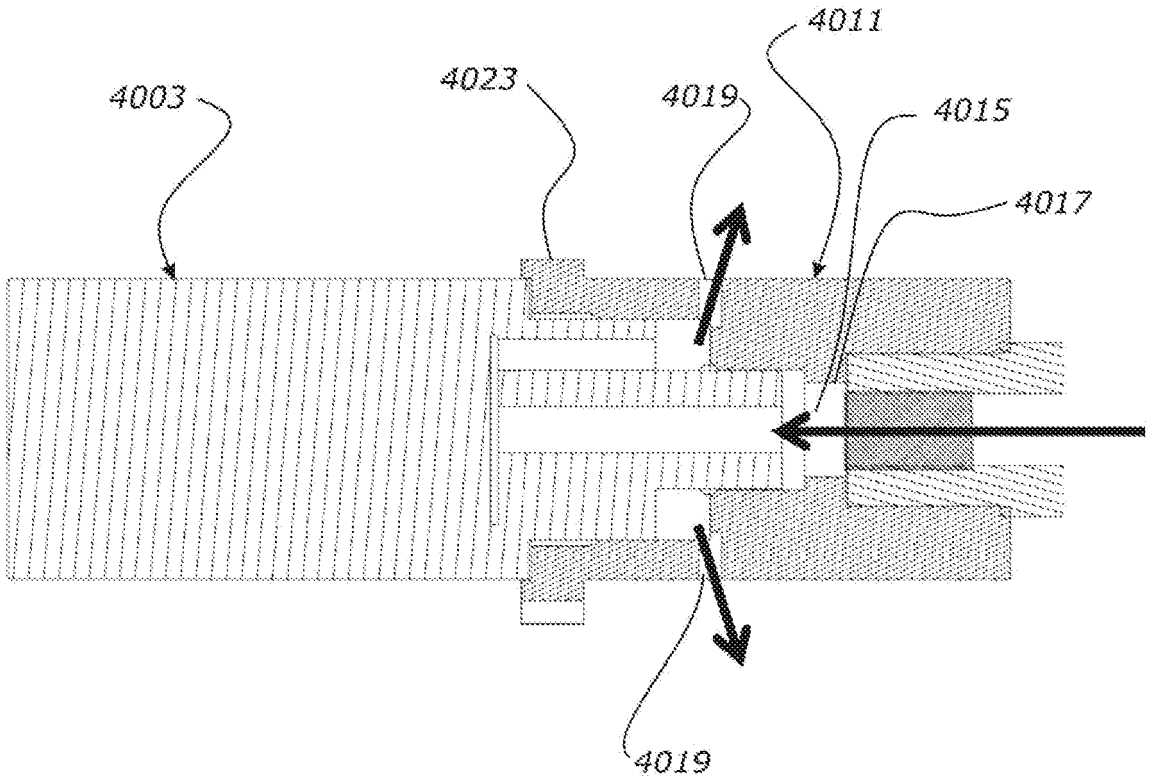

Figure 24

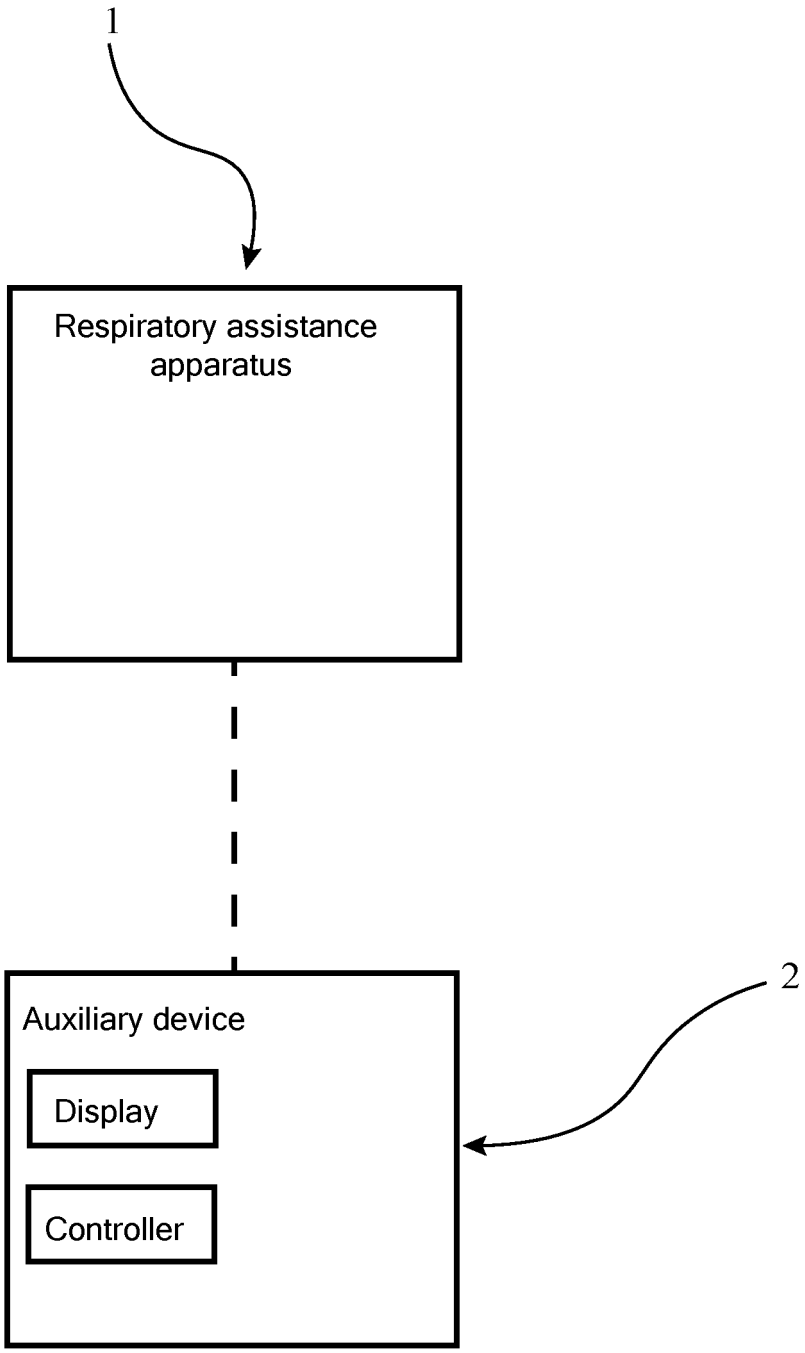
1
Respiratory assistance apparatus
Auxiliary device
Display
Controller
2

Figure 25