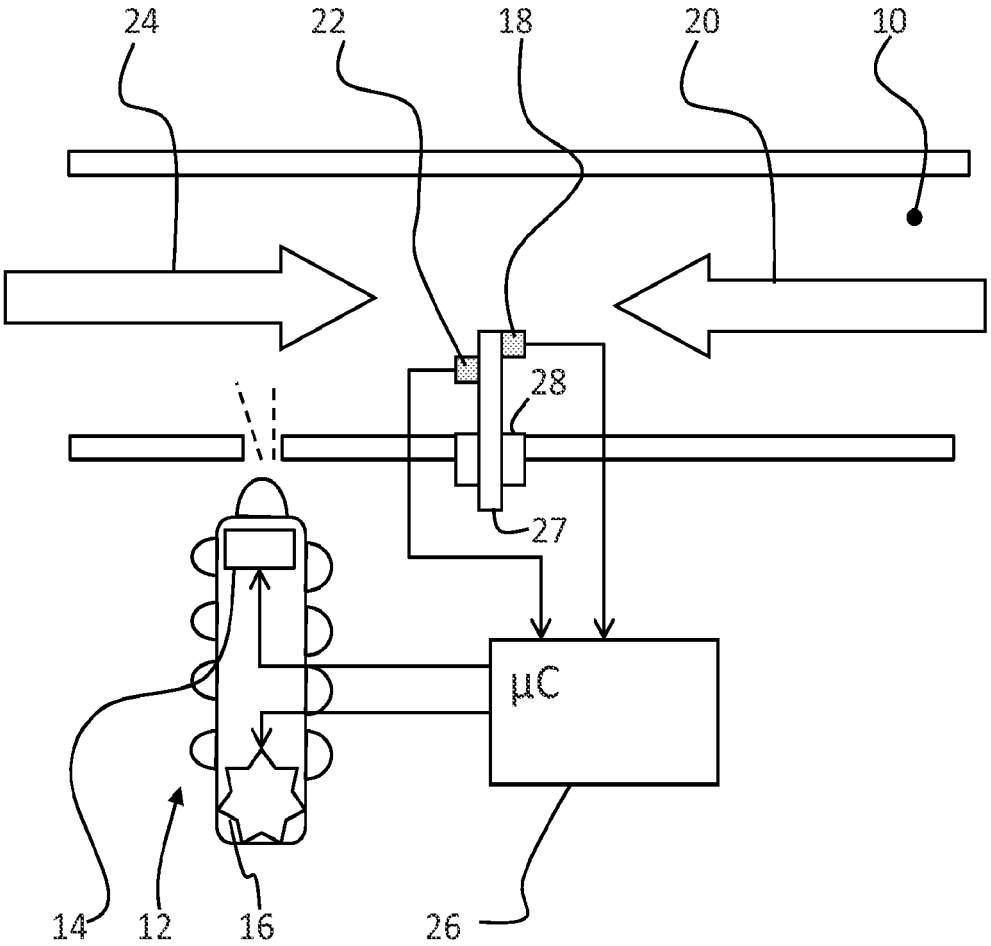


FIG. 1

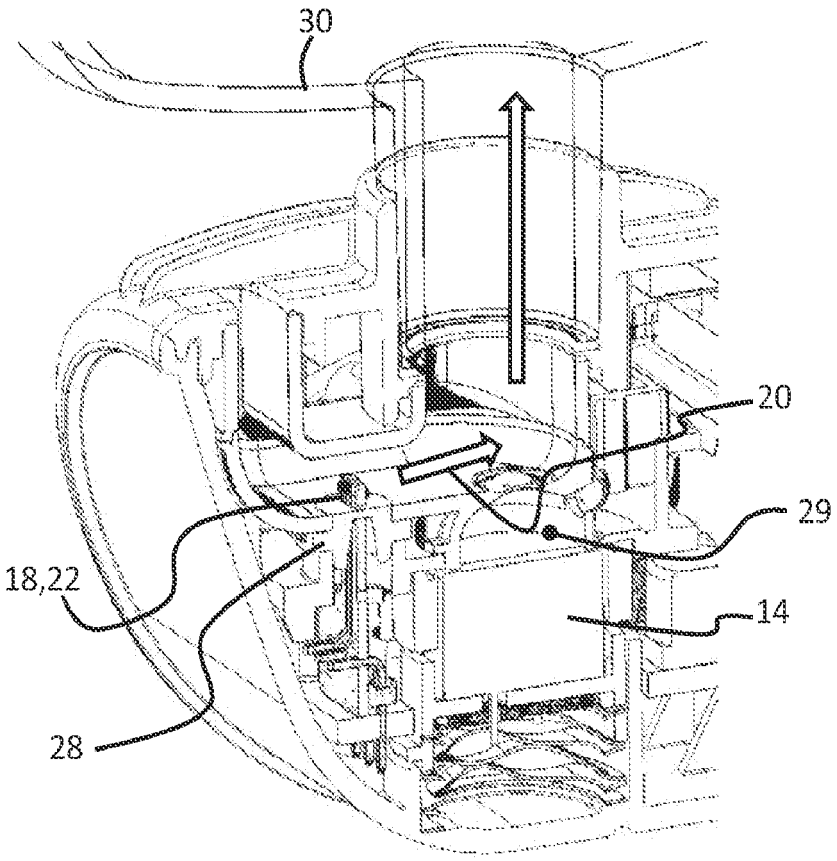

30
20
29
18,22
14
28

FIG. 2

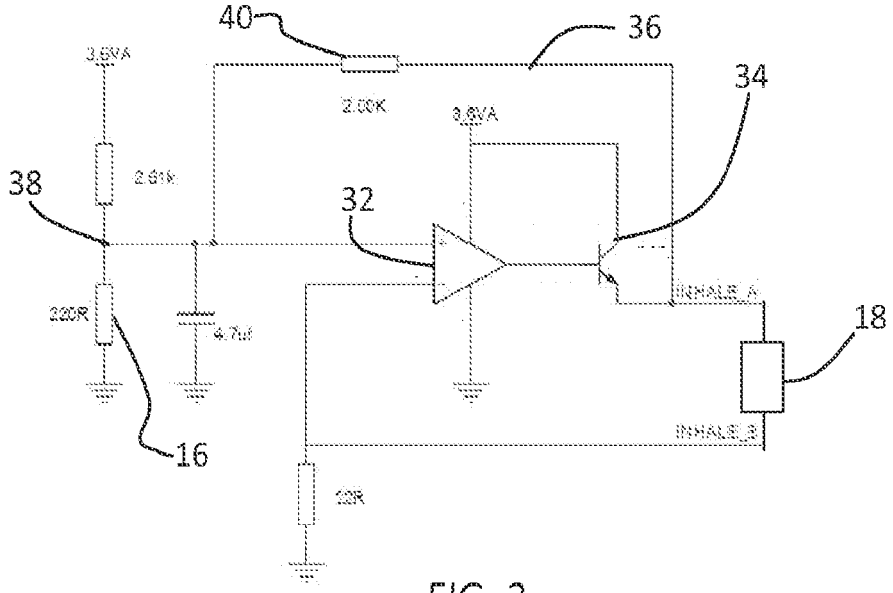

40
36
34
3.6VA
2.00K
3.6VA
38
2.61k
32
220R
4.7uf
INHALE_A
18
INHALE_B
16
22R

FIG. 3

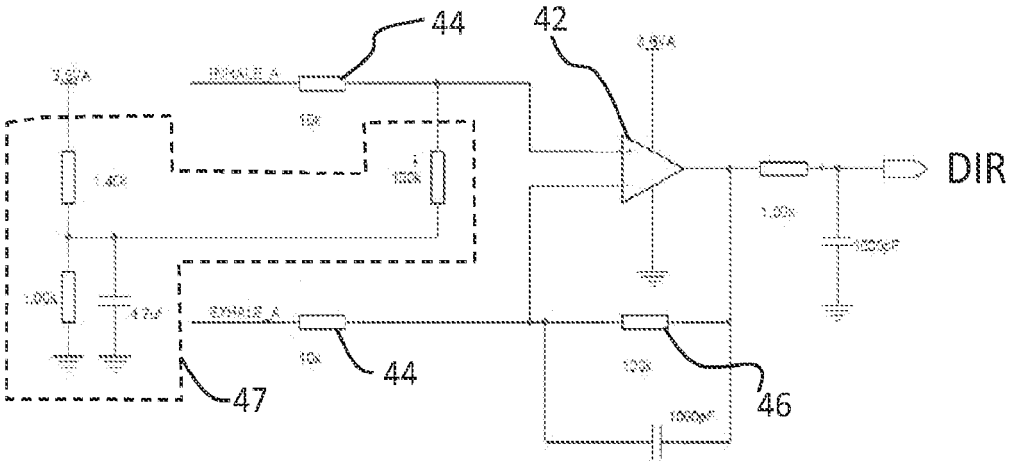


FIG. 4

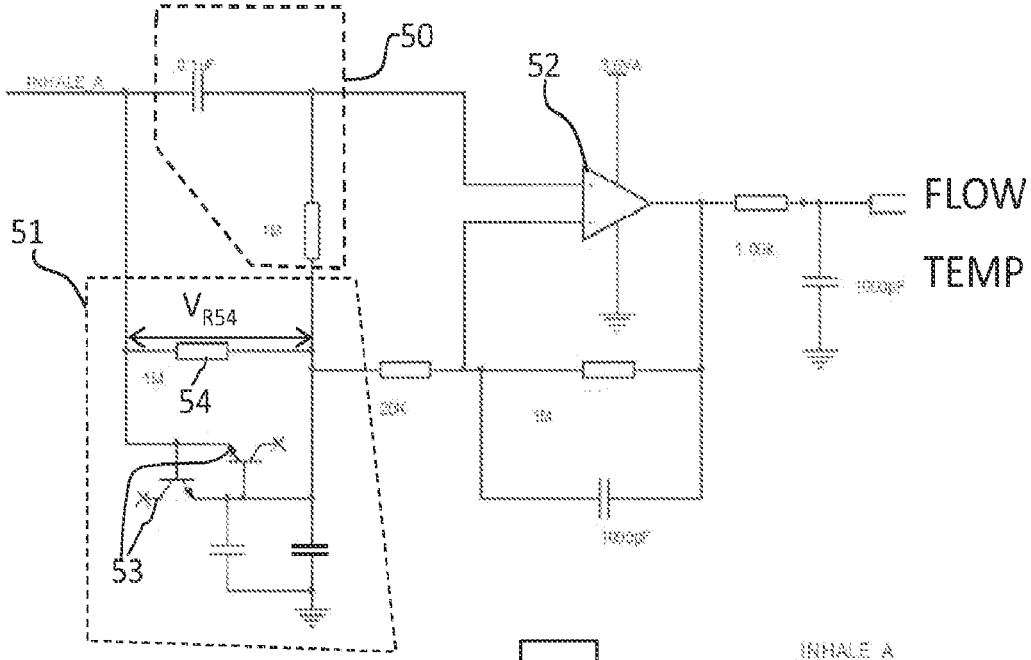


FIG. 5

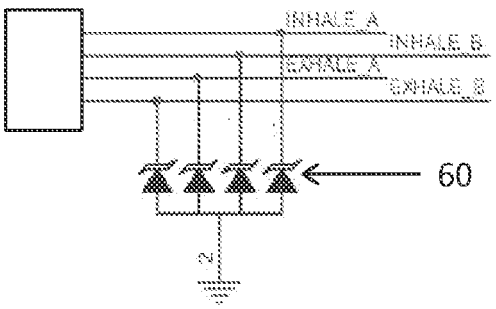


FIG. 6

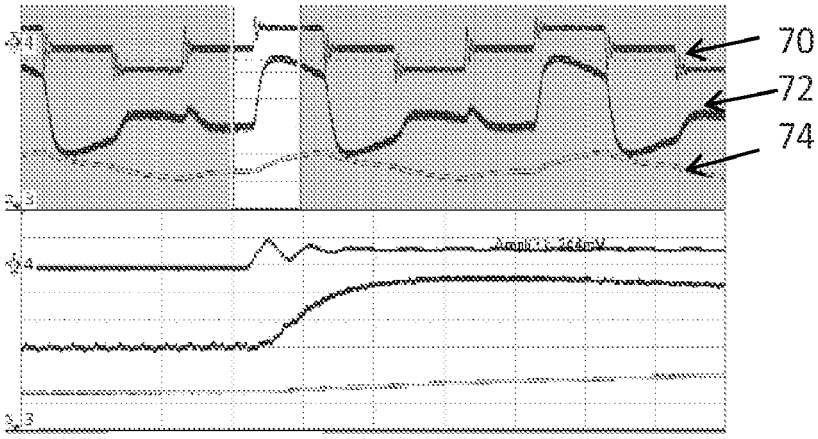


FIG. 7

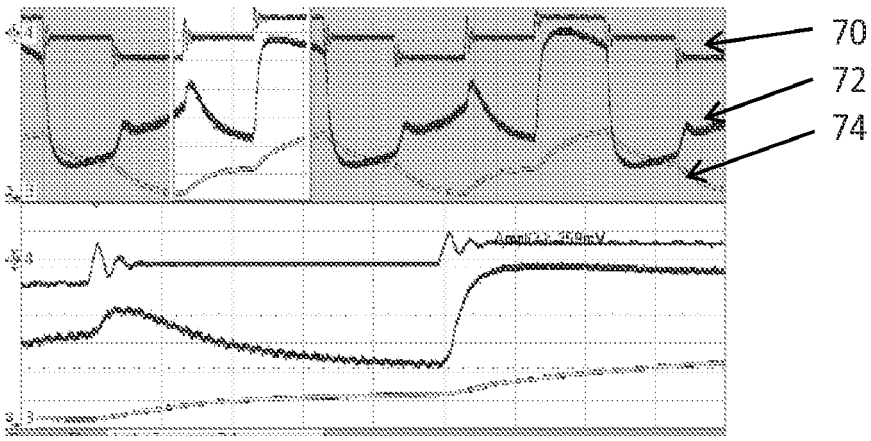


FIG. 8

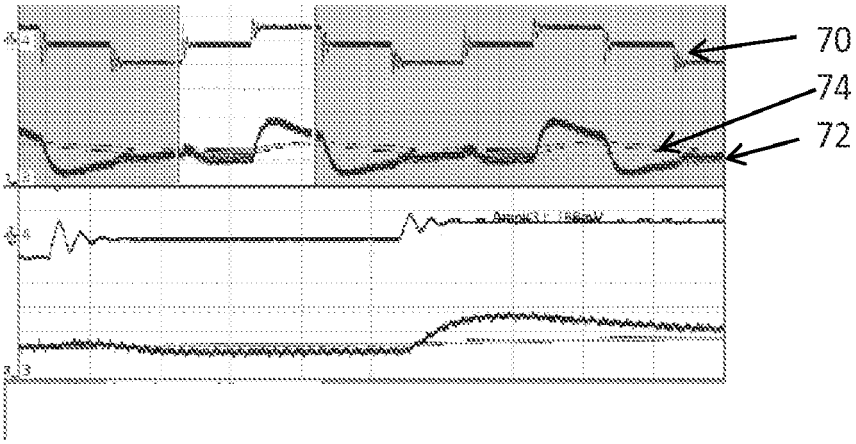


FIG. 9

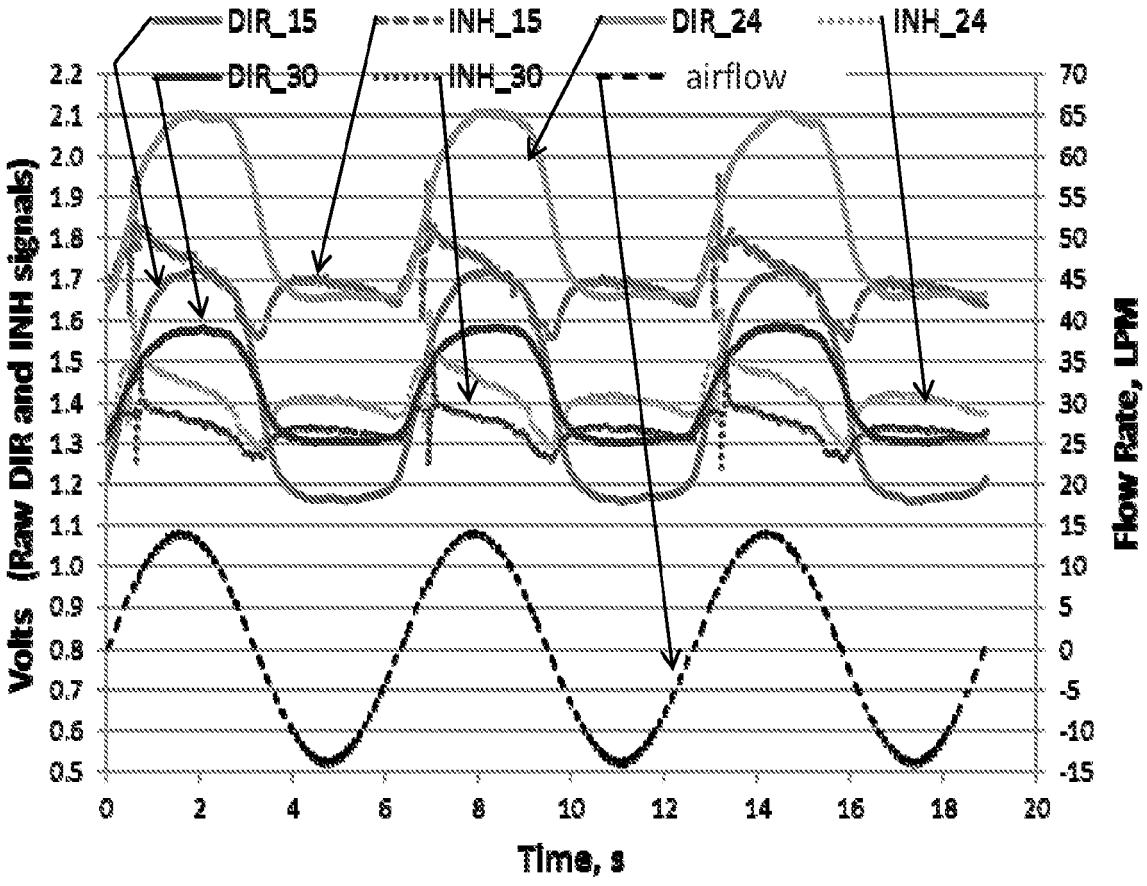

DIR_15
INH_15
DIR_24
INH_24
DIR_30
INH_30
airflow
Volts (Raw DIR and INH signals)
Flow Rate, LPM
Time, s
2.2
2.1
2.0
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
-5
-10
-15
0
2
4
6
8
10
12
14
16
18
20

FIG. 10

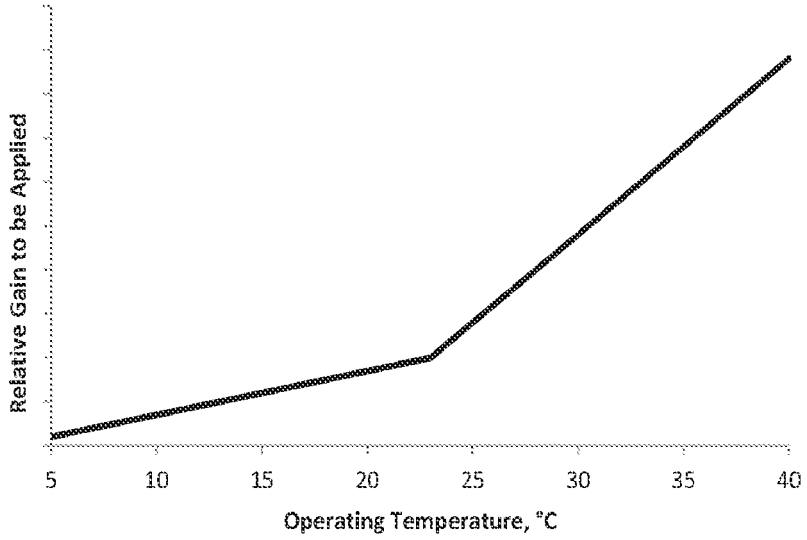

Relative Gain to be Applied
5
10
15
20
25
30
35
40
Operating Temperature, °C

FIG. 11

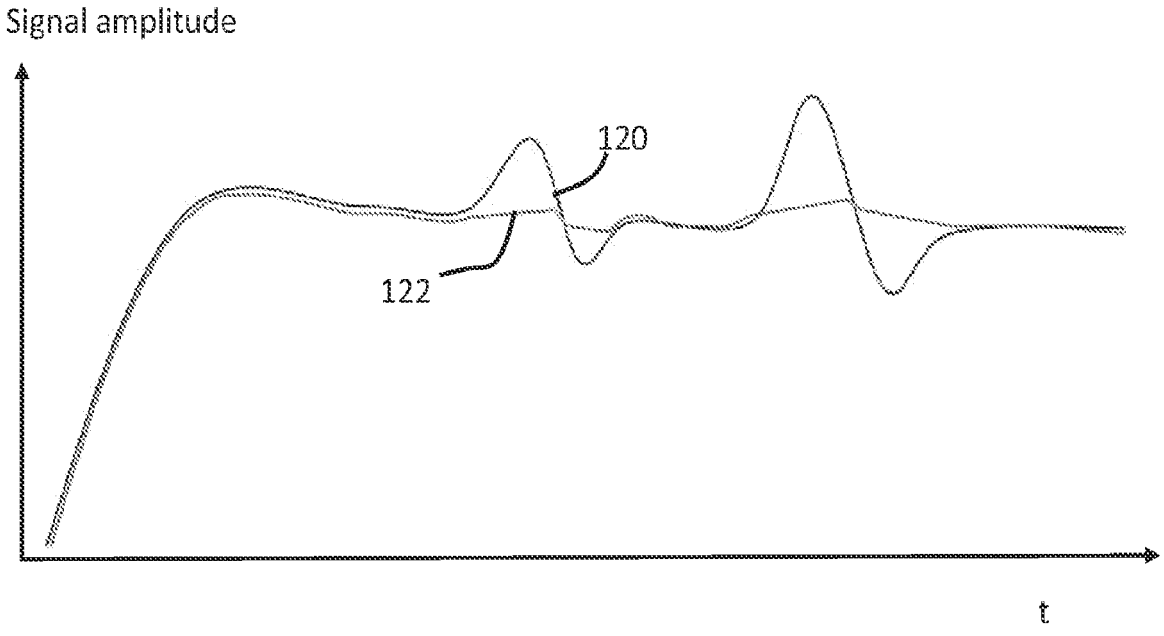

Signal amplitude
120
122
t

FIG. 12

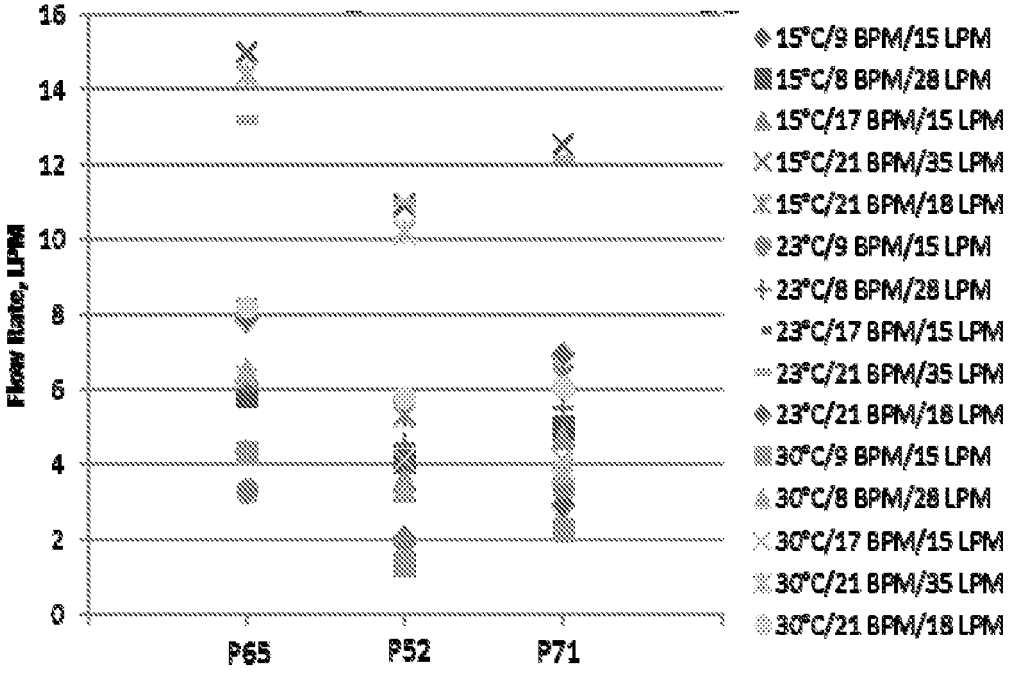

Flow Rate, LPM
16
14
12
10
8
6
4
2
0
P65
P52
P71
15°C/9 BPM/15 LPM
15°C/8 BPM/28 LPM
15°C/17 BPM/15 LPM
15°C/21 BPM/35 LPM
15°C/21 BPM/18 LPM
23°C/9 BPM/15 LPM
23°C/8 BPM/28 LPM
23°C/17 BPM/15 LPM
23°C/21 BPM/35 LPM
23°C/21 BPM/18 LPM
30°C/9 BPM/15 LPM
30°C/8 BPM/28 LPM
30°C/17 BPM/15 LPM
30°C/21 BPM/35 LPM
30°C/21 BPM/18 LPM

FIG. 13

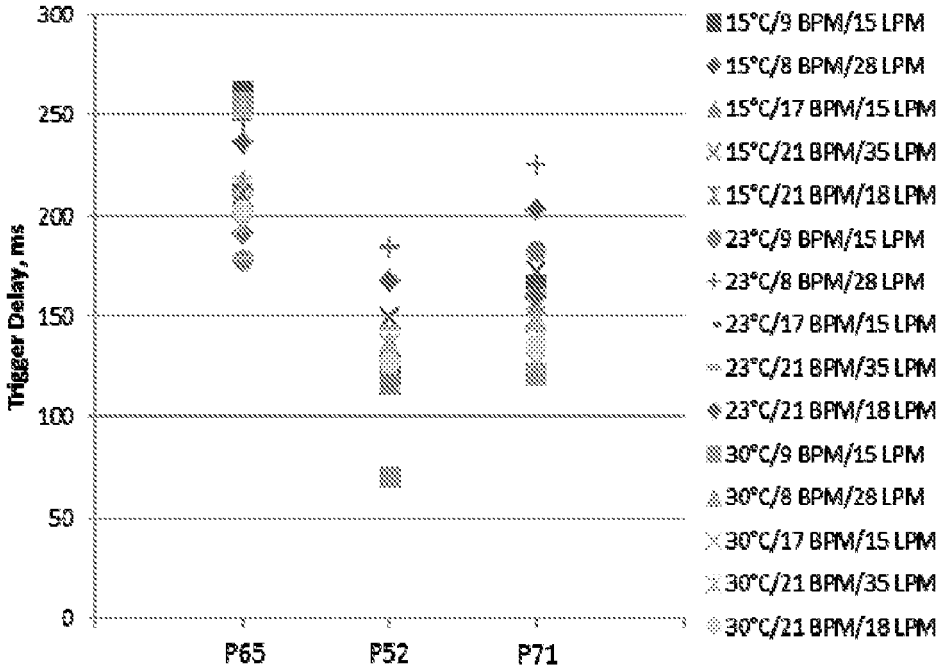

Trigger Delay, ms
300
250
200
150
100
50
0
P65
P52
P71
15°C/9 BPM/15 LPM
15°C/8 BPM/28 LPM
15°C/17 BPM/15 LPM
15°C/21 BPM/35 LPM
15°C/21 BPM/18 LPM
23°C/9 BPM/15 LPM
23°C/8 BPM/28 LPM
23°C/17 BPM/15 LPM
23°C/21 BPM/35 LPM
23°C/21 BPM/18 LPM
30°C/9 BPM/15 LPM
30°C/8 BPM/28 LPM
30°C/17 BPM/15 LPM
30°C/21 BPM/35 LPM
30°C/21 BPM/18 LPM

FIG. 14

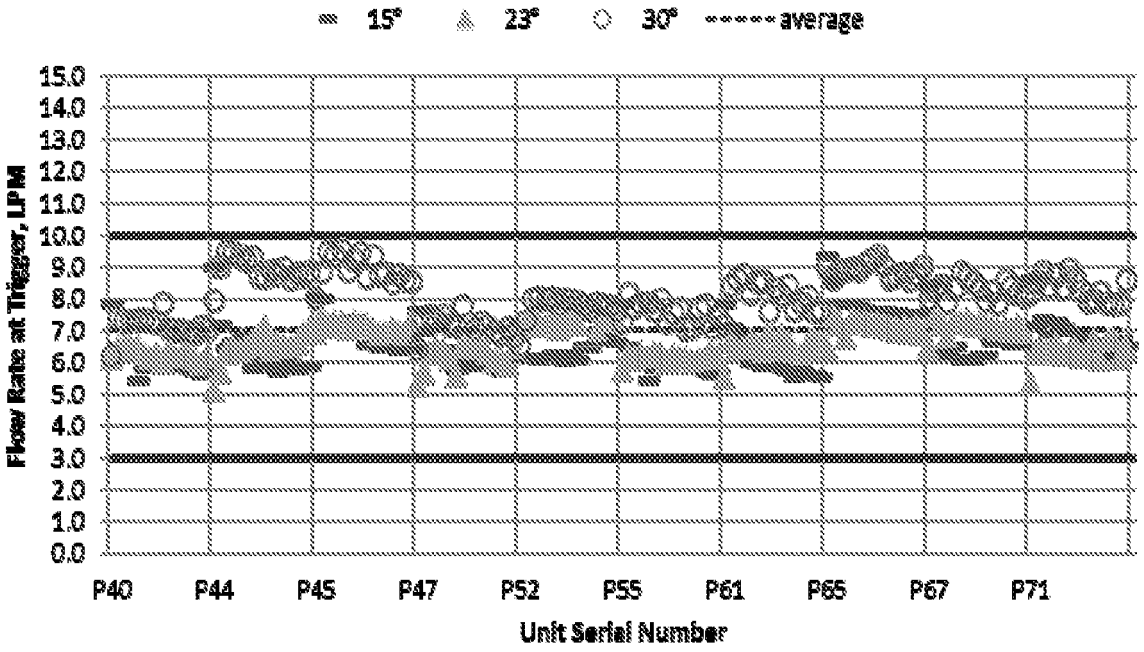

15°
23°
30°
average
15.0
14.0
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Flow Rate at Trigger, LPM
P40
P44
P45
P47
P52
P55
P61
P65
P67
P71
Unit Serial Number

FIG. 15

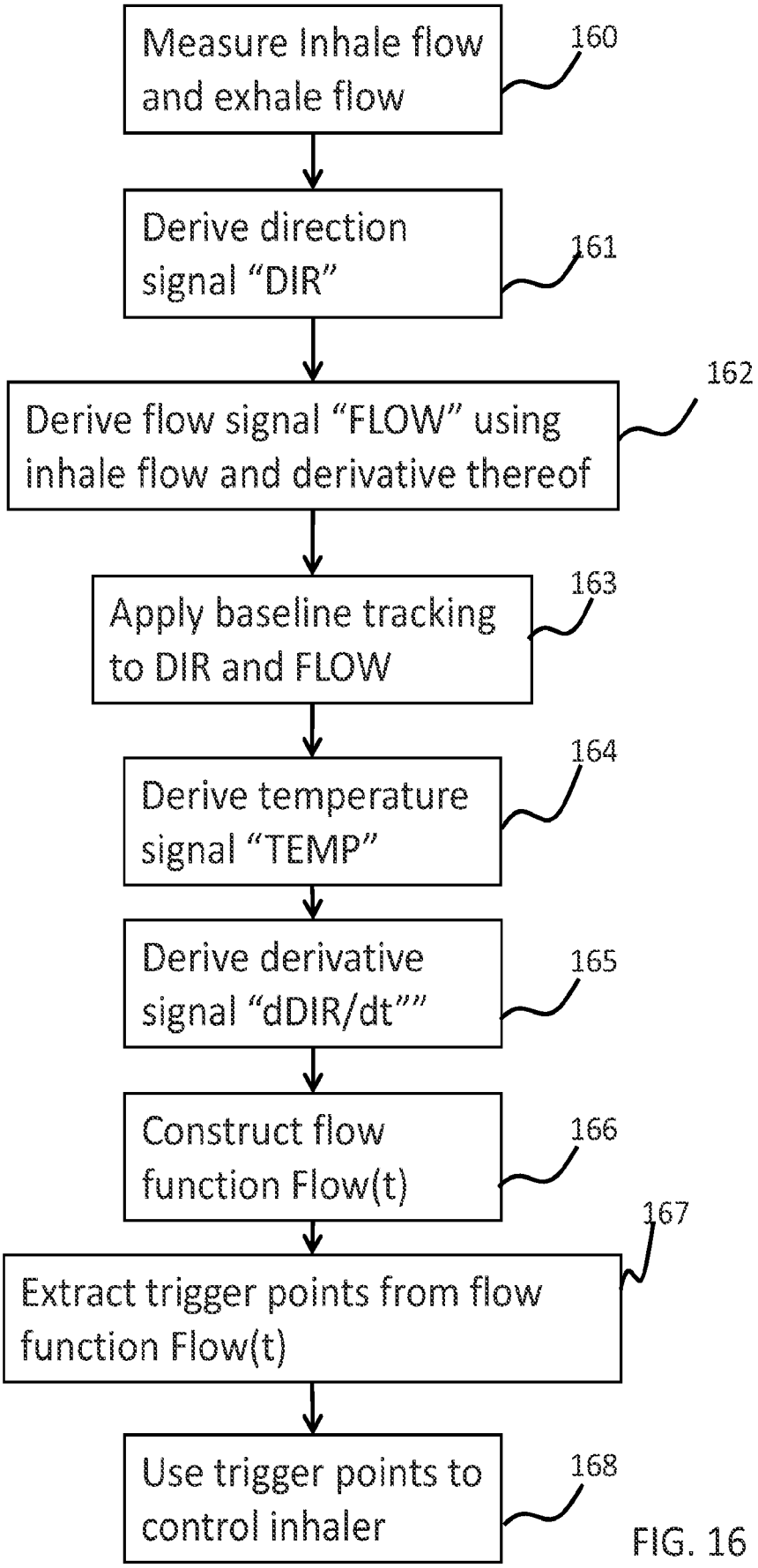

Measure Inhale flow and exhale flow
160
Derive direction signal "DIR"
161
Derive flow signal "FLOW" using inhale flow and derivative thereof
162
Apply baseline tracking to DIR and FLOW
163
Derive temperature signal "TEMP"
164
Derive derivative signal "dDIR/dt""
165
Construct flow function Flow(t)
166
Extract trigger points from flow function Flow(t)
167
Use trigger points to control inhaler
168

FIG. 16

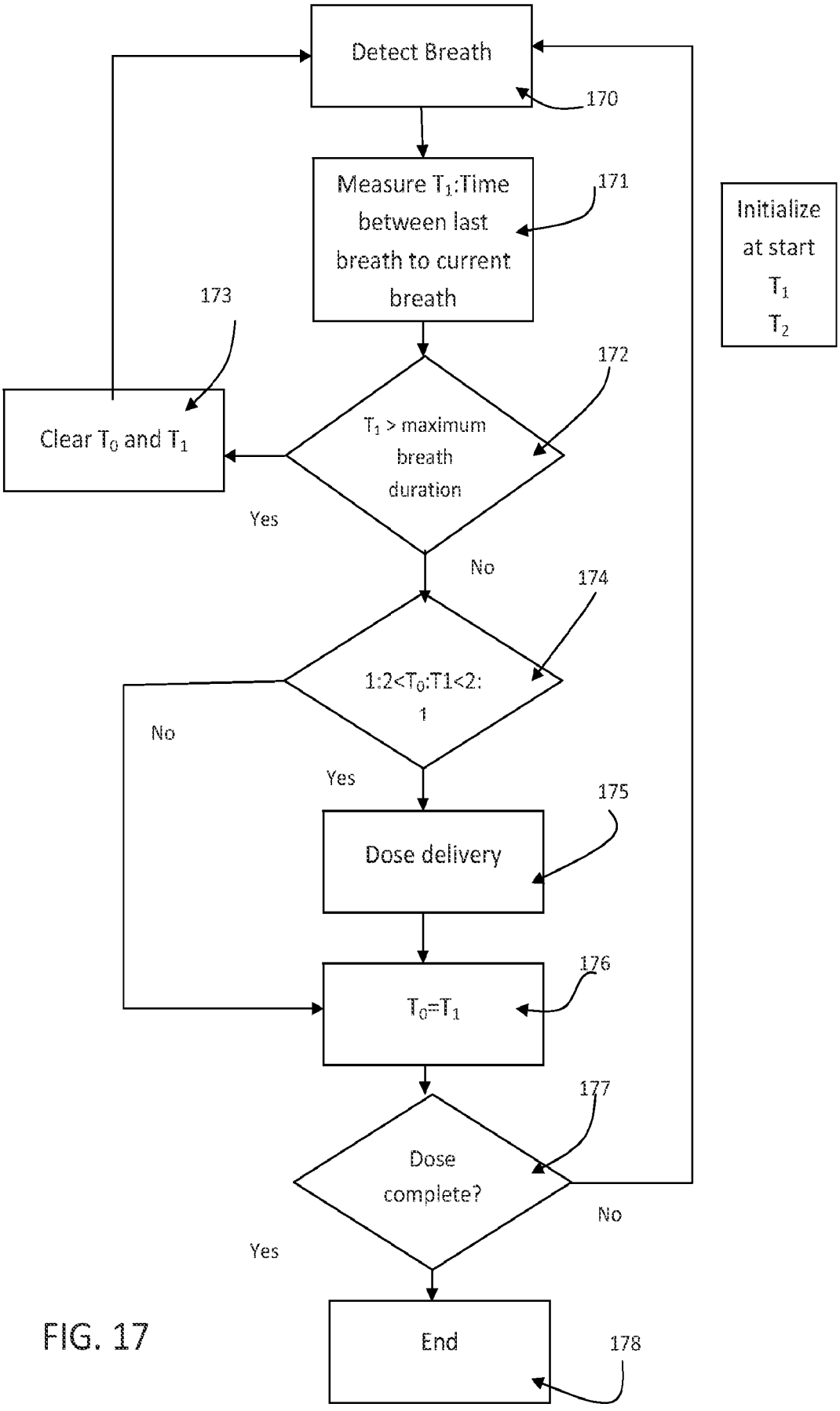

Detect Breath
170
Measure T_1:Time between last breath to current breath
171
Initialize at start
T_1
T_2
173
172
Clear T_0 and T_1
T_1 > maximum breath duration
Yes
No
174
1:2<T_0:T1<2:1
No
Yes
175
Dose delivery
176
T_0=T_1
177
Dose complete?
No
Yes
End
178

FIG. 17

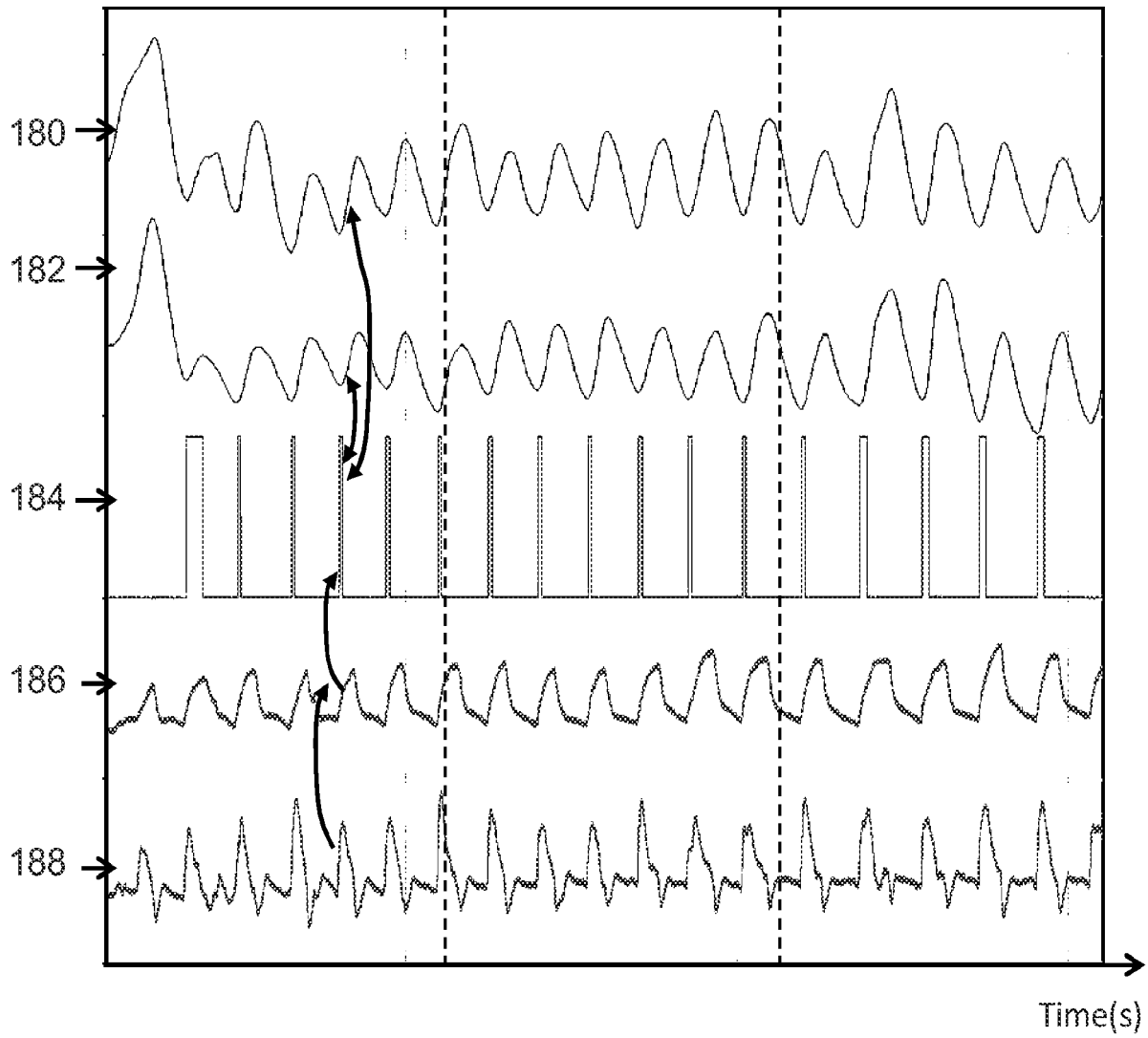


FIG. 18