Fig.1

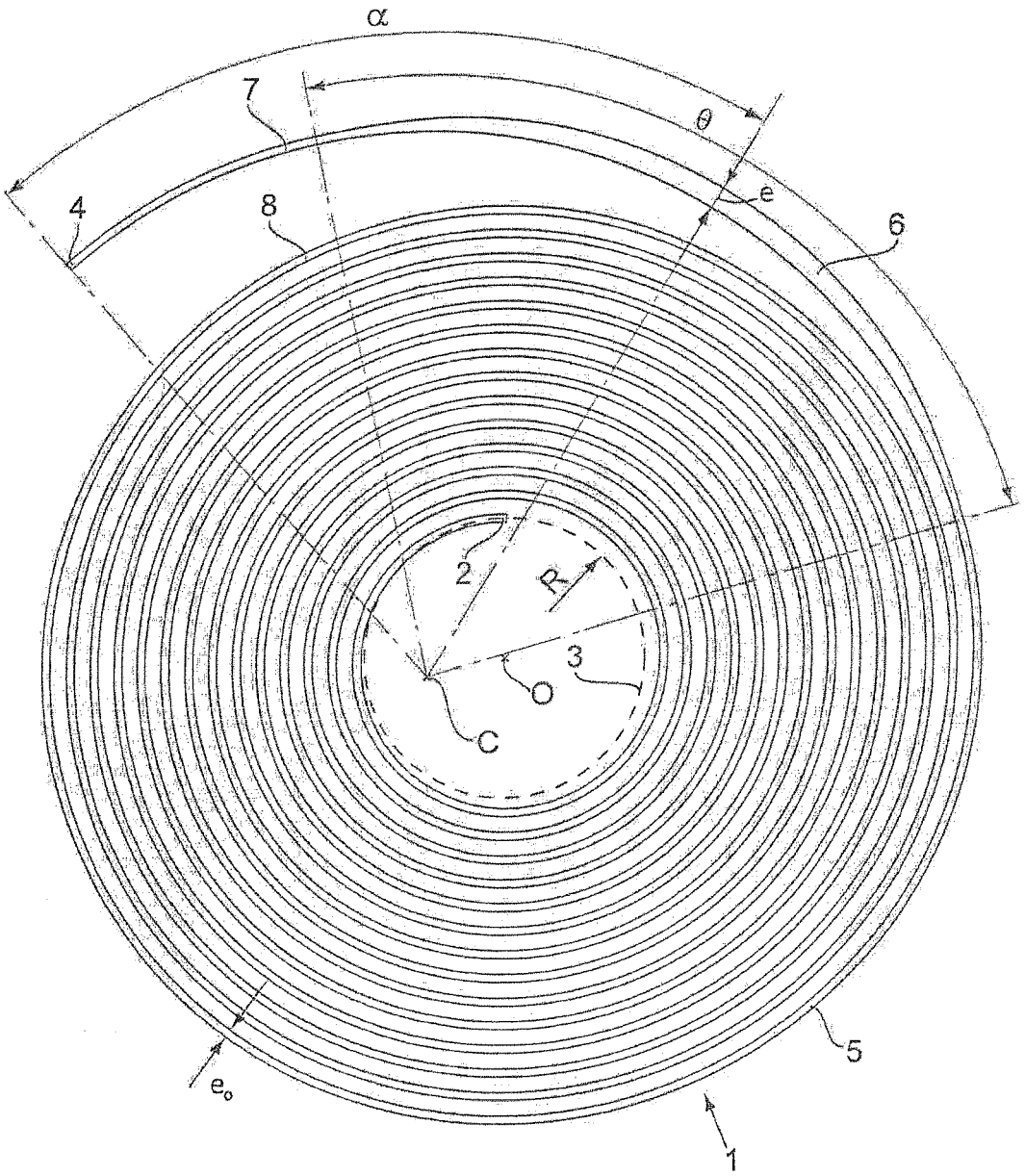


Fig.2

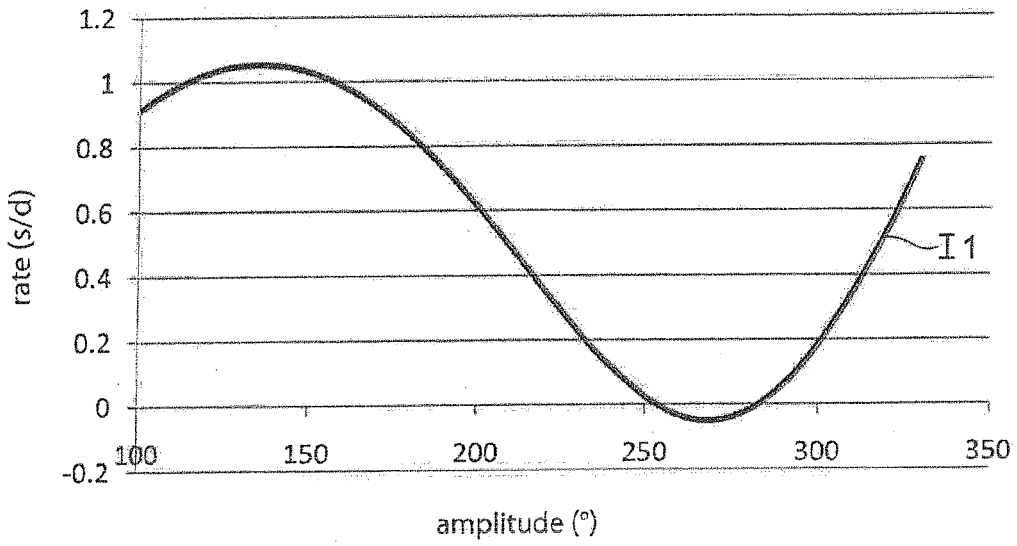

1.2
1
0.8
0.6
0.4
0.2
0
-0.2
100
150
200
250
300
350
rate (s/d)
amplitude (°)
I 1

Fig.3

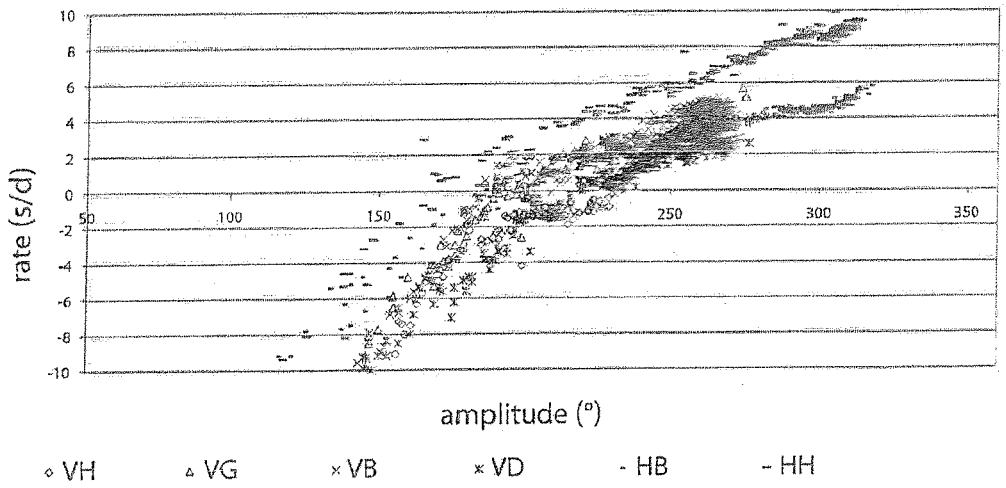

10
8
6
4
2
0
-2
-4
-6
-8
-10
50
100
150
250
300
350
rate (s/d)
amplitude (°)
◇ VH
△ VG
× VB
× VD
- HB
- HH

Fig.4

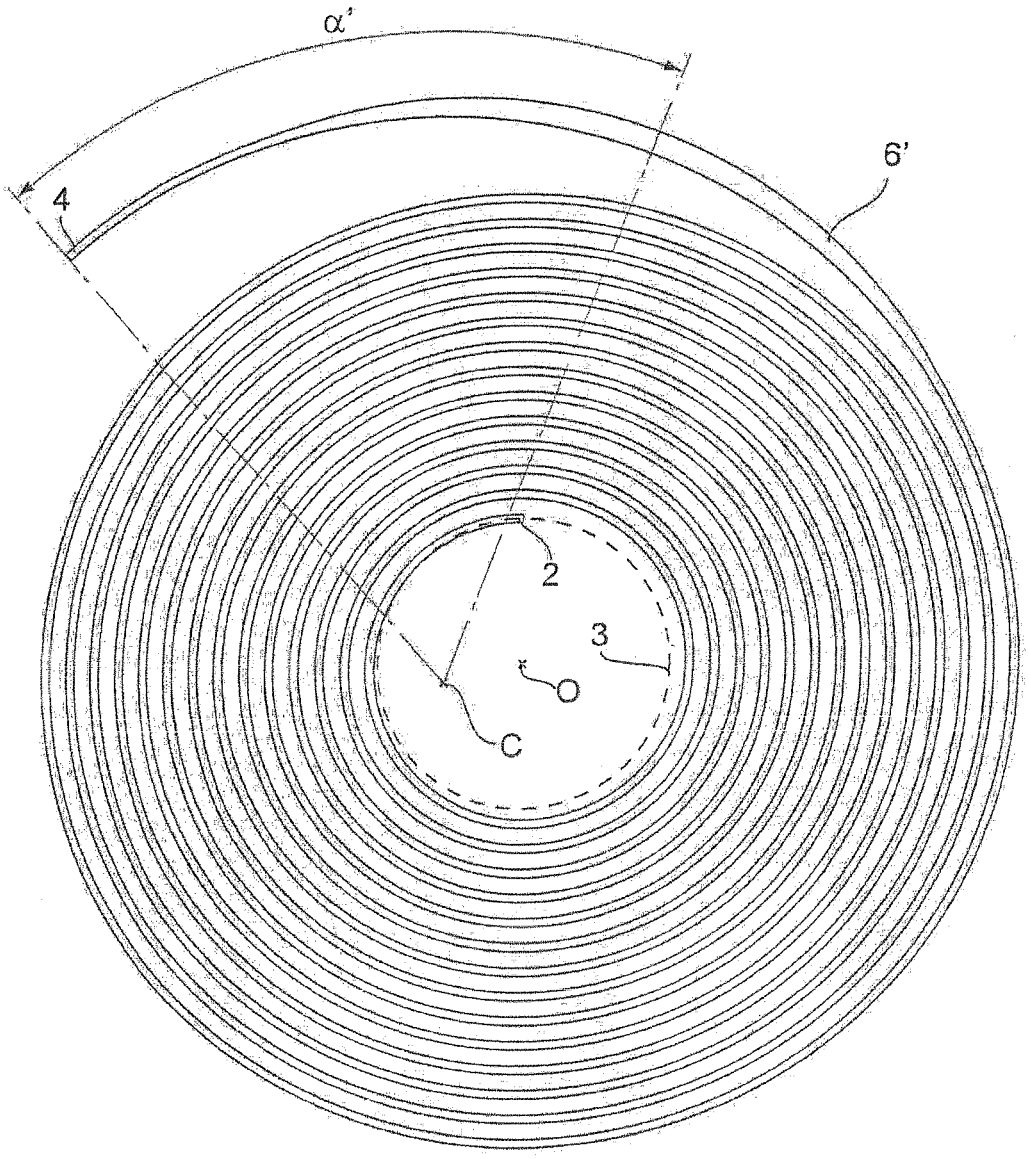


Fig.5

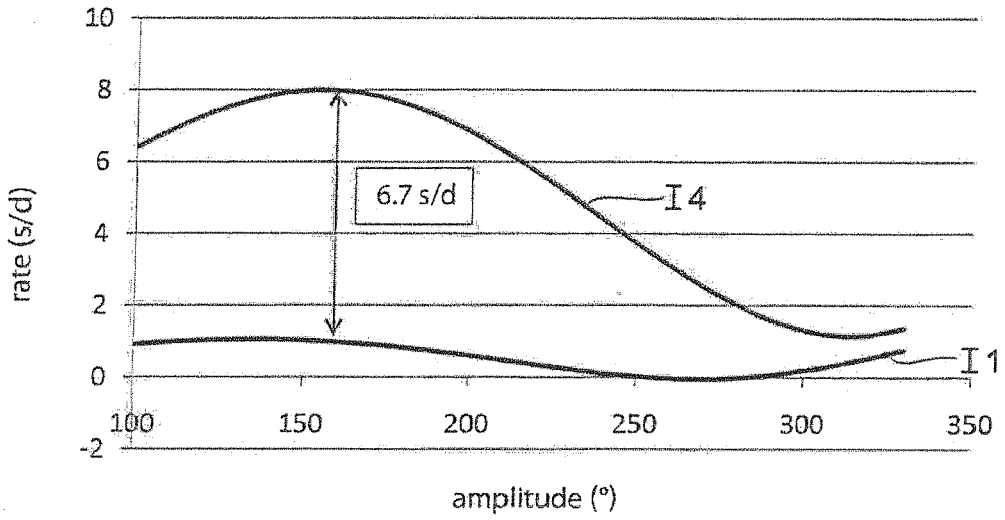

10
8
6
4
2
0
-2
100
150
200
250
300
350
rate (s/d)
amplitude (°)
6.7 s/d
I 4
I 1

Fig.6

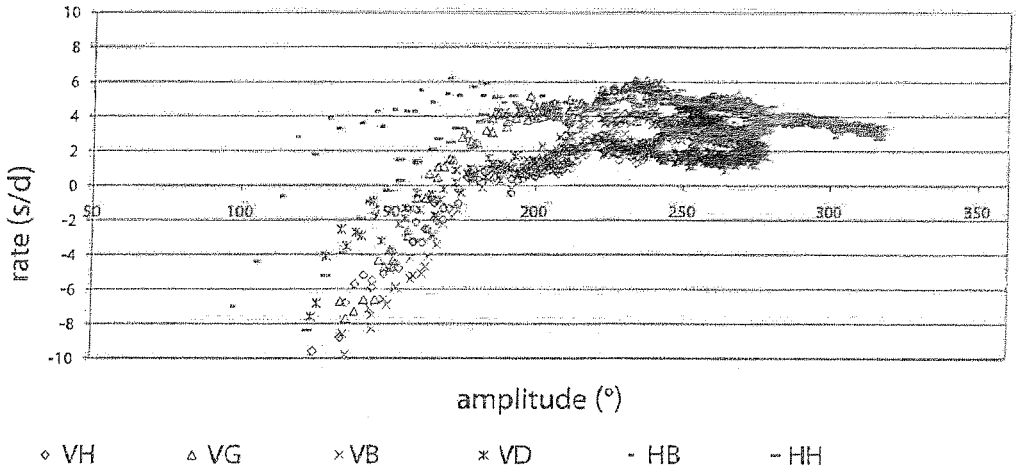

10
8
6
4
2
0
-2
-4
-6
-8
-10
50
100
150
200
250
300
350
rate (s/d)
amplitude (°)
◇ VH
△ VG
× VB
✳ VD
- HB
– HH

Fig.7

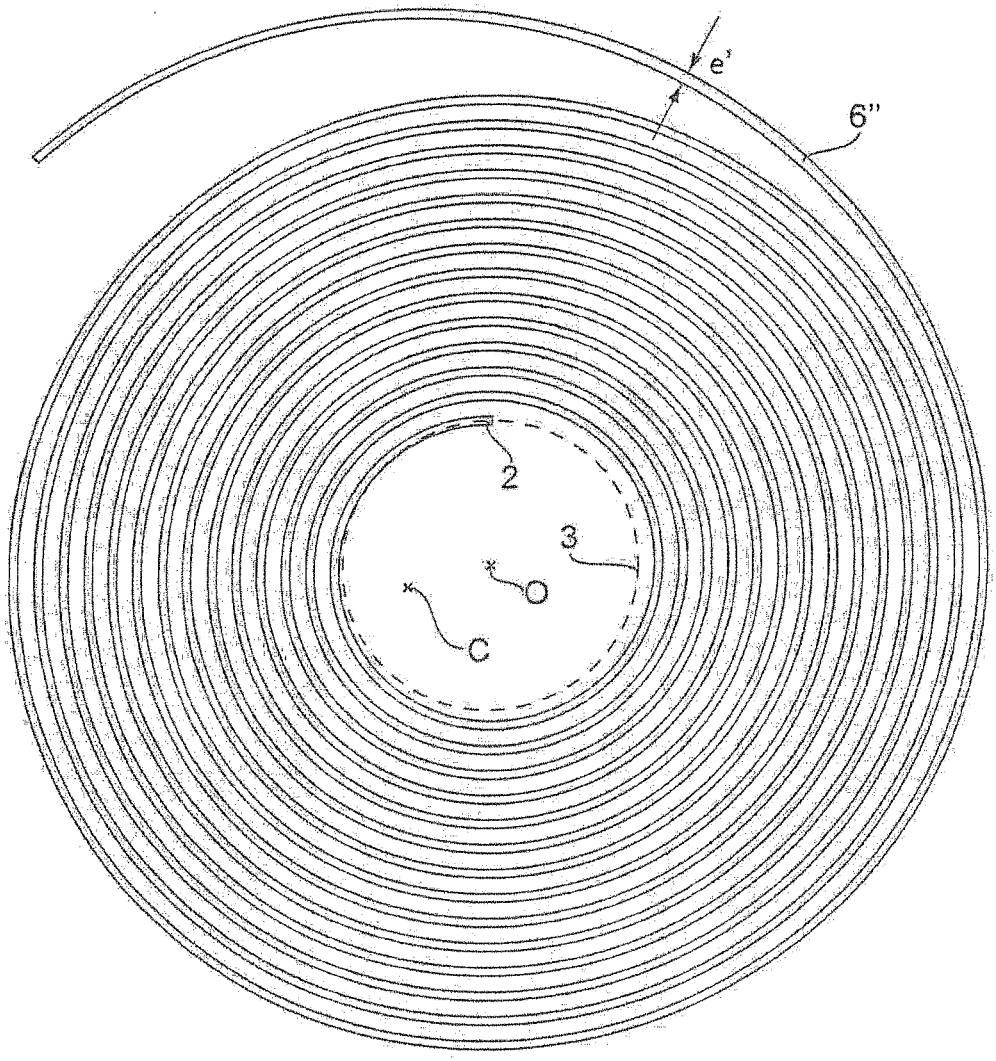


Fig.8

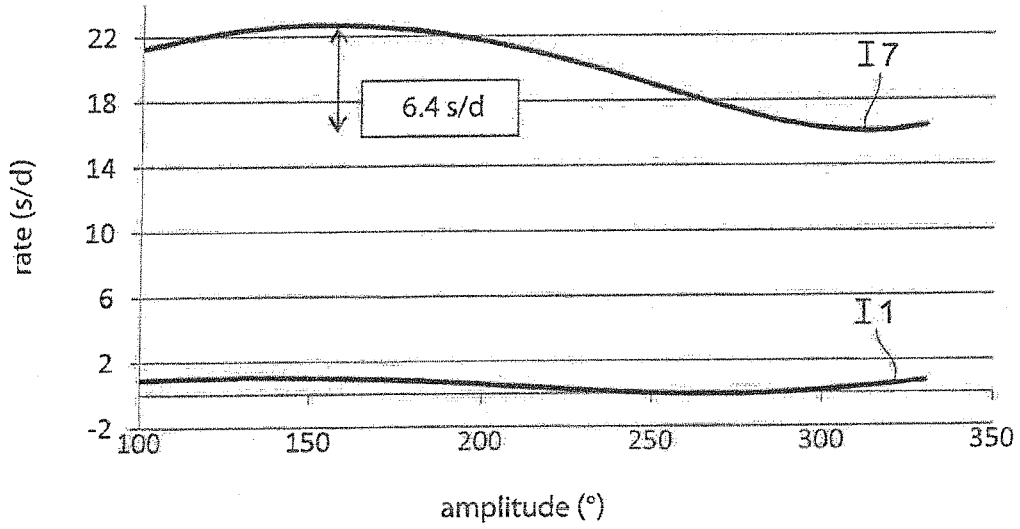

22
18
14
10
6
2
-2
100
150
200
250
300
350
rate (s/d)
amplitude (°)
6.4 s/d
I7
I1

Fig.10

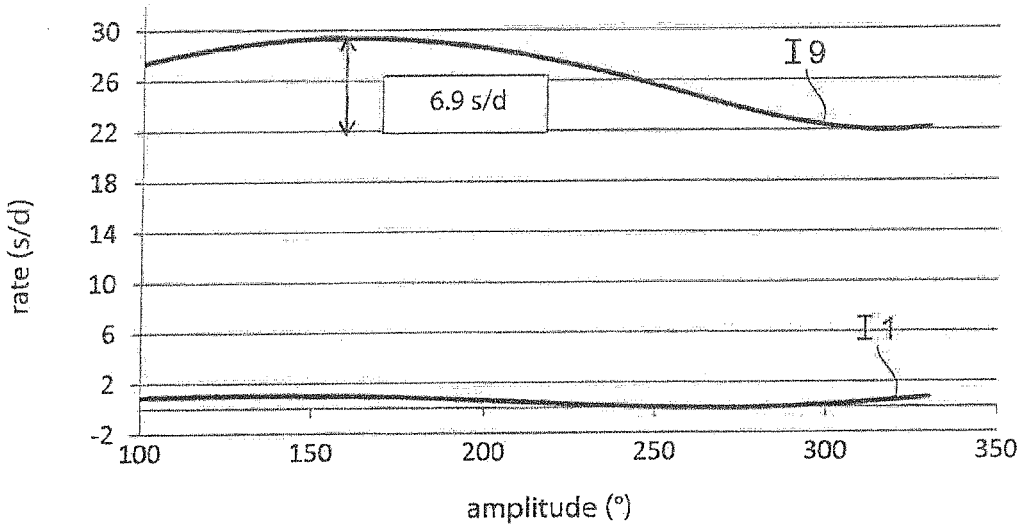

30
26
22
18
14
10
6
2
-2
100
150
200
250
300
350
rate (s/d)
amplitude (°)
6.9 s/d
I9
I1

Fig.9

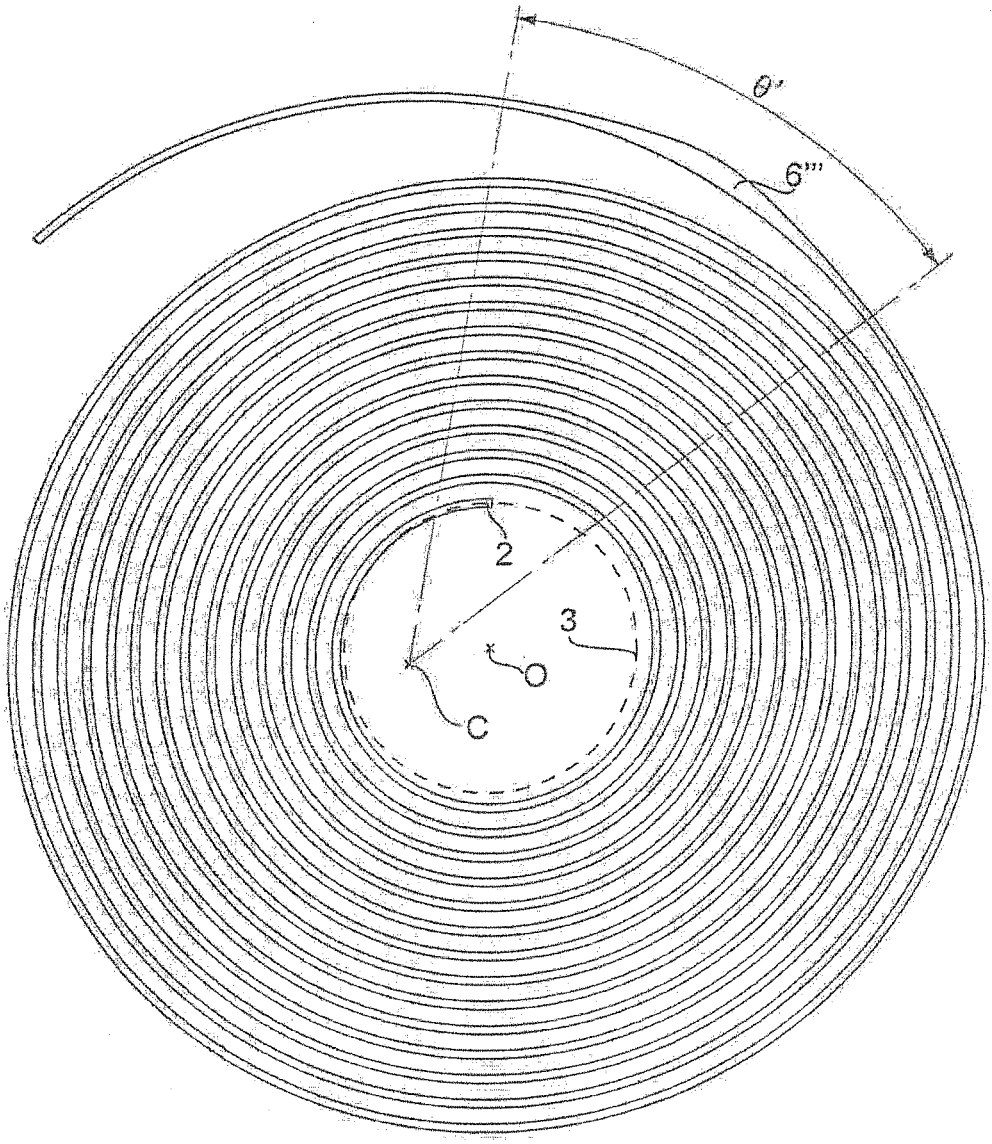


Fig.11

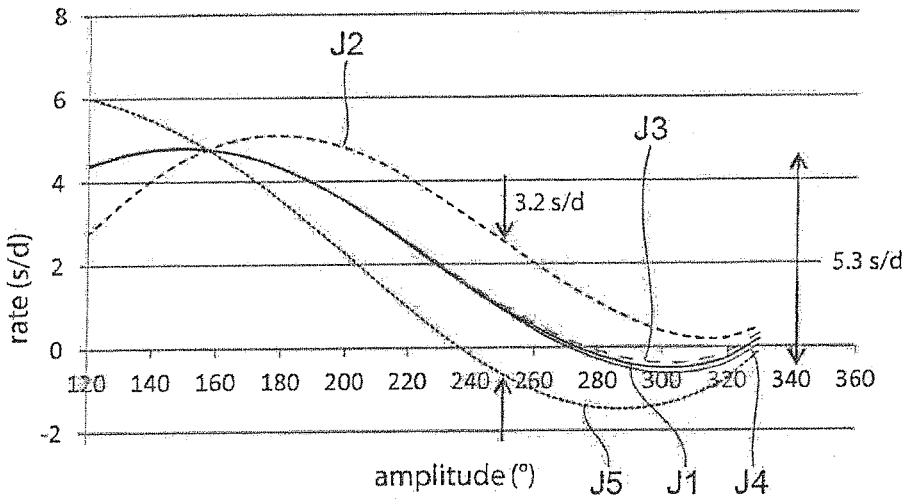

8
6
4
2
0
-2
rate (s/d)
120
140
160
180
200
220
240
260
280
300
320
340
360
amplitude (°)
J2
J3
3.2 s/d
5.3 s/d
J5
J1
J4

Fig.12

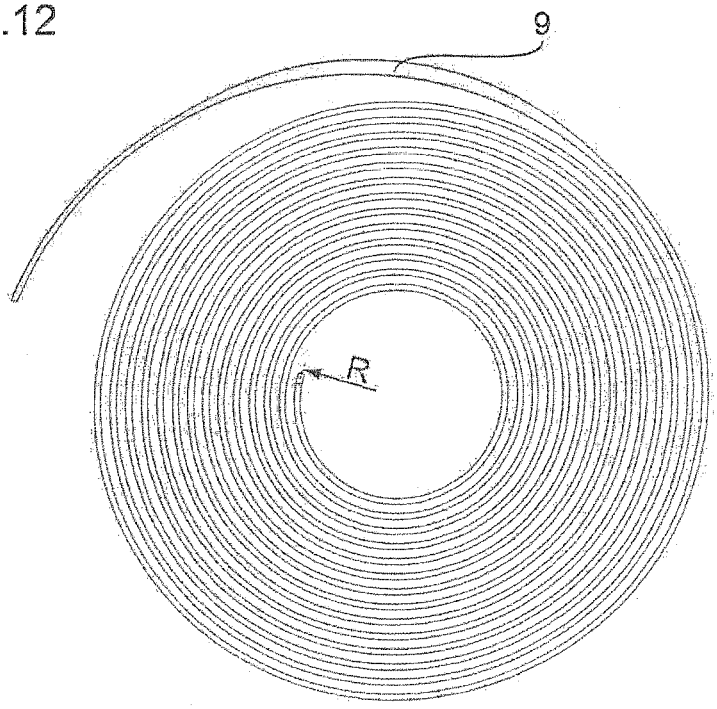

9
R

Fig.13

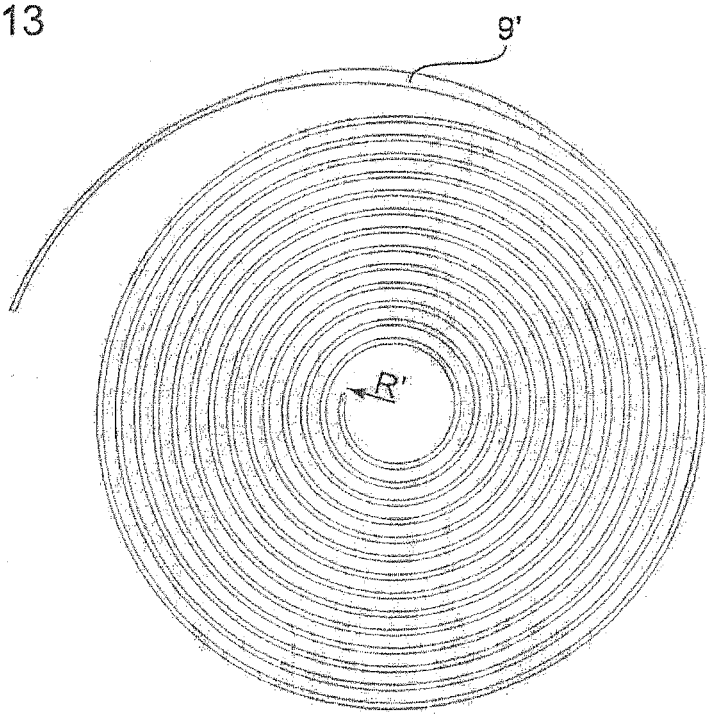

g'
R'

Fig.14

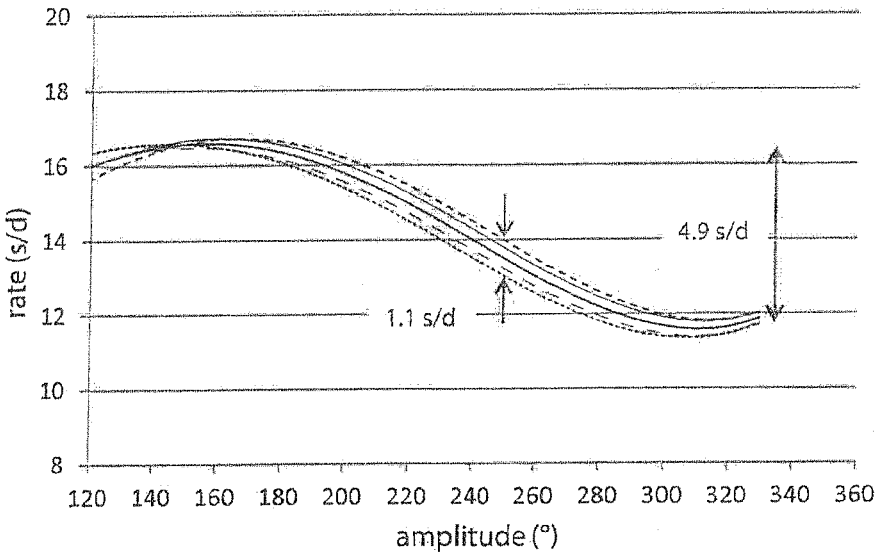

20
18
16
14
12
10
8
rate (s/d)
4.9 s/d
1.1 s/d
120 140 160 180 200 220 240 260 280 300 320 340 360
amplitude (°)

Fig.15

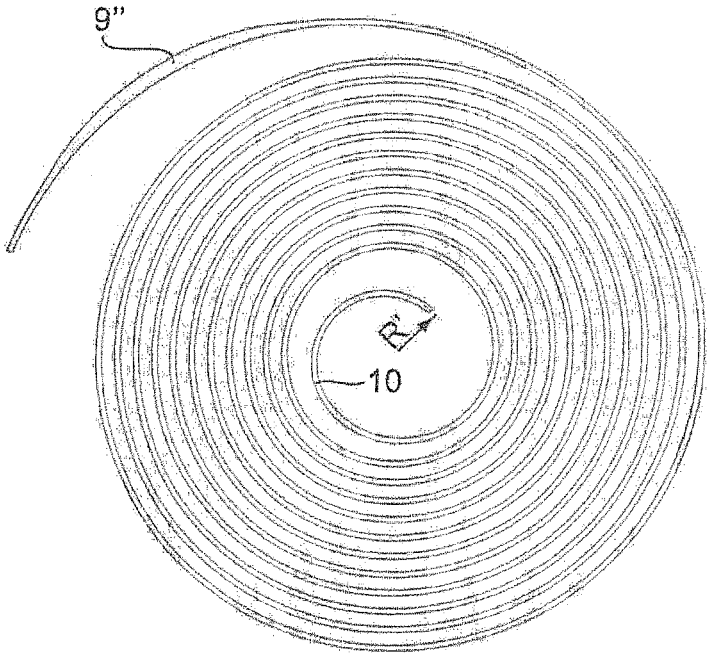

9"
10

Fig.16

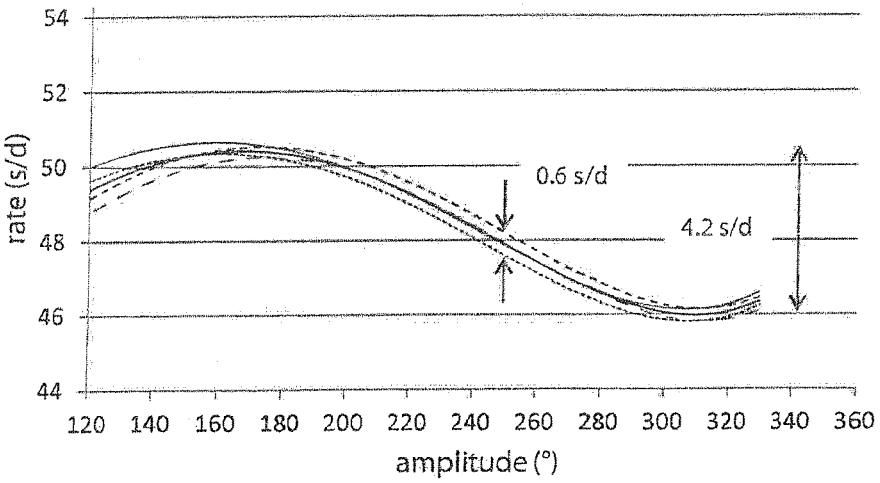

54
52
50
48
46
44
rate (s/d)
0.6 s/d
4.2 s/d
120 140 160 180 200 220 240 260 280 300 320 340 360
amplitude (°)

Fig.17

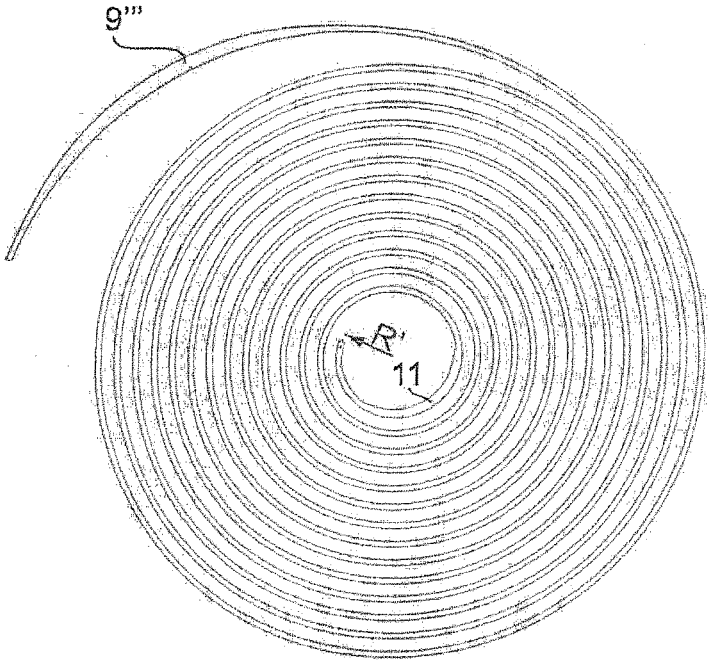

9'''
R'
11

Fig.18

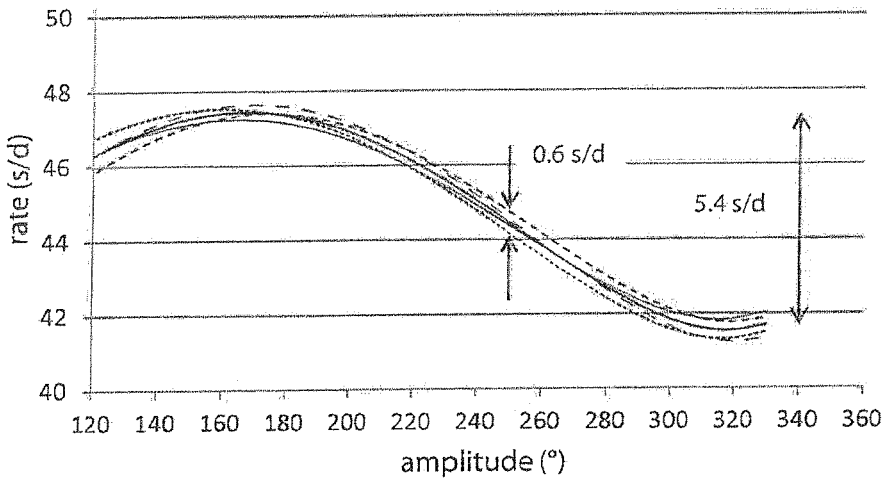
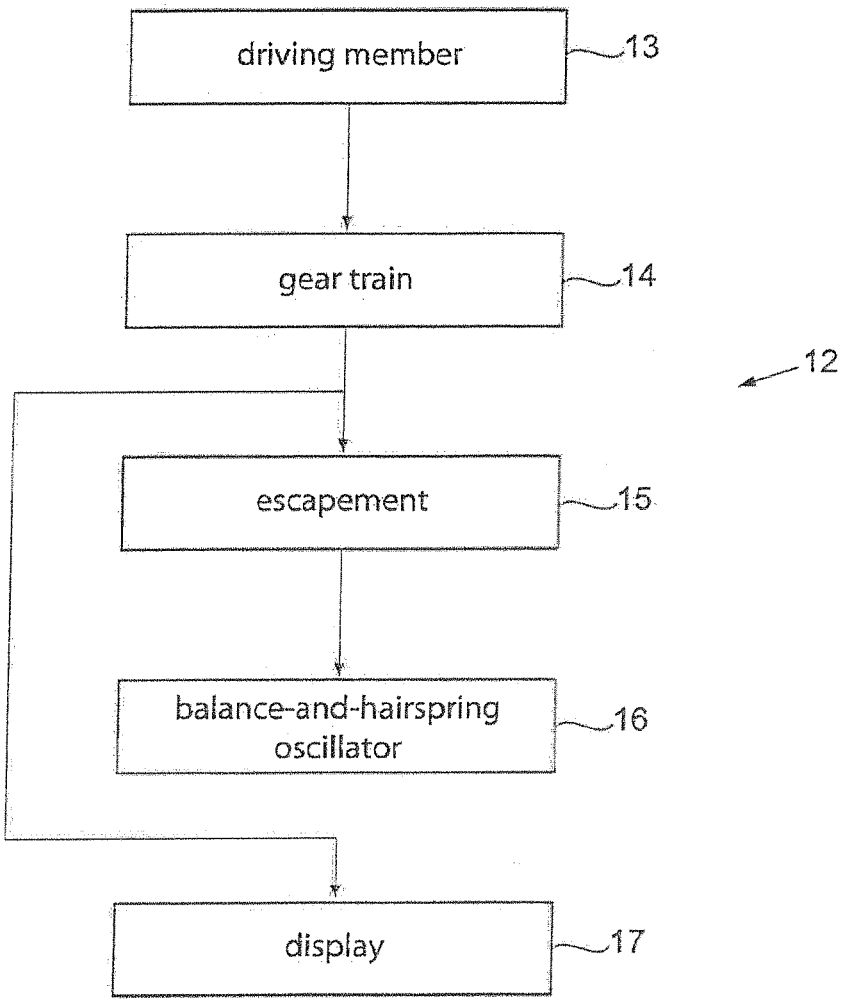

50
48
46
44
42
40
rate (s/d)
0.6 s/d
5.4 s/d
120
140
160
180
200
220
240
260
280
300
320
340
360
amplitude (°)

Fig.19


driving member
13
gear train
14
12
escapement
15
balance-and-hairspring oscillator
16
display
17