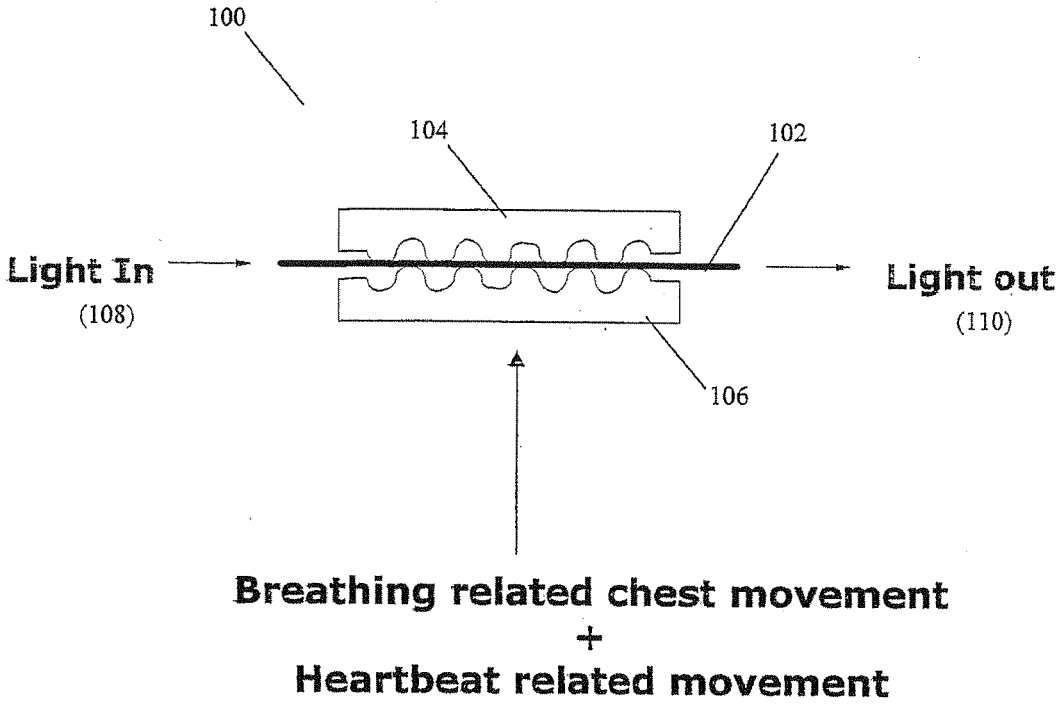

100
104
102
Light In
(108)
Light out
(110)
106
Breathing related chest movement
+
Heartbeat related movement

Figure 1

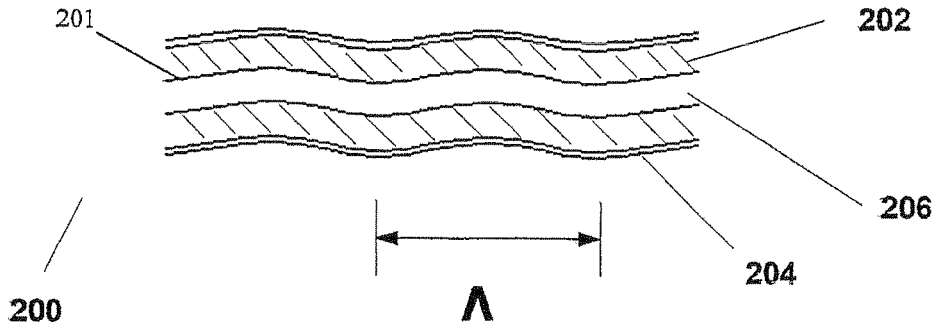


Figure 2

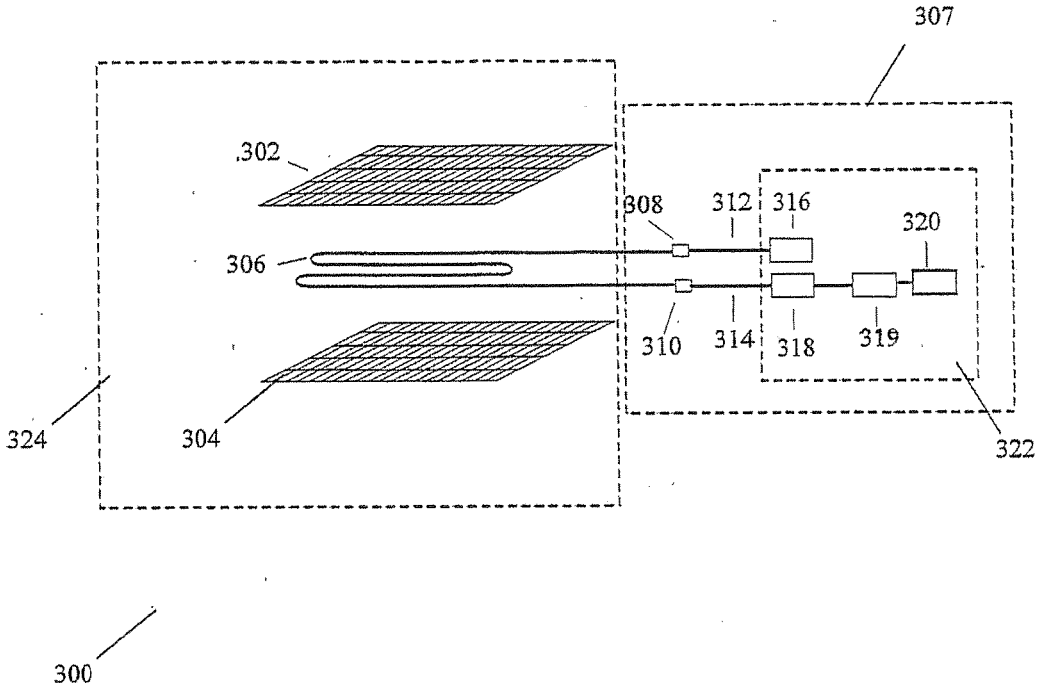


Figure 3

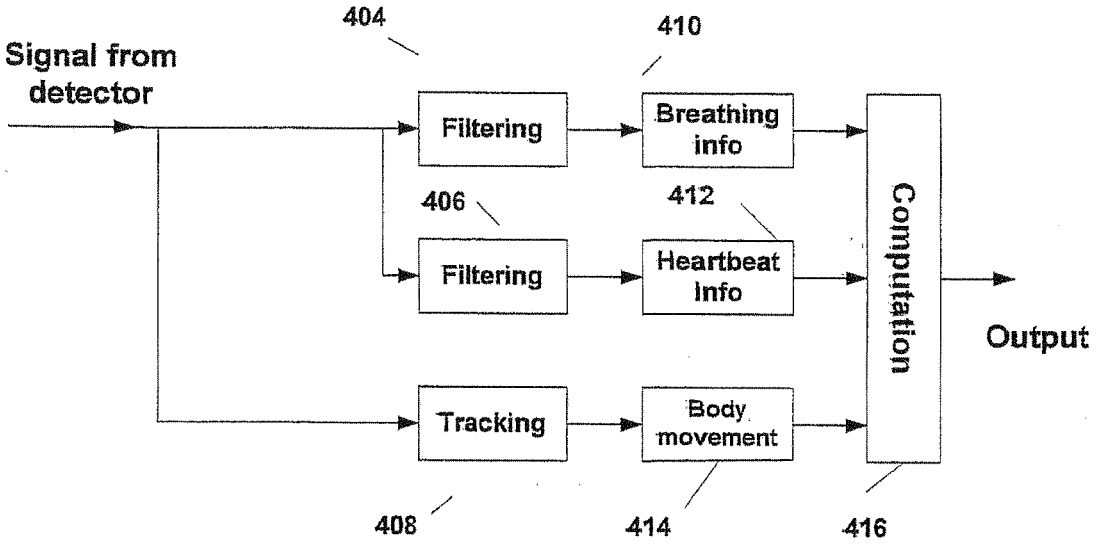

Signal from detector
404
410
Filtering
Breathing info
406
412
Filtering
Heartbeat Info
Computation
Output
Tracking
Body movement
408
414
416

Figure 4

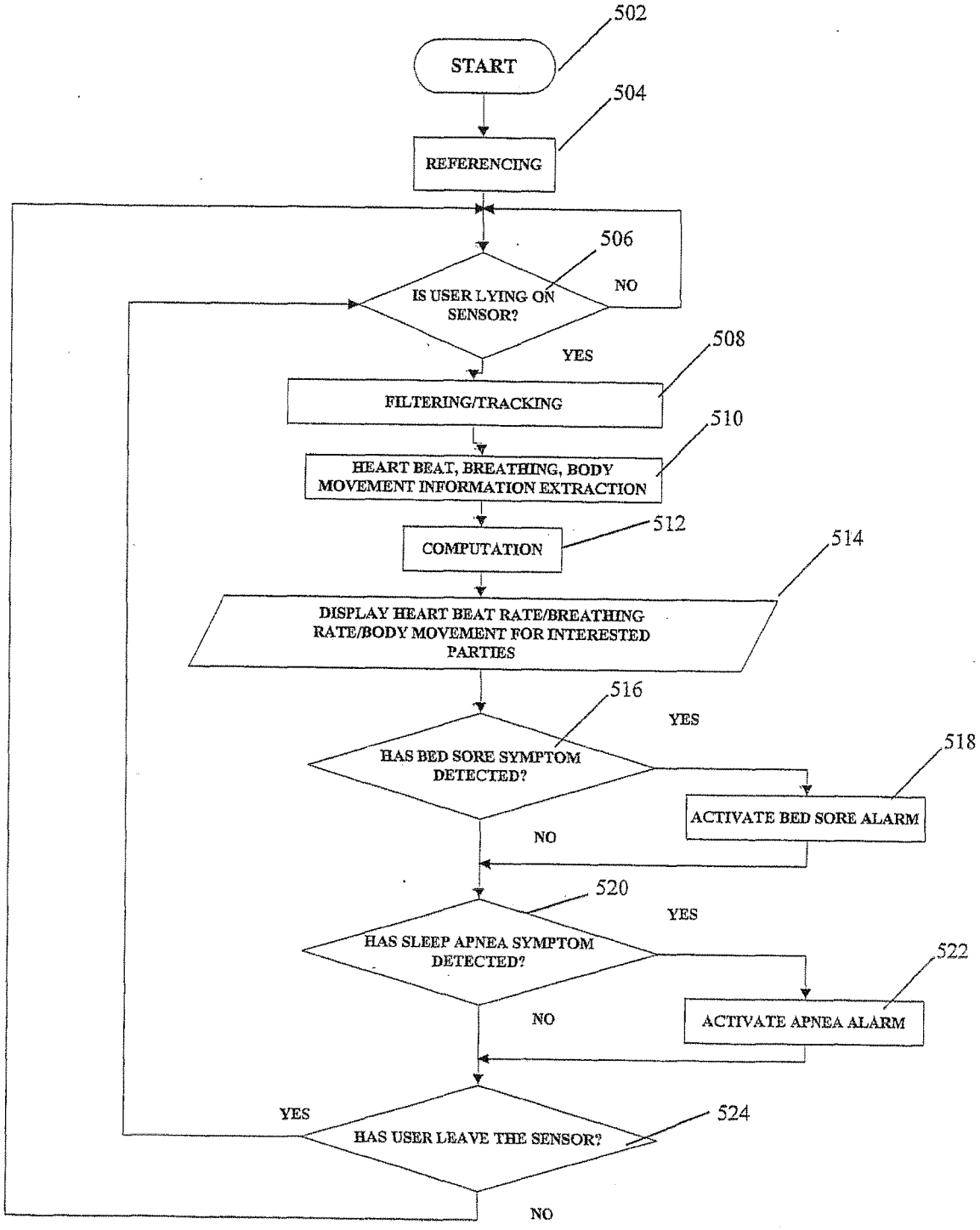

502
START
504
REFERENCING
506
IS USER LYING ON SENSOR?
NO
YES
508
FILTERING/TRACKING
510
HEART BEAT, BREATHING, BODY MOVEMENT INFORMATION EXTRACTION
512
COMPUTATION
514
DISPLAY HEART BEAT RATE/BREATHING RATE/BODY MOVEMENT FOR INTERESTED PARTIES
516
HAS BED SORE SYMPTOM DETECTED?
YES
518
ACTIVATE BED SORE ALARM
NO
520
HAS SLEEP APNEA SYMPTOM DETECTED?
YES
522
ACTIVATE APNEA ALARM
NO
524
HAS USER LEAVE THE SENSOR?
YES
NO

Figure 5

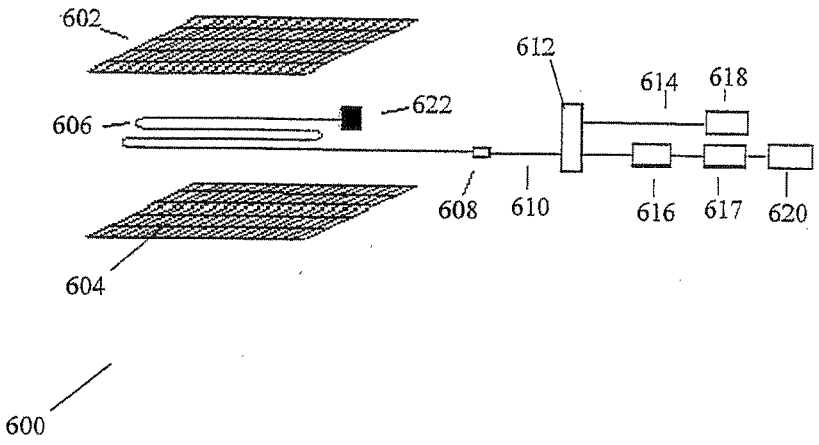


Figure 6

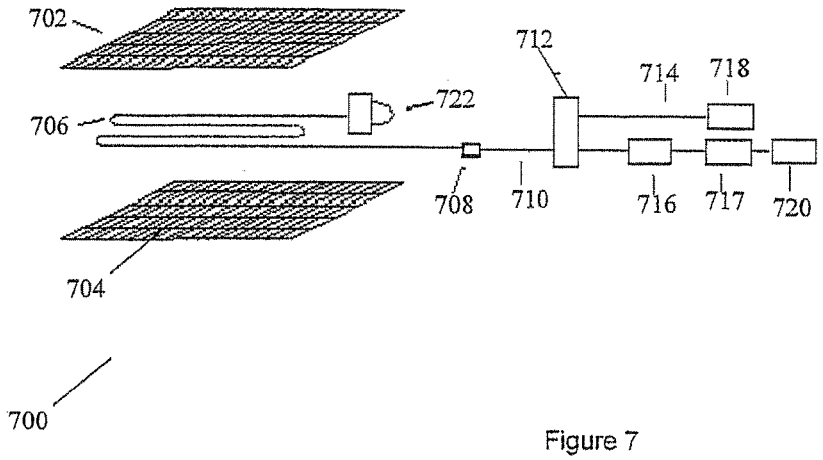


Figure 7

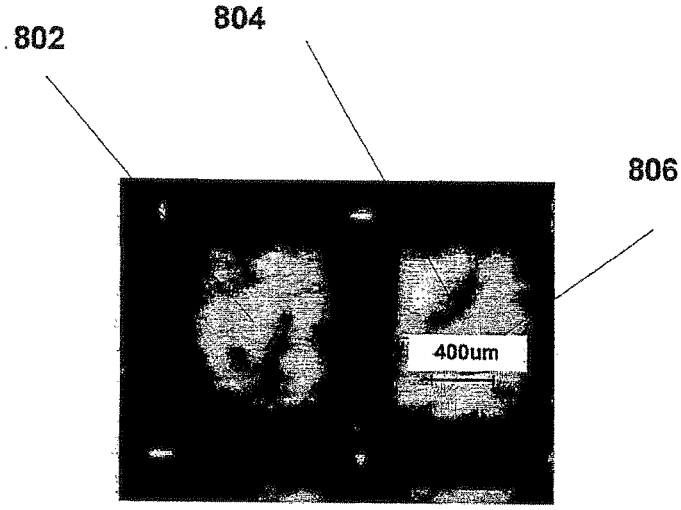


Figure 8

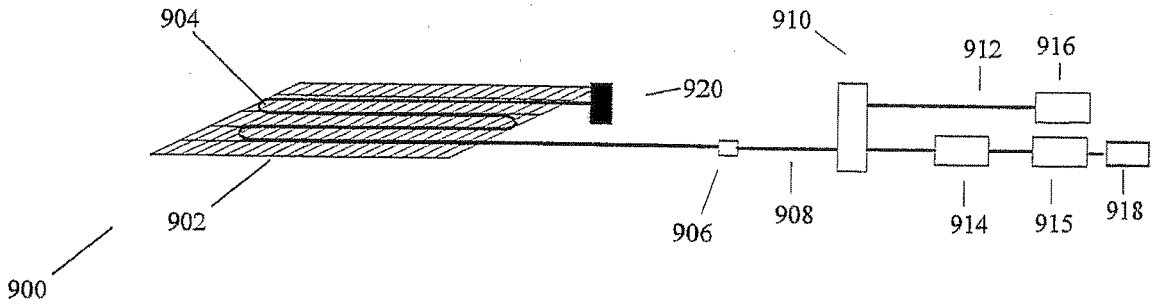


Figure 9(a)

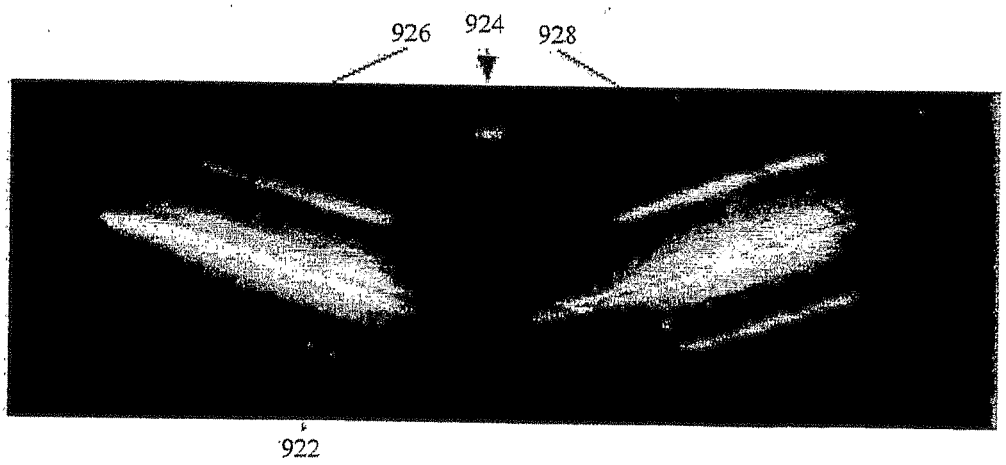


Figure 9(b)

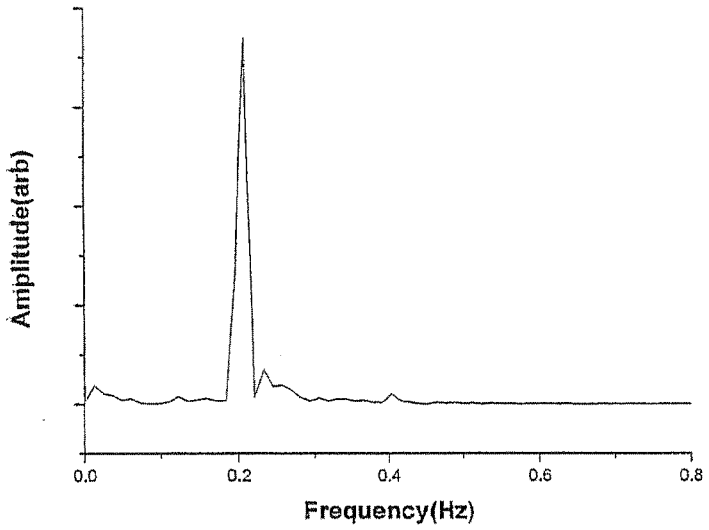


Figure 10

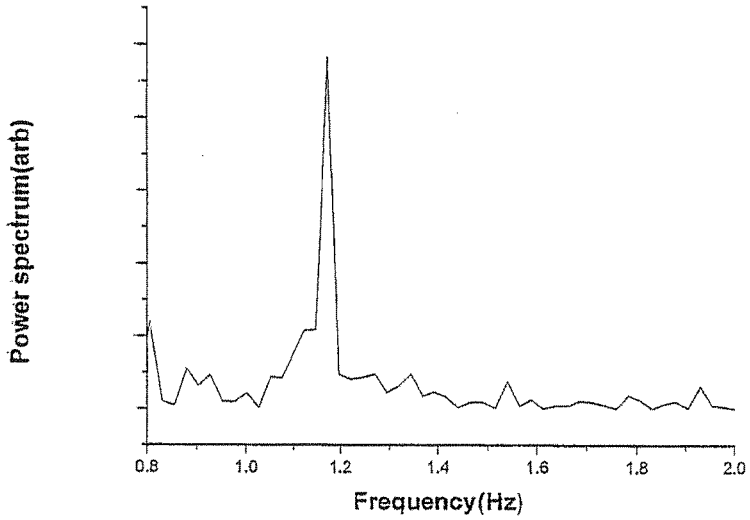


Figure 11

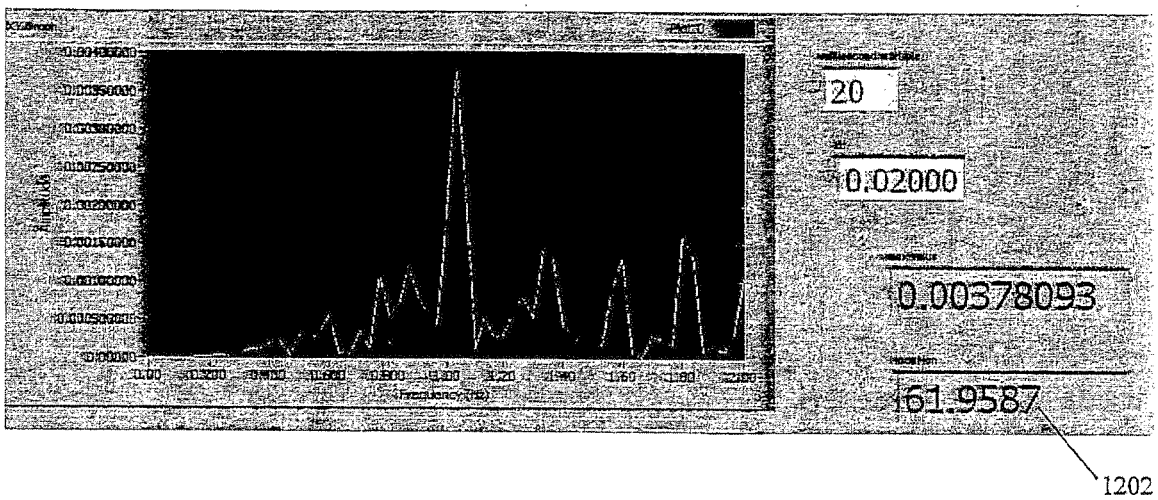


Figure 12

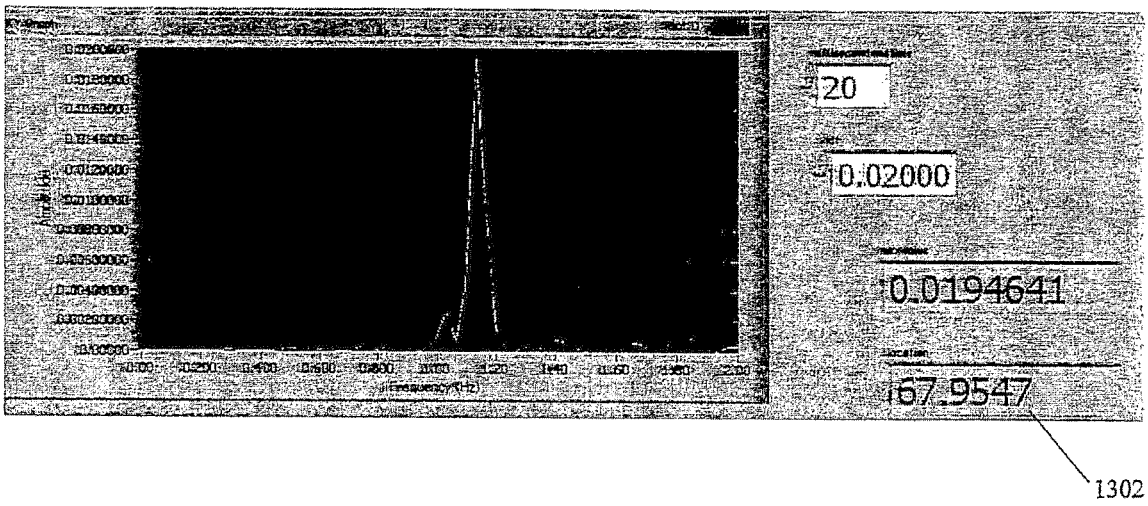


Figure 13

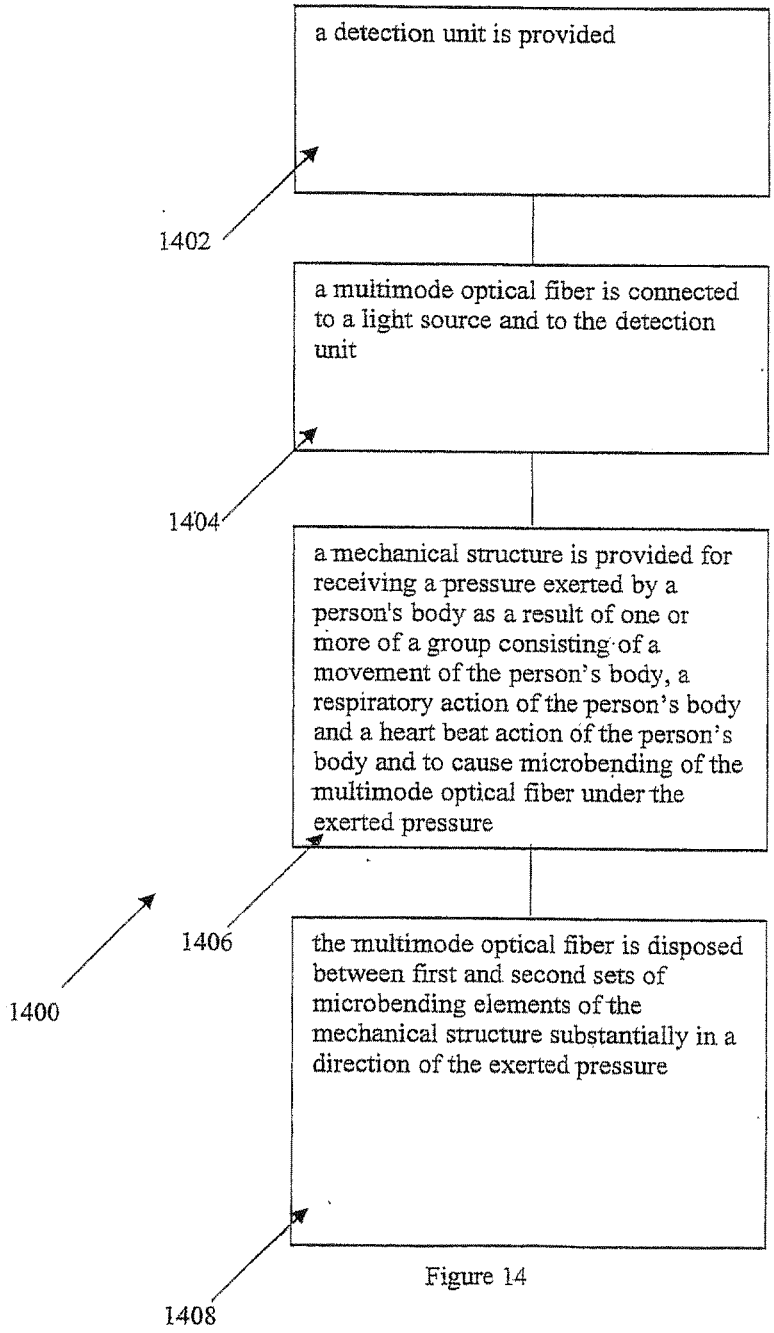

a detection unit is provided
1402
a multimode optical fiber is connected to a light source and to the detection unit
1404
a mechanical structure is provided for receiving a pressure exerted by a person's body as a result of one or more of a group consisting of a movement of the person's body, a respiratory action of the person's body and a heart beat action of the person's body and to cause microbending of the multimode optical fiber under the exerted pressure
1406
1400
the multimode optical fiber is disposed between first and second sets of microbending elements of the mechanical structure substantially in a direction of the exerted pressure
1408

Figure 14

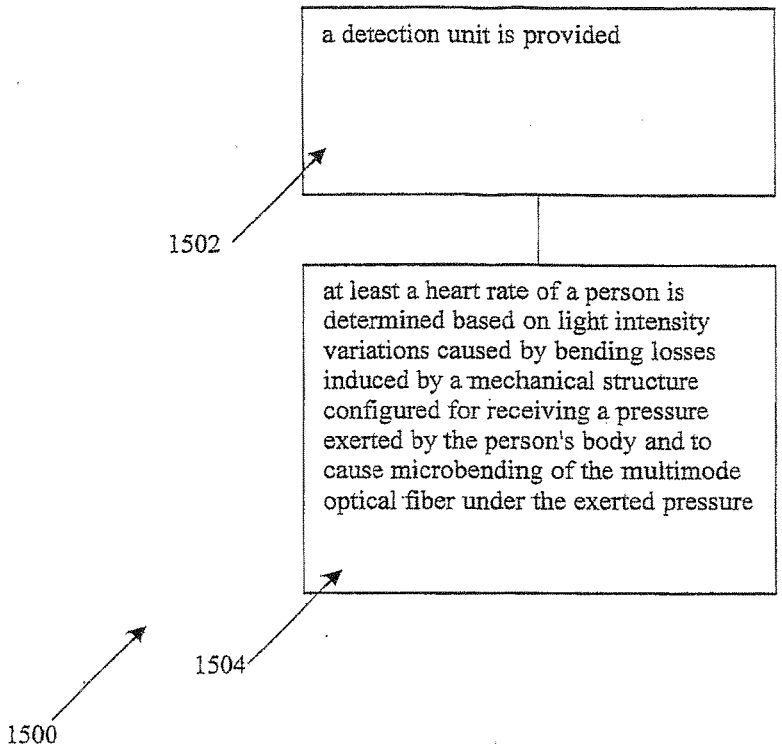

a detection unit is provided
1502
at least a heart rate of a person is determined based on light intensity variations caused by bending losses induced by a mechanical structure configured for receiving a pressure exerted by the person's body and to cause microbending of the multimode optical fiber under the exerted pressure
1504
1500

Figure 15

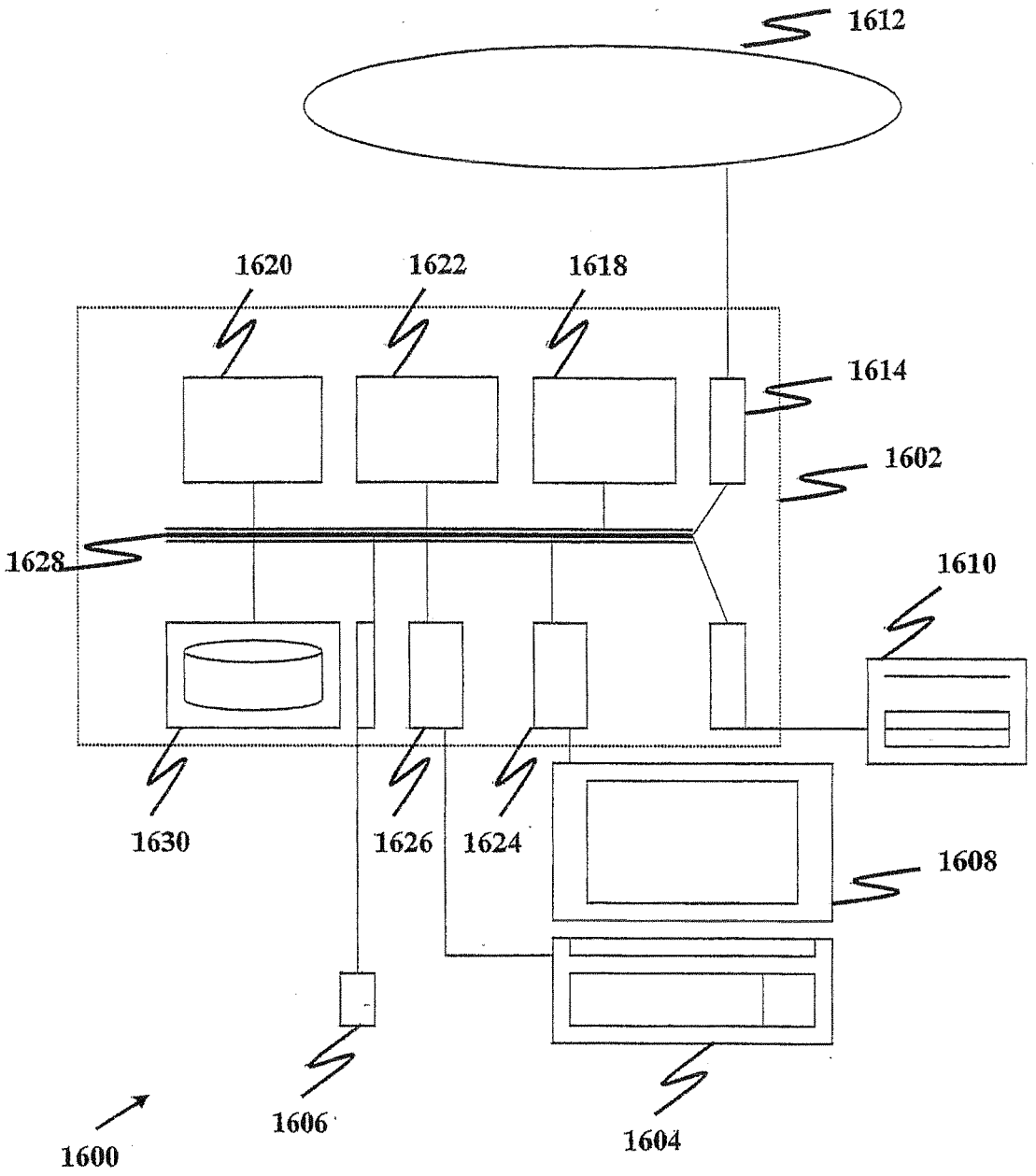

1612
1620
1622
1618
1614
1602
1628
1610
1630
1626
1624
1608
1606
1604
1600

Figure 16

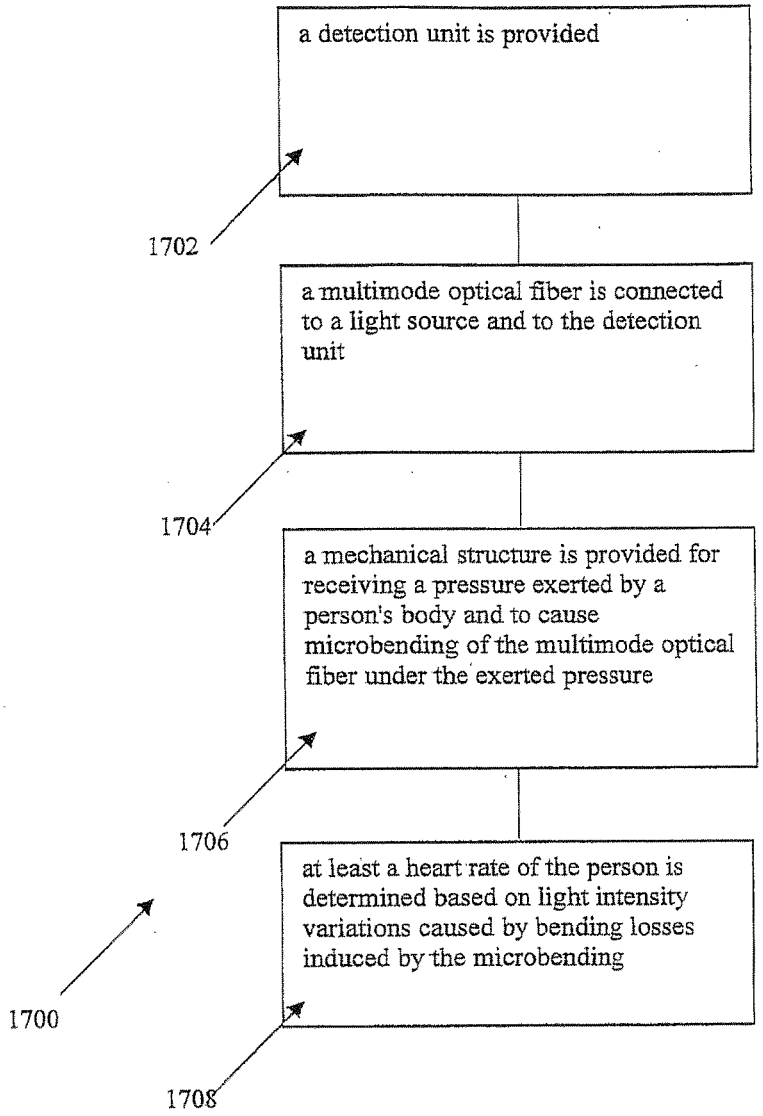

a detection unit is provided
1702
a multimode optical fiber is connected to a light source and to the detection unit
1704
a mechanical structure is provided for receiving a pressure exerted by a person's body and to cause microbending of the multimode optical fiber under the exerted pressure
1706
at least a heart rate of the person is determined based on light intensity variations caused by bending losses induced by the microbending
1700
1708

Figure 17