CLAIMS

What is claimed is:

1. An apparatus for controlling vehicle operation based on a driver's blood alcohol content comprising:

a detector module comprising a sensor to produce an electrical signal representative of a blood alcohol content of the driver, wherein the electrical signal is generated by measuring an alcohol content of the air within a predetermined vehicle zone; and

a control module electrically coupled to the detector module, the control module to control at least one vehicle operation in response to the electrical signal received by the control module from the sensor.

2. The apparatus of claim 1, comprising:

a vehicle status detector module to generate a status signal representative of a vehicle operation condition.

3. The apparatus of claim 2, wherein when the status signal is representative of a stationary vehicle, the control module prevents the operation of at least one of an ignition system, a fuel system, and a transmission system.

4. The apparatus of claim 2, wherein when the status signal is representative of a moving vehicle, the control module activates at least one of a horn, a vehicle flasher, and an audible warning.

5. The apparatus of claim 1, comprising an air intake to intake air from the predetermined vehicle zone.

6. The apparatus of claim 1, wherein the sensor comprises a fuel cell sensor.

7. The apparatus of claim 5, wherein the fuel cell sensor comprises:

a first and second platinum electrode;

a porous acid-electrolyte located between the first and second platinum electrodes; and

a current meter connected in series between the first and second platinum electrodes.

8. The apparatus of claim 1, wherein the sensor comprises an oxide semiconductor sensor.

9. The apparatus of claim 8, wherein the oxide semiconductor sensor comprises:

a printed circuit board;

a breath alcohol sensor mounted operably mounted to the printed circuit board; and

a heating unit operably mounted to the printed circuit board, wherein the heating unit heats the breath alcohol sensor to a predetermined temperature.

10. The apparatus of claim 1, wherein the sensor comprises an infrared spectroscopy sensor.

11. The apparatus of claim 10, wherein the infrared spectroscopy sensor comprises:

a housing comprising an inlet port, an outlet port, and defining a sample chamber therein;

a lamp configured to generate a broadband infrared beam;

a filter wheel comprising one or more narrow band filters;

one or more photocells, wherein the broadband infrared beam passes through the sample chamber, the filter wheel, and the one or more photocells.

12. The apparatus of claim 1, wherein the predetermined vehicle zone is defined as a volume of air surrounding the driver of the vehicle but excluding passenger areas of the vehicle.

13. A system for controlling vehicle operation based on a driver's blood alcohol content comprising:

a control module, responsive to a wireless signal from a mobile device, wherein the wireless signal is representative of a blood alcohol content of a user of the mobile device as determined by an alcohol sensor located within the mobile device, and wherein the control module is configured to control one or more vehicle operations.

14. The system of claim 13, comprising:

a vehicle status detector module to generate a status signal representative of a vehicle operation condition.

15. The system of claim 14, wherein when the status signal is representative of a stationary vehicle, the control module prevents the operation of at least one of an ignition system, a fuel system, and a transmission system.

16. The system of claim 14, wherein when the status signal is representative of a moving vehicle, the control module activates at least one of a horn, a vehicle flasher, and an audible warning.

17. A method for preventing operation of a vehicle by an intoxicated person, the method comprising:

detecting, via a sensor, the blood alcohol content of a person, wherein the detecting is performed by testing the alcohol content of a volume of air within a predetermined vehicle zone;

signaling, by the sensor, a control module configured to control at least one vehicle operation; and

controlling, by the control module, the at least one vehicle operation so as to control operation of the vehicle.

18. The method of claim 17, comprising signaling by the sensor when the sensor detects a blood alcohol content over a predetermined limit.

19. The method of claim 17, comprising generating, via a vehicle status detector module, a status signal representative of a vehicle operation condition.

20. The method of claim 19, comprising preventing, via the control module, activation of the at least one vehicle operation when the status signal is representative of a stationary vehicle.

21. The method of claim 20, wherein the at least one vehicle operation includes an ignition system, a transmission system, and a fuel system.

22. The method of claim 19, comprising activating, via the control module, the at least one operation when the status signal is representative of a moving vehicle.

23. The method of claim 22, wherein the at least one vehicle operation includes a horn, a vehicle light system, and an audible warning system.

AMENDED CLAIMS
received by the International Bureau on 18 January 2013 (18.01.2013)

What is claimed is:

1. An apparatus for controlling vehicle operation based on a driver's blood alcohol content comprising:

a detector module (204) comprising a sensor module (206) and an air intake (216), wherein the sensor module (206) is configured to produce an electrical signal representative of a blood alcohol content of the driver, wherein the electrical signal is generated by measuring an alcohol content of the air within a predetermined vehicle detection zone (104) defined as a three-dimensional zone substantially in or in proximity of a driver seat side of a vehicle, and wherein a detection process is not dependent upon the driver's interaction to initiate the detection process; and

a control module (208) electrically coupled to the detector module (204), the control module (208) to control at least one vehicle operation in response to the electrical signal received by the control module (208) from the sensor module (206).

2. The apparatus of claim 1, comprising:

a vehicle status detector module (210) to generate a status signal representative of a vehicle operation condition.

3. The apparatus of claim 2, wherein when the status signal is representative of a stationary vehicle, the control module (208) prevents the operation of at least one of an ignition system, a fuel system, and a transmission system.

4. The apparatus of claim 2, wherein when the status signal is representative of a moving vehicle, the control module (208) activates at least one of a horn, a vehicle flasher, and an audible warning.

5. The apparatus of claim 1, wherein the air intake (216) is configured to intake air from the predetermined vehicle detection zone (104).

6. The apparatus of claim 1, wherein the sensor module (206) comprises a fuel cell sensor (308).

7. The apparatus of claim 5, wherein the fuel cell sensor (306) comprises:

a first and second platinum electrode (310a, 310b);

a porous acid-electrolyte (312) located between the first and second platinum electrodes (310a, 310b); and

a current meter (314) connected in series between the first and second platinum electrodes (310a, 310b).

8. The apparatus of claim 1, wherein the sensor module (206) comprises an oxide semiconductor sensor (506).

9. The apparatus of claim 8, wherein the oxide semiconductor (506) sensor comprises:

a printed circuit board (508);

a breath alcohol sensor (512) operably mounted to the printed circuit board (508); and

a heating unit (510) operably mounted to the printed circuit board (508), wherein the heating unit (510) heats the breath alcohol sensor (512) to a predetermined temperature.

10. The apparatus of claim 1, wherein the sensor module (206) comprises an infrared spectroscopy sensor (406).

11. The apparatus of claim 10, wherein the infrared spectroscopy sensor (406) comprises:

a housing (404) comprising an inlet port (408), an outlet port (410), and defining a sample chamber therein;

a lamp (412) configured to generate a broadband infrared beam;

a filter wheel (418) comprising one or more narrow band filters;

one or more photocells (422), wherein the broadband infrared beam passes through the sample chamber, the filter wheel, and the one or more photocells.

12. The apparatus of claim 1, wherein the predetermined vehicle detection zone (104) is defined as a volume of air surrounding the driver of the vehicle but excluding passenger areas of the vehicle.

13. A system for controlling vehicle operation based on a driver's blood alcohol content comprising:

a control module (708) responsive to a wireless signal from a mobile device located within a predetermined vehicle detection zone (104) defined as a three-dimensional zone substantially in or

in proximity of a driver seat side of a vehicle, wherein the wireless signal is representative of a blood alcohol content of a user of the mobile device as determined by an alcohol sensor (706) located within the mobile device, and wherein the control module (708) is configured to control one or more vehicle operations.

14. The system of claim 13, comprising:

a vehicle status detector module (210) to generate a status signal representative of a vehicle operation condition.

15. The system of claim 14, wherein when the status signal is representative of a stationary vehicle, the control module (708) prevents the operation of at least one of an ignition system, a fuel system, and a transmission system.

16. The system of claim 14, wherein when the status signal is representative of a moving vehicle, the control module (708) activates at least one of a horn, a vehicle flasher, and an audible warning.

17. A method for preventing operation of a vehicle by an intoxicated person, the method comprising:

detecting, via a detector module (204) comprising a sensor module (206) and an air intake (216), the blood alcohol content of a person, wherein the detecting is performed by testing the alcohol content of a volume of air within a predetermined vehicle detection zone (104) defined as a three-dimensional zone substantially in or in proximity of a driver seat side of a vehicle, and wherein the detection is not dependent upon the driver's interaction to initiate the detecting;

signaling, by the sensor module (206), a control module (208) configured to control at least one vehicle operation; and

controlling, by the control module (208), the at least one vehicle operation so as to control operation of the vehicle.

18. The method of claim 17, comprising signaling by the sensor module (206) when the sensor module (206) detects a blood alcohol content over a predetermined limit.

19. The method of claim 17, comprising generating, via a vehicle status detector module (210), a status signal representative of a vehicle operation condition.

20. The method of claim 19, comprising preventing, via the control module (208), activation of the at least one vehicle operation when the status signal is representative of a stationary vehicle.

21. The method of claim 20, wherein the at least one vehicle operation includes an ignition system, a transmission system, and a fuel system.

22. The method of claim 19, comprising activating, via the control module (208), the at least one operation when the status signal is representative of a moving vehicle.

23. The method of claim 22, wherein the at least one vehicle operation includes a horn, a vehicle light system, and an audible warning system.

STATEMENT UNDER ARTICLE 19 (1)

In Box No.5 of the Written Opinion of the International Searching Authority (Written Opinion), claims 1-23 were determined to lack novelty and inventive step. Applicant respectfully disagrees with this determination. Nevertheless, Applicant has elected to amend claims 1-20, and 22 under PCT Article 19 to clarify the subject matter claimed by the present international application and further distinguish the claimed subject matter from the references cited in the ISR. Applicant respectfully submits that the amendment is fully supported by the originally filed international application and does not introduce new matter.

The Written Opinion referenced the following documents D1-D3 identified in the ISR in support of the above determination:

D1: US 2006/0237253 A1 to Larry J. Mobley et al. dated 26 October 2006

D2: WO 02/012883 A1 to Robert Payne et al. dated 14 February 2002

D3: WO 04/018249 A1 to Sauro Bianchelli dated 4 March 2004

First, Applicant respectfully submits that D1 fails to disclose or suggest that the a sensor module generates a signal indicative of the blood alcohol content of a driver "by measuring an alcohol content of the air within a predetermined vehicle detection zone (104) defined as a three-dimensional zone substantially in or in proximity of a driver seat side of a vehicle, and wherein a detection process is not dependent upon the driver's interaction to initiate the detection process" as recited in claims 1 and 17 as amended. Rather, D1 requires a driver to blow directly into a sample head to obtain the air sample for testing. D1 at ¶ 0025. Although D1 does disclose that ambient air may be drawn into the sample head, D1 fails to disclose that the air is drawn from "a three dimensional zone substantially in or in proximity of a driver seat side of a vehicle." Furthermore, D1 does not determine the blood alcohol content of a driver from the ambient air, but instead merely discloses controlling the frequency of required

"deep lung" tests, which are defined as being performed by blowing directly into the sample head by the driver. D1 at ¶¶ 0025, 0045.

Second, Applicant respectfully submits that the combination of D1 and D2 fails to disclose "a control module (708) responsive to a wireless signal from a mobile device located within a predetermined vehicle detection zone (104) defined as a three-dimensional zone substantially in or in proximity of a driver seat side of a vehicle" as disclosed in claim 13. D1 does not disclose that the control module is responsive to a mobile device located in a three-dimensional zone substantially in or in proximity to a driver seat side of a vehicle. Although D1 does disclose the use of a wireless transdermal alcohol sensor and a magnet for determining proximity of the magnet to a predetermined point, D1 fails to disclose that the control module is responsive to a mobile device when the device is located in a three-dimensional zone substantially in or in proximity to a driver seat side of a vehicle. D2 fails to overcome this deficiency, as D2 merely discloses a mobile phone comprising an alcohol sensor. D2 at 9:18. D2 does not disclose that the alcohol sensor of the phone is only operational in a predetermined vehicle detection zone. Because D2 fails to disclose the use of the alcohol sensor is operational only in a predetermined zone, D2 fails to provide any support for modifying D1 to utilize an alcohol sensor located in a phone, as neither reference provides a way to associate the alcohol sensor reading of the phone with the operator of an automobile.

CLAIMS

1. An apparatus for controlling vehicle operation based on a driver's blood alcohol content comprising:

a detector module comprising a sensor configured to produce an electrical signal representative of a blood alcohol content of the driver, wherein the electrical signal is generated by measuring an alcohol content of air within a predetermined vehicle zone defined as a three-dimensional zone substantially in or in proximity of a driver seat side of a vehicle, wherein the detector module measures the alcohol content of the air independent of the driver's interaction with the detector module; and

a control module electrically coupled to the detector module, the control module to control at least one vehicle operation in response to the electrical signal received by the control module from the sensor.

2. The apparatus of claim 1, comprising:

a vehicle status detector module to generate a status signal representative of a vehicle operation condition.

3. The apparatus of claim 2, wherein when the status signal is representative of a stationary vehicle, the control module prevents the operation of at least one of an ignition system, a fuel system, and a transmission system.

4. The apparatus of claim 2, wherein when the status signal is representative of a moving vehicle, the control module activates at least one of a horn, a vehicle flasher, and an audible warning.

5. The apparatus of claim 1, comprising an air intake to intake air from the predetermined vehicle zone.

6. The apparatus of claim 1, wherein the sensor comprises a fuel cell sensor.

7. The apparatus of claim 6, wherein the fuel cell sensor comprises:

a first and second platinum electrode;

a porous acid-electrolyte located between the first and second platinum electrodes; and

a current meter connected in series between the first and second platinum electrodes.

8. The apparatus of claim 1, wherein the sensor comprises an oxide semiconductor sensor.

9. The apparatus of claim 8, wherein the oxide semiconductor sensor comprises:

a printed circuit board;

a breath alcohol sensor mounted operably mounted to the printed circuit board; and

a heating unit operably mounted to the printed circuit board, wherein the heating unit heats the breath alcohol sensor to a predetermined temperature.

10. The apparatus of claim 1, wherein the sensor comprises an infrared spectroscopy sensor.

11. The apparatus of claim 10, wherein the infrared spectroscopy sensor comprises:

a housing comprising an inlet port, an outlet port, and defining a sample chamber therein;

a lamp configured to generate a broadband infrared beam;

a filter wheel comprising one or more narrow band filters;

one or more photocells, wherein the broadband infrared beam passes through the sample chamber, the filter wheel, and the one or more photocells.

12. The apparatus of claim 1, wherein the predetermined vehicle zone is defined as a volume of air surrounding the driver of the vehicle but excluding passenger areas of the vehicle.

13. A system for controlling vehicle operation based on a driver's blood alcohol content comprising:

a control module, responsive to a wireless signal from a mobile device, wherein the wireless signal is representative of a blood alcohol content of a user of the mobile device as determined by an alcohol sensor located within the mobile device, and wherein the control module is configured to control one or more vehicle operations.

14. The system of claim 13, comprising:

a vehicle status detector module to generate a status signal representative of a vehicle operation condition.

15. The system of claim 14, wherein when the status signal is representative of a stationary vehicle, the control module prevents the operation of at least one of an ignition system, a fuel system, and a transmission system.

16. The system of claim 14, wherein when the status signal is representative of a moving vehicle, the control module activates at least one of a horn, a vehicle flasher, and an audible warning.

17. A method for preventing operation of a vehicle by an intoxicated person, the method comprising:

detecting, via a sensor, the blood alcohol content of a person, wherein the detecting is performed by testing the alcohol content of a volume of air within a predetermined vehicle zone defined as a three-dimensional zone substantially in or in proximity of a driver seat side of a vehicle, wherein the detecting is performed independent of the driver's interaction with the sensor;

signaling, by the sensor, a control module configured to control at least one vehicle operation; and

controlling, by the control module, the at least one vehicle operation so as to control operation of the vehicle.

18. The method of claim 17, comprising signaling by the sensor when the sensor detects a blood alcohol content over a predetermined limit.

19. The method of claim 17, comprising generating, via a vehicle status detector module, a status signal representative of a vehicle operation condition.

20. The method of claim 19, comprising preventing, via the control module, activation of the at least one vehicle operation when the status signal is representative of a stationary vehicle.

21. The method of claim 20, wherein the at least one vehicle operation includes an ignition system, a transmission system, and a fuel system.

22. The method of claim 19, comprising activating, via the control module, the at least one operation when the status signal is representative of a moving vehicle.

23. The method of claim 22, wherein the at least one vehicle operation includes a horn, a vehicle light system, and an audible warning system.