CLAIMS

1. A system (20) for generating and supplying hydrogen gas to an internal combustion engine comprising:

-an engine system (32) of a vehicle or automobile electrically coupled to an electrical control unit (ECU) of the vehicle or automobile (36);

-at least one hydrogen generating unit (22) configured to generate hydrogen gas or a mixture of hydrogen and oxygen through electrolysis of water;

-a primary water tank (24) configured to hold a quantity of water and supply the water to the hydrogen generating unit (22);

-a power supply unit (26) configured to supply electrical current to the hydrogen generating unit (22) for use in the electrolysis of water;

-an electrical control unit (ECU) of the hydrogen generating unit (34); and

-a backfire prevention unit (30) interposed between the primary water tank (24) and the engine system (32) wherein the backfire prevention unit (30) comprising:

a reservoir (31) partially filled with water to block a backfire from the engine system (32) so that the backfire prevention unit (30) together with the primary water tank (24) prevent the system (20) from being damaged by the backfire, and

an inner cup (33) disposed within the reservoir (31) for temporary storing the water of the reservoir (31) when the hydrogen generating unit (22) is deactivated thereby preventing the water of the reservoir (31) from being pulled into the hydrogen generating unit (22) through the primary water tank (24) due to a vacuum effect created inside the hydrogen generating unit (22) when the hydrogen generating unit (22) is deactivated wherein the water stored in the inner cup (33) will be flushed back into the reservoir (31) when the hydrogen generating unit (22) is reactivated;

wherein the ECU of the hydrogen generating unit (34) is electrically coupled to the hydrogen generating unit (22), the power supply unit (26) and the ECU of the vehicle or automobile (36) whereby through a communication between the ECU of the vehicle or automobile (36) and the ECU of the hydrogen generating unit (34), the system (20) enables regulation of generating and supplying of hydrogen gas by the hydrogen generating unit (22) to the engine system (32).

2. The system (20) according to claim 1 further comprising:

-a secondary water tank (38) connected to the primary water tank (24); and

-a motor pump (40) coupled to the secondary water tank (38), and electrically connected to the power supply unit (26) and the ECU of the hydrogen generating unit (34);

wherein the ECU of the hydrogen generating unit (34) allows supply of power from the power supply unit (26) to the motor pump (40) to activate the motor pump (40) to pump water from the secondary water tank (38) into the primary water tank (24) when a depletion of water at the primary water tank to a threshold level is detected and disconnects the power supply to the motor pump (40) to deactivate the motor pump (40) once the water in the primary water tank (24) reaches a predetermined level.

3. The system (20) according to claim 1 or 2 wherein the hydrogen generating unit (22) comprising:

-a hydrogen generating tank (60) configured to be fastened to a structure of the vehicle or automobile and defining multiple compartments (62) each of which is configured to contain a quantity of water as electrolyzing agent being supplied by the primary water tank (24);

-a tank cover (52) configured to hermetically seal the hydrogen generating tank (60); and

-a plurality of cell assemblies (66) connected to one another where each cell assembly (66) arranged inside each compartment (62) of the hydrogen generating tank (60) is configured to receive electrical current from the power supply unit (26) to allow electrolysis of water to generate hydrogen gas or a mixture of hydrogen and oxygen.

4. The system (20) according to claim 3, wherein each cell assembly (66) comprises a plurality of spaced-apart conductive metal plates (68) each of which is assigned to connect to a respective positive or negative electrode (71, 73) enabling each metal plate (68) to be negatively or positively charged, and wherein each of the negatively or positively charged metal plate (68) is arranged in alternate to one another on a metal plate seater (72) disposed inside each compartment (62).

5. The system (20) according to claim 4, wherein the positive and the negative electrodes (71, 73) including the negatively and positively charged metal plates of the cell assembly (66) allow switching of functions between negatively and positively charged at a predesignated time interval.

6. The system (20) according to claim 5 wherein, the primary water tank (24) comprising:

- one or more fastening arms (102) configured to receive fastening means to allow securing of the primary water tank (24) in place;

-an opening (94) or a primary water inlet (112) configured to receive supply of water to be supplied to the hydrogen generating unit (22) via a primary water tank water outlet (99) located at a lower section of the primary water tank (24);

-a maximum water level sensor (106A) and a minimum water level sensor (106B);

-a primary water tank gas inlet (108) which receives hydrogen gas or a mixture of hydrogen and oxygen from the hydrogen generating unit (22); and

-a primary water tank gas outlet (110) which allows passage of the hydrogen gas or the mixture of hydrogen and oxygen received by the primary water tank (24) through to the engine system (32) via the backfire prevent unit (30) interposed between the primary water tank (24) and the engine system (32).

7. The system (20) according to claim 2 or 6 wherein the secondary water tank (38) comprising:

-one or more fastening members (44) configured to receive fastening means to allow securing of the secondary water tank (38) in place;

-a water receiving port (41) which allows re-filling of water wherein the water receiving port (41) is provided with a lid (42);

-a secondary water tank water level clear window (43) to allow visibility of water level inside the secondary water tank (38); and

-a secondary water tank water outlet (39) positioned at a lower portion of the secondary water tank (38);

wherein the secondary water tank (38) with an aid of the motor pump (40) and the ECU of the hydrogen generating unit (34) discharges the water to the primary water tank (24) to ensure a continuous supply of water from the primary water tank (24) to the hydrogen generating unit (22).

8. The system according to claim 7, wherein the hydrogen generating unit (22) further comprising a temperature sensor (78) configured to detect, read or collect temperature data at the hydrogen generating unit (22) and transmit the data to the ECU of the hydrogen generating unit (34) in order to cause the ECU of the hydrogen generating unit (34) to deactivate the hydrogen generating unit (22) when the temperature at the hydrogen generating unit (22) exceeded a set value or to reactivate the hydrogen generating unit (22) when the temperature at the hydrogen generating unit is cool down to an acceptable range.

9. The system (20) according to claims 1 or 8, wherein the backfire prevention unit (30) further comprising:

-a reservoir cover (37) with a reservoir gas inlet (49) and a reservoir gas outlet (29) arranged on the reservoir cover (37);

wherein the inner cup (31) is integrally formed with the reservoir cover (37) and the reservoir cover (37) is configured to couple to the reservoir (31) and seal both the reservoir

(31) and the inner cup (33) at which the reservoir gas inlet (49) which receives hydrogen gas or a mixture of hydrogen and oxygen from the primary water tank (24) communicates with the inner cup (31); and the reservoir gas outlet (29) which communicates with the reservoir (31) allows the hydrogen gas or the mixture of hydrogen and oxygen which escape from the inner cup (31) through the water to flow through to the engine system (32) for combustion.

10. The system (20) according to any one of the preceding claims wherein the ECU of the hydrogen generating unit (34) which is electrically coupled to the ECU of the vehicle or automobile (36) is programmable to allow tuning of the ECU of the hydrogen generating unit (34) against the ECU of the vehicle or automobile (36) to enable regulation of the hydrogen generating unit (34) to produce and supply the hydrogen in correspondence to the fuel consumption, operation or running mode of the engine system (32).

11. A hydrogen generating unit (22) of the system (20) for generating and supplying hydrogen gas to an internal combustion engine according to any one of claims 1 to 10 comprising:

-a hydrogen generating tank (60) configured to be fastened to a structure of the vehicle or automobile and defining multiple compartments (62) each of which is configured to contain a quantity of water as electrolyzing agent being supplied by the primary water tank (24);

-a tank cover (52) configured to hermetically seal the hydrogen generating tank (62);

-a plurality of cell assemblies (66) connected to one another where each cell assembly (66) arranged inside each compartment (62) of the hydrogen generating tank (60) is configured to receive electrical current from the power supply unit (26) to allow electrolysis of water to generate hydrogen gas or a mixture of hydrogen and oxygen; and

-an electrical control unit (ECU) of the hydrogen generating unit (34) electrically coupled to the hydrogen generating unit (22);

wherein the ECU of the hydrogen generating unit (34) is communicated to an electrical control unit (ECU) of a vehicle or automobile (36) coupled to an engine system (32); and wherein a communication between the ECU of the hydrogen generating unit (34) and the ECU of the vehicle or automobile (36) allows regulation of generating and supplying of hydrogen gas by the hydrogen generating unit (22) in correspondence to fuel consumption, operation or running mode of the engine system (32).