Claims

1. A decarbonisation system comprising:

a container defining an enclosure for containing liquids and a first inlet and a first outlet to the enclosure;

a first valve coupled to the first inlet and adapted for intercoupling an air supply and the container, the first valve being operable for one of substantially impeding and enabling passage of pressurized air from the air supply to the container;

a second valve coupled to the first outlet;

a delivery unit having two ends forming extremities thereof;

a nozzle coupled to one end of the delivery unit with the other end thereof being coupled to the second valve for interposing the second valve between the container and the delivery unit, the second valve being operable for one of substantially impeding and enabling passage of liquid from the container to the delivery unit, the delivery unit being adapted for being retained at and positioning the nozzle at least one of within and towards the intake manifold of an engine; and

a controller in signal communication with the first valve and second vale for controlling operation thereof, the controller having predefined a plurality of routines, each of the plurality of routines indicative of at least one of a routine duration, spray pattern, at least one spray pulse duration and at least one duration between spray pulses, the controller having a plurality of modes comprising:

a STOP mode wherein the second valve is operated to impede flow of the liquid from the container to the delivery unit, and

a PLAY mode wherein the second valve is operated to enable flow of the liquid from the pressurized container to the delivery unit, the flow of the liquid into the delivery unit being controlled by the controller based on one of the plurality of routines, the nozzle being shaped and dimensioned for atomising the liquid exiting the delivery unit into an atomized mist for being directed into the intake manifold of the engine for decarbonisation thereof,

wherein the controller has a determined total authorized duration wherefrom the routine duration associated with the selected one of the plurality of routines is deducted during the PLAY mode, the controller disabling switching to the PLAY mode when the total authorized duration is less than the routine duration.

2. The decarbonization system as in claim 1, wherein the first valve is operated to impede flow of compressed air into the container via the first inlet when the controller is in the STOP mode and the first valve is operated to enable flow of compressed air into the container via the first inlet for pressurizing the container when the controller is in the PLAY mode.

3. The decarbonisation system as in claim 2, wherein operation of the second valve by the controller lags the operation of the first valve by a pre-determined duration during the PLAY mode.

4. The decarbonisation system as in claim 1, the engine crank revolution rate being substantially increased from an idle state prior to and during activation of the PLAY mode.

5. The decarbonisation system as in claim 1, the air supply comprising an air compressor.

6. The decarbonisation system as in claim 1, the controller comprising a user interface (UI) for enabling switching between the plurality of modes and for viewing the plurality of routines for selecting one thereof therevia.

7. The decarbonisation system as in claim 6, the controller further comprising at least one pressure sensor disposed for determining pressure level within the enclosure, the determined pressure level being transduced for provision to the controller, the UI further displaying at least one of the determined pressure level within the container, an indicator of the pressure level falling below a predetermined threshold pressure level, and an indicator of the pressure level being at least at a reference pressure level.

~~8. The decarbonisation system as in claim 6, the controller having a determined total authorized duration wherefrom the routine duration associated with the selected one of the plurality of routines is deducted during the PLAY mode, the controller disabling switching to the PLAY mode when the total authorized duration is less than the routine duration.~~

8~~9~~. The decarbonisation system as in claim 6~~8~~, the controller for receiving and verifying validity of one of a plurality of predetermined top-up code, each of the plurality of predetermined top-up code having a top-up duration associated therewith, the controller for adding the top-up duration associated with the verified one of the plurality of top-up codes to the total authorized duration, the verified one of the plurality of top-up codes being received from one of the UI during interaction of a user therewith and from a control computing system in data communication with the controller.

9~~10~~. The decarbonisation system as in claim 1, the delivery unit comprising:

a retention structure whereto the nozzle is coupled, the retention structure being shaped and dimensioned for being retained between inter-coupled conduits for forming an air passage adjacent the intake manifold of the engine for positioning the nozzle towards the direction of air flow in the air passage; and

a tube extending from the container to the retention structure for fluid communicating the enclosure with the nozzle.

10~~1~~. The decarbonisation system as in claim 1, further comprising:

a first tube extending from the first inlet into the enclosure to terminate at a first free end distal the base of the container; and

a second tube extending from the first outlet into the enclosure for terminating at a second free end proximal the base of the container, wherein when in use, the first free end of the first tube is not submerged and the second free end of the second tube is submerged in the liquid contained in the enclosure of the container.

11~~2~~. The decarbonisation system as in claim 1, the container further defining a second inlet and a second outlet to the enclosure, the decarbonisation system further comprising:

a third valve coupled to the second inlet and adapted for intercoupling a liquid receiver structure and the container, the liquid receiver structure being adapted for receiving liquids for replenishing the liquid contained within the enclosure, the third valve being operable for one of substantially impeding and enabling passage of liquid from the liquid receiver structure into the container; and

a fourth valve coupled to the second outlet and adapted for intercoupling a vent and the container, the fourth valve being operable for one of substantially impeding and enabling escape of air from within the enclosure and out of the vent, the escape of air from the enclosure for depressurizing the container.

123. The decarbonisation system as in claim 112, the controller being further in signal communication with the third valve and the fourth valve, the plurality of modes further comprising:

a REFILL mode wherein the third valve is operated to enable flow of liquids from the liquid receiver structure into the container and the fourth valve is operated to enable escape of the air from within the enclosure to aid flow of liquid into the second inlet,

wherein the third valve is operated to impede flow of liquid into the enclosure via the second inlet and the fourth valve is operated to enable escape of air from the enclosure via the second outlet during each of the PLAY mode and the STOP mode.

134. The decarbonisation system as in claim 1, the liquid receiver structure being further adapted to removably couple with a liquid canister for receiving liquid therefrom.

145. The decarbonisation system as in claim 1, wherein operation of the third valve by the controller lags the operation of the fourth valve by a pre-determined duration during the REFILL mode.

15~~6~~. A decarbonisation method comprising:

coupling a container to an air supply for receiving pressurized air therefrom, the container defining an enclosure for containing liquids, a first inlet to the container wherewith a first valve couples and a first outlet to the container wherewith a second valve couples, the first valve inter-couples the air supply and the container and is operable for one of substantially impeding and enabling passage of pressurized air from the air supply to the container;

configuring a delivery unit with an engine to thereby position a nozzle coupled to one of two extremities thereof at least one of within and towards the intake manifold of an engine, the other of the two extremities of the delivery unit being coupled to the second valve for interposing the second valve between the container and the delivery unit, the second valve being operable for one of substantially impeding and enabling passage of liquid from the container to the delivery unit, a controller in signal communication with the first valve and second vale for controlling operation thereof; and

initiating one of a plurality of routines predefined with the controller, each of the plurality of routines being indicative of at least one of a routine duration, spray pattern, at least one spray pulse duration and at least one duration between spray pulses, the one of the plurality of routines being initiated by operating the second valve to enable flow of the liquid from the pressurized container to the delivery unit, the flow of the liquid into the delivery unit being controlled by the controller based on one of the plurality of routines, the nozzle being shaped and dimensioned for atomising the liquid exiting the delivery unit into an atomized mist for being directed into the intake manifold of the engine for decarbonisation thereof,

wherein initiating one of a plurality of routines predefined with the controller comprising:

determining total authorized duration wherefrom the routine duration associated with the selected one of the plurality of routines is deducted during the PLAY mode; and

disabling switching to the PLAY mode when the total authorized duration is less than the routine duration by the controller, and

wherein the initiated one of the plurality of routine is one of terminated and completed by operating the second valve to impede flow of the liquid from the container to the delivery unit.

16~~7~~. The decarbonization method as in claim 15~~6~~, wherein the one of the plurality of routines is initiated further by operating the first valve is operated to enable flow of compressed air into the container via the first inlet for pressurizing the container and the initiated one of the plurality of routines is terminated further by operating the first valve to impede flow of compressed air into the container via the first inlet.

17~~8~~. The decarbonisation method as in claim 16~~7~~, initiating one of a plurality of routines predefined with the controller comprising:

operating of the first valve by a pre-determined duration prior to operating the second valve during the PLAY mode.

18~~9~~. The decarbonisation method as in claim 15~~6~~, initiating one of a plurality of routines predefined with the controller comprising:

substantially increasing the engine crank revolution rate from an idle state prior to and during activation of the PLAY mode.

~~20. The decarbonisation method as in claim 16, initiating one of a plurality of routines predefined with the controller comprising:~~

~~determining total authorized duration wherefrom the routine duration associated with the selected one of the plurality of routines is deducted during the PLAY mode; and~~

~~disabling switching to the PLAY mode when the total authorized duration is less than the routine duration by the controller.~~

19~~21~~. The decrbonisation method as in claim 15~~20~~, initiating one of a plurality of routines predefined with the controller further comprising:

receiving and verifying validity of one of a plurality of predetermined top-up code by the controller, each of the plurality of predetermined top-up code having a top-up duration associated therewith, the controller for adding the top-up duration associated with the verified one of the plurality of top-up codes to the total authorized duration, the verified one of the plurality of top-up codes being received from one of the UI during interaction of a user therewith and from a control computing system in data communication with the controller.

20~~2~~. The decarbonisation method as in claim 15~~16~~, the container comprising:

a first tube extending from the first inlet into the enclosure to terminate at a first free end distal the base of the container; and

a second tube extending from the first outlet into the enclosure for terminating at a second free end proximal the base of the container, wherein when in use, the first free end of the first tube is not submerged and the second free end of the second tube is submerged in the liquid contained in the enclosure of the container.