# FLUID SYSTEM

This invention relates to a fluid container, a dock, a system and corresponding methods, and in particular to a replaceable fluid container for an engine or a vehicle, a dock for the container, a system, a method of supplying fluid to a vehicle engine or a vehicle, and a method of decoupling a fluid container from a fluid circulation system or a vehicle.

Many vehicle engines use one or more fluids for their operation. Such fluids are often liquids. For example, internal combustion engines use liquid lubricating oil. Also, electric engines use fluids which can provide heat exchange functionality, for example to cool the engine and/or to heat the engine, and/or to cool and heat the engine during different operating conditions. The heat exchange functionality of the fluids may be provided in addition to other functions (such as a primary function) which may include for example charge conduction and/or electrical connectivity. Such fluids are generally held in reservoirs associated with the engine and may require periodic replacement.

Conventional periodic replacement of engine lubricating oil in a vehicle engine usually involves draining the oil from the engine sump. The process may also involve removing and replacing the engine oil filter. Such a procedure usually requires access to the engine sump drain plug and oil filter from the underside of the engine, may require the use of hand tools and usually requires a suitable collection method for the drained lubricating oil. This is complex and expensive.

Aspects of the invention address or at least ameliorate at least one of the above issues.

According to a first aspect of the present invention, there is provided a replaceable fluid container for an engine or a vehicle, including a fluid reservoir; at least one fluid port adapted to couple with a fluid circulation system; and an actuator, configured to be operated between a first condition and a second condition, wherein the actuator is configured, in the first condition, to enable the fluid container to be inserted into and/or held in a dock, in a seated but undocked condition, and inhibit docking of the fluid container to the dock; and wherein the actuator is further configured, when operated from the first condition to the second condition with the fluid container being in the seated but undocked condition, to enable the fluid container to dock in an engaged condition with the dock; and wherein the at least one fluid port comprises a coupling adapted to connect to a corresponding coupling of a fluid circulation system associated with an engine; such that when the couplings are being connected, a seal is made between the connecting ports before any valves open to allow fluid to flow.

According to a second aspect of the present invention, there is provided a dock including a fastening mechanism, wherein the fastening mechanism of the dock is configured to cooperate with the above container.

According to a third aspect of the present invention, there is provided a system including the above fluid container and the above dock.

According to a fourth aspect of the present invention, there is provided a method of supplying a fluid to a vehicle or an engine comprising a fluid circulation system, including: inserting a replaceable fluid container in a dock, the fluid container comprising a fluid reservoir, at least one fluid port adapted to couple with the fluid circulation system, and an actuator configured to be operated between a first condition and a second condition, the fluid container being inserted first in a seated but undocked condition with the actuator being in the first condition, and operating the actuator from the first condition to the second condition with the fluid container being in the seated but undocked condition, to dock the fluid container in an engaged condition with the dock.

According to a fifth aspect of the present invention, there is provided a method of decoupling a fluid container from a fluid circulation system of a vehicle or an engine, the fluid container including a fluid reservoir, at least one fluid port adapted to couple with the fluid circulation system, and an actuator configured to be operated between a first condition and a second condition, the method including: from a condition where the fluid container is in an engaged condition with a dock and the actuator is in the second condition, operating the actuator of the fluid container from the second condition to the first condition, to extract the fluid container from the dock to take the fluid container from the engaged condition into an seated but undocked condition with the actuator being in the first condition.

The present invention extends to:

a dock configured to cooperate with a container of any aspect of the invention, and/or

a system comprising a dock of any aspect of the invention and a replaceable fluid container configured to cooperate with a dock of any aspect of the invention, and/or

a method of supplying a fluid to a vehicle or an engine, and/or

a method of decoupling a fluid container from a fluid circulation system of a