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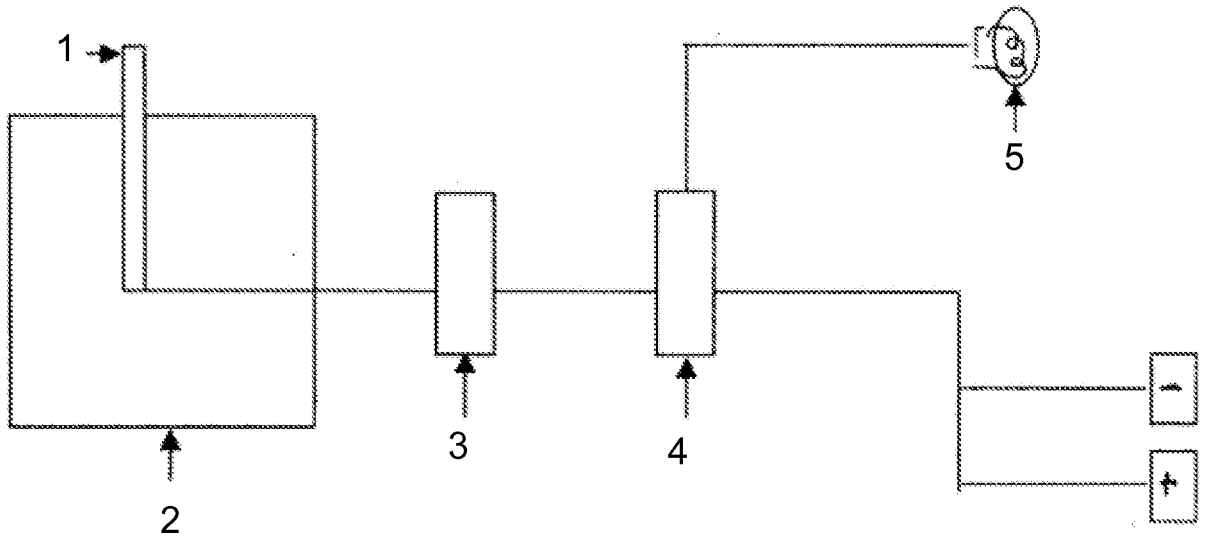
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(54) Engine protection system

(57) This invention relates to Engine protection system which comprises at least one float sensor, auxiliary coolant tank, a relay, Fuel Injection Pump (FIP) solenoid switch and coolant level warning indicator wherein said float sensor is provided on an auxiliary coolant tank to sense the level of coolant inside the said tank. Said auxiliary coolant tank is provided to maintain sufficient coolant level inside the radiator. When coolant level inside the said auxiliary coolant tank drops beyond the specified safe limit then float unit of said float sensor moves down and completes the electrical circuit, because of which the FIP solenoid switch will cut off the diesel supply to the engine. After this even though the engine gets cranked but it will not start unless the level of coolant in a said tank resumes to the normal level. According to another embodiment the said FIP solenoid switch of diesel engine is replaced with electronic control unit for petrol engine.

Fig. 1



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Description

[0001] The following specification particularly describes the invention and the manner in which it is to be performed.

FIELD OF INVENTION

[0002] This invention relates to protection system used in vehicles and more particularly this relates to engine protection system that monitors engine operating conditions and disables the engine in the event of non-functioning of cooling system or short fall of cooling media.

BACKGROUND OF INVENTION

[0003] During combustion of the engine and because of friction between various moving parts of the engine substantial amount of heat is generated which needs to be dissipated in order to maintain safe temperatures for engine and various systems to work properly.

[0004] An automobile may be either air-cooled or coolant cooled. In case of an air cooled engine, the engine is mounted such that air passes through it when the automobile is in motion. The passing over of air over the engine block ensures it's cooling. However this type of cooling is effective only for smaller engines like those used in scooters or motorbikes. Bigger engines generally are coolant cooled. In this system coolant is circulated through a coolant jacket in the engine block with an aid of a pump. The coolant while it passes through the engine block carries with it the heat of combustion, this heat is then dissipated through a radiator placed in front of the vehicle.

[0005] The burning fuel inside the engine cylinder raises the temperature of the cylinder, piston and valve. If some of this heat is not removed, these components would be damaged severely. Simultaneously sufficient care must be taken that the engine must also not be over cooled, therefore an ideal equilibrium temp. of 75-95°C should be maintained by the cooling system.

[0006] If the engine is over cooled some of the heat which could be used to expand the gases will be lost. The fuel will not vaporize properly and some of the gases produced by combustion will condense on the cylinder walls. This leads to dilution of the oil in the sump and the addition of harmful corrosive acids. Removal of the oil film from the cylinder wall by the unvaporized fuel leads to increased cylinder bore wear inadequate lubrication of the engine, due to the oil not being warm enough to flow freely, results in greater frictional losses. In general the economy and life of the engine would be reduced.

[0007] At the same time under cooling can cause engine seizure or at least shortened valve life and possible distortion of the cylinder block, head or gasket a hot-spot inside the combustion chamber may be sufficient to cause pre-ignition to ignite the fuel before the spark plug does, this causing loss of power and possible damage to the engine components. Coolant in the cooling system may boil and evaporate, and if the oil film burns away additional friction and wear will occur between cylinder and piston.

[0008] In automobiles with an internal combustion engine, a radiator is connected to channels running through the engine and cylinder head, through which a liquid is pumped. This liquid is typically a mixture of coolant with Ethylene glycol as antifreezer. The fluid moves in a closed system from the radiator to the engine, where it conducts heat away from the engine parts and carries the heat primarily to the radiator. The radiator is typically mounted behind the vehicle's grille, with cold air driven through the radiator to cool the radiator, the fluid inside, and therefore the engine. Between the engine and the radiator lies the thermostat, a temperature operated valve. It remains closed, restricting coolant flow, until the engine reaches the thermostat's activation temperature. This arrangement allows the engine temperature to be maintained in the ideal operating range.

[0009] Most of the motor vehicles use circulating coolant to cool the engine and there are different methods of cooling:

a) Thermo-siphon system- The thermo siphon system depends upon the natural circulation of coolant when heated at one point. In this circulation, coolant flows from radiator bottom tank to engine coolant jackets and from engine coolant jackets to radiator top coolant tank and from radiator top tank to bottom tank. This coolant movement is caused by convection currents.

Coolant surrounds each of the cylinders, valves and plug pockets. The coolant in these areas gets hot and expands. Cooled coolant from the bottom tank of the radiator moves into position round the regions vacated by the hot rising coolant. The hot coolant reaches the header tank and passes down to the radiator tubes, where it is cooled by air traveling through the radiator grill. On reaching the bottom tank, its temperature decreases and it enters in the cylinder block and head again.

b) Use of impeller- Under heavy loads or in hot climates the engine gets so hot that the coolant may not circulate fast enough. A pump is needed especially in over head valve engine which have small coolant passages. This addition allows a smaller radiator to be used.

[0010] Since the coolant is constantly under pressure, it can be directed to engine at high temperature locations, such as valve seats and plug bosses.

[0011] In both above systems it is essential that a proper level of coolant is maintained, well above the pipe bringing coolant from the engine, otherwise circulation will stop. Also connecting pipes must be large enough to permit the coolant to flow freely.

[0012] At the same time the total coolant cooling sys-

tem which includes radiator, coolant pump, coolant jacket and all connecting pipes and hoses should be perfectly enclosed. There should not be any leakage at any point or any part of the entire coolant cooling system. And if it happens the coolant in the cooling system may drain. Due to less amount of coolant in the system, the temperature of the engine will keep on increasing and ultimately which will result is over heating of engine.

OBJECTS OF THIS INVENTION

[0013] The main object of this invention is to provide an engine protection system that can disable the engine in the event of shortage or leakage of cooling media to prevent engine seizure.

[0014] Another object of this invention is to provide an engine protection system which is simple and cost effective.

BRIEF DESCRIPTION OF INVENTION

[0015] Engine protection system in accordance with this invention basically comprises at least one float sensor, auxiliary coolant tank, a relay, Fuel Injection Pump (FIP) solenoid switch and coolant level warning indicator wherein said float sensor basically comprises a sensor stem, a magnetic float freely mounted on said stem and a magnetic reed valve provided at free end of the said stem and is provided on an auxiliary coolant tank to sense the level of coolant inside the said tank. Said auxiliary coolant tank is provided to maintain sufficient coolant level inside the radiator. Said relay is having two coil points, one pole point, one normally open and one normally close point. Wherein said one coil point is connected to first point of float sensor and another coil point is connected to coolant level warning indicator through an earthling. Said pole point is connected to power supply and second point of float sensor, said normally open point is connected to coolant level warning indicator and normally close point is connected to FIP solenoid switch. Said coolant level warning indicator is provided at instrument cluster.

[0016] When coolant level inside the said auxiliary coolant tank drops beyond the specified limit then float unit of said float sensor moves down and completes the electrical circuit, because of which the FIP solenoid switch will cut off the diesel supply to the engine. After this even though the engine gets cranked but it will not start unless the level of coolant in a said tank resumes to the normal level.

DETAILED DESCRIPTION OF INVENTION

[0017] Referring now to the drawings wherein the showings are for the purpose of illustrating a preferred embodiment of the invention only, and not for the purpose of limiting the same,

Fig. 1 - Shows an engine protection system in accordance with this invention;

Fig. 2 - Shows a magnetic float sensor used in engine protection system;

Fig. 3 - Shows a relay circuit diagram used in engine protection system.

[0018] Referring to Figures 1 to 3, Engine protection system according to one embodiment of this invention basically comprises at least one float sensor (1), auxiliary coolant tank (2), a relay (3), Fuel Injection Pump (FIP) solenoid switch (4) in case of diesel engine and coolant level warning indicator (5) wherein said float sensor basically comprises a sensor stem (11), a magnetic float (10) freely mounted on said stem and a magnetic reed valve (12) provided at free end of the said stem and is provided on cap (13) of an auxiliary coolant tank (2) to sense the level of coolant inside the said tank. Said auxiliary coolant tank is provided to maintain sufficient coolant level inside the radiator (not shown). Said relay is having two coil points (A, E), one pole point (B), one normally open point (C) and one normally close point (D). Wherein said coil point (A) is connected to first point (6) of float sensor (1) and another coil point (E) is connected to coolant level warning indicator (5) through an earthing point (7). Said pole point (B) is connected to power supply (8) and second point (9) of float sensor (1), said normally open point (C) is connected to coolant level warning indicator (5) and normally close point (D) is connected to FIP solenoid switch (4). Said coolant level warning indicator is provided at instrument cluster (not shown).

[0019] When coolant level inside the said auxiliary coolant tank (2) drops beyond the specified normal limit then magnetic float (10) of said float sensor (1) moves down and comes into contact with reed valve (12) and completes the circuit, because of which the FIP solenoid switch (4) cuts power supply to the FIP and hence there will not be any fuel supply to the engine. After this even though the engine gets cranked but it will not start unless the level of coolant in a said tank resumes to the normal level.

[0020] To avoid above problem, as soon as coolant level in auxiliary coolant tank goes down it would be indicated to driver on instrument cluster through the proposed circuitry.

[0021] Engine protection system according to another embodiment of this invention basically comprises at least one float sensor (1), auxiliary coolant tank (2), a relay (3), Engine control unit (4) in case of petrol engine and coolant level warning indicator (5) wherein said float sensor basically comprises a sensor stem (11), a magnetic float (10) freely mounted on said stem and a magnetic reed valve (12) provided at free end of the said stem and is provided on cap (13) of an auxiliary coolant tank (2) to sense the level of coolant inside the said tank. Said auxiliary coolant tank is provided to maintain sufficient coolant level inside the radiator (not shown). Said relay is having two coil points (A, E), one pole point (B), one normally open point (C) and one normally close point (D).

Wherein said coil point (A) is connected to first point (6) of float sensor (1) and another coil point (E) is connected to coolant level warning indicator (5) through an earthing point (7). Said pole point (B) is connected to power supply (8) and second point (9) of float sensor (1), said normally open point (C) is connected to coolant level warning indicator (5) and normally close point (D) is connected to said Engine control unit (4). Said coolant level warning indicator is provided at instrument cluster (not shown).

[0022] When coolant level inside the said auxiliary coolant tank (2) drops beyond the specified normal limit then magnetic float (10) of said float sensor (1) moves down and comes into contact with reed valve (12) and completes the circuit, because of which the Engine control unit (4) cuts power supply to the engine. After this even though the engine gets cranked but it will not start unless the level of coolant in a said tank resumes to the normal level. To avoid above problem, as soon as coolant level in auxiliary coolant tank goes down it would be indicated to driver on instrument cluster through the proposed circuitry.

[0023] The foregoing description is a specific embodiment of the present invention. It should be appreciated that this embodiment is described for purpose of illustration only, and that numerous alterations and modifications may be practiced by those skilled in the art without departing from the spirit and scope of the invention. It is intended that all such modifications and alterations be included insofar as they come within the scope of the invention as claimed or the equivalents thereof.

Claims

1. Engine protection system comprises at least one float sensor, auxiliary coolant tank, a relay, Fuel Injection Pump (FIP) solenoid switch and coolant level warning indicator wherein said float sensor is provided on an auxiliary coolant tank to sense the level of coolant inside the said tank, said relay is having two coil points, one pole point, one normally open point and one normally close point, said one coil point is connected to first point of float sensor and another coil point is connected to coolant level warning indicator through an earthing, said pole point is connected to power supply and second point of float sensor, said normally open point is connected to coolant level warning indicator and normally close point is connected to FIP solenoid switch and said coolant level warning indicator is provided at instrument cluster.

2. Engine protection system comprises at least one float sensor, auxiliary coolant tank, a relay, engine control unit (ECU) and coolant level warning indicator wherein said float sensor is provided on an auxiliary coolant tank to sense the level of coolant inside the said tank, said relay is having two coil points, one pole point, one normally open point and one normally close point, said one coil point is connected to first point of float sensor and another coil point is connected to coolant level warning indicator through an earthing, said pole point is connected to power supply and second point of float sensor, said normally open point is connected to coolant level warning indicator and normally close point is connected to engine control unit (ECU) and said coolant level warning indicator is provided at instrument cluster.

3. Engine protection system as claimed in claims 1 and 2, wherein said float sensor basically comprises a sensor stem, a magnetic float freely mounted on said stem and a magnetic reed valve provided at free end of the said stem.

4. Engine protection system as claimed in claims 1 to 3, wherein said float sensor is provided in a cap of said auxiliary coolant tank.

5. Engine protection system as claimed in claims 1 to 4, wherein said auxiliary coolant tank is provided over the radiator to maintain sufficient coolant level inside the radiator.

6. Engine protection system as claimed in claims 1 to 5, wherein said relay is provided inside the instrument cluster.

7. Engine protection system as claimed in claims 1 to 6, wherein said coolant is water mixed with antifreezer.

8. Engine protection system as claimed in claims 1 to 7, wherein said coolant level warning indicator is a cluster bulb.

9. Vehicle provided with the engine protection system as claimed in claims 1 to 8.

10. Engine protection system substantially as herein described with reference to accompanying drawings.

Fig. 1

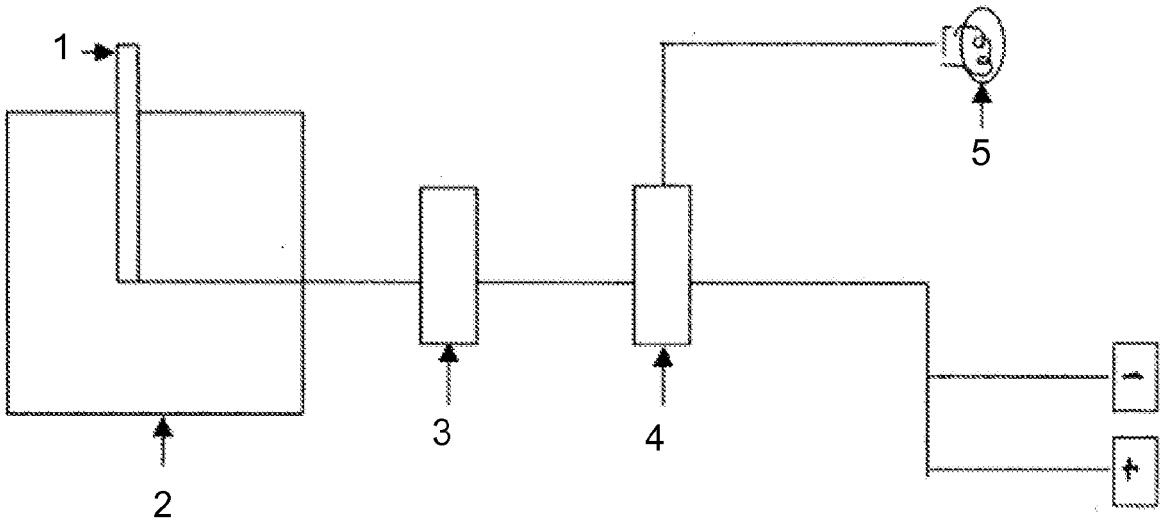


Fig. 2

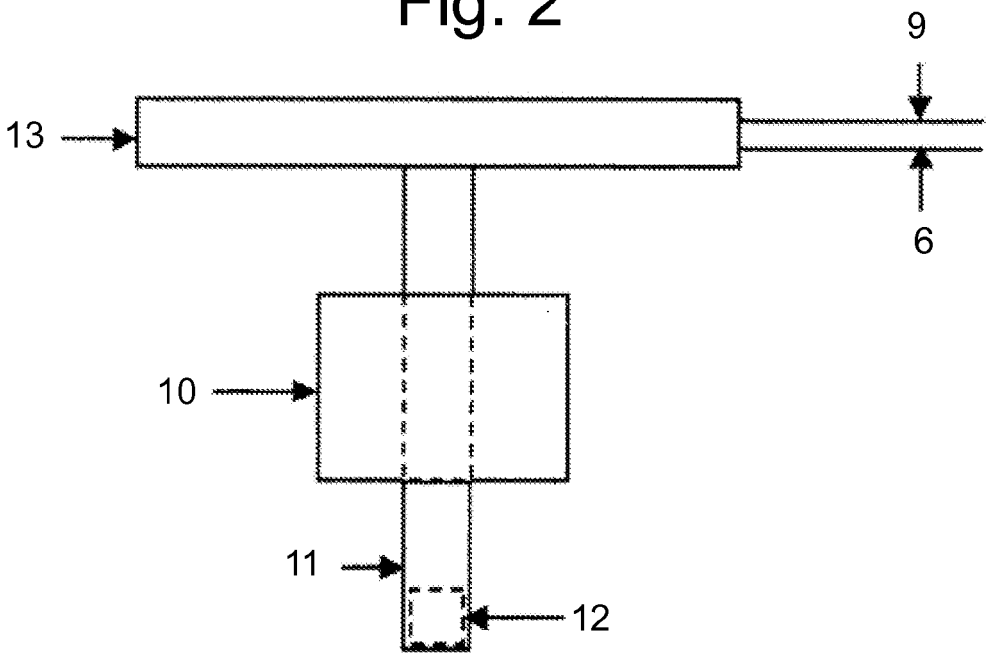


Fig. 3

