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Review on Turbo Combustion Engine

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Abstract: ***Industrial development and population growth have led to a surge in the global demand for energy in recent years. Abundant use of fossil fuels has caused depletion of fossil fuels and increase in pollution. Increase in pollution mainly caused due to emission of exhaust gases from vehicles which run on fossil fuels. The green engine is one of the most important discoveries of the century considering the depletion of fossil fuel and rise in level of population. It has got some magnificent features that were used for first time in the making of engines. The engine doesn't contain a typical piston with magnificent features like sequential variable compression ratio, direct air intake, direct fuel injection, multi fuel usage etc. The efficiency of this engine is high when compared to the traditionally used I.C. Engines and also the exhaust emission are nearly zero. This paper includes introduction to "Green Engine", its technical features, working and comparison with the conventional I.C. Engines. A Green Engine is six phased I.C. Engine. Due to six phase of working, air fuel mixing process and constant volume combustion with controlled time can be achieved. Hence green engine is the only multi fuelled engine which can work on any liquid orgaseousfuel.Thusthe pollution and fuel depletion problem canbesolved completely. Thus "GREENENGINE"willbringacomplete transformation in the field of engine technology.***

Keywords: Efficiency: Green Technology, Low Emission, Multi Fuelled

1. Introduction

Industrial Development and abrupt increase in population has caused surge use of natural resources such as fossil fuels. Fossil fuels such as petroleum and may other are non renewable type of natural resources. Thus their use should be limited. Uncontrolled use of fossil fuels has brought downs the levels of fossil fuels to extension. Moreover their excessive use also has adverse effects on theenvironment the form of environmental pollution.

Thus their use should be controlled. To minimize the fossil fuel usage environment friendly fuels such as bio fuels should be used as an alternative. As most of the vehicles run on fossil fuels to bring down its usage we must make some modification to the conventional IC engines so that they are suitable of different types of fuels which cause lesser/ no environmental pollution Statistics show that, the daily consumption of petroleum all over the world today is 40 million barrels, of which about 50 per cent is used in communications and transportation. In this sort of consumption, about 70-80 per cent is for automobile use. That is to say, auto petroleum constitutes about 35 percent of the whole petroleum consumption. In accordance with this calculation, daily consumption of petroleum by automobiles all over the world is over two million tones. At the same time as these fuels are burnt, poisonous materials such as 500 million tones of carbon monoxides (CO), 100 million tons of hydro carbons (HC), 550 million tons of carbon(C), 50 million tons of nitrogen oxides(NOx) are emitted into the atmosphere every year, severely polluting the atmosphere. At the same time, large quantities of carbon dioxide (CO2) gases, resulting from burning, have also taken the major responsibility for the "green house effect". The situation is really very grim. To counter this problem, the concept of green engine is introduced. This is six phase I.C. engine in which the priority is given to the complete mixing of fuel with the air thereby causing its complete burning. It is a multi fuel engine; therefore the fuel crisis can also be overcome.

2. Technical Features

Compared to conventional piston engine operated on four phases, the Green Engine is an actual six-phase internal combustion engine with much higher expansion ratio. The six phases are Intake, Compression, Mixing, Combustion, Power and Exaust. The main features of this engine are High air charge rate, Satisfactory air-fuel mixing, Complete burning, High combustion efficiency, Full expansion, The most important characteristic is theexpansion ratio being much bigger than the compression ratio. Also the other main features are The Sequential

Variable Compression Ratio, Constant Volume Combustion, Self-adapting Sealing System. Because of these revolutionary inventions the engine has some advantages like The thermal efficiency of the engine is increased. The engine is free of the harmful emissions. As more power is obtained in a less space, the engine is more compact and light. Also the reciprocating parts are eliminated, so the engine is vibration free.

2.1 Direct Air Intake

Direct air intake means that there is no air inlet pipe, throttle and inlet valves on the air intake system. Air filter is directly connected to the intake port of the engine, therefore highest volumetric efficiency which makes engine produce a high torque of output on all speed range is achieved, and the pump loss which consumes the part of engine power is eliminated.

2.2 Sequential Variable Compression Ratio

This greatly revolutionary innovation can provide the most suitable compression ratio for the engine whatever operation mode it works on with burning variety of fuels. Therefore, an excellent combustion performance is attained.

2.3 Direct Fuel Injection

Direct fuel injection can provide higher output and torque, while at the same time it also enhances the response for accelerations.

2.4 Super Air-Fuel Mixing

Since the independent air-fuel mixing phase is having enough time for mixing air and fuel under strong swirling and hot situation, the engine is capable to burn any liquid gas fuels without modifications. An ideal air-fuel mixture could delete CO emission.

2.5 Lowest Surface To Volume Ratio

The shape of combustion chamber is paraboloid. Thus a lowest surface-to-volume ratio is obtained, and the engine is having less heat losses and high combustion efficiency.

2.6 Constant Volume Combustion

The fuels can generate more energy while the combustion is occurred on the constant volume. Also the constant volume combustion technology can allow the engine to have a stable combustion when the lean-burning is managed so the heat losses and NOx emissions are decreased.

2.7 High Expansion Ratio

High expansion ratio can make the burned gases to release much more power, in other words, the waste gases while they run out the engine are only bringing much less energy with them, therefore the engine's thermal efficiency is greatly raised, and at the same time, the noise and temperature of the exhaust are tremendously dropped.

2.8 Vibration Free

As major moving parts, vanes, which are counted in little mass and operated symmetrically, the performance of the engine is very smooth got away from vibration.

3. Working of the Green Engine

A Turbo combustion engine for conversation of combustible fuel to rotating energy includes a cylinder, piston, connecting rod and crankshaft system for suction and compression and a rotor for expansion and exhaust. Combustible fuel is compressed within a combustion chamber separate from the cylinder and the combustion force applied directly to the rim of the rotor as in turbines with much larger capacity than the cylinder, converting the entire combustion force at maximum torque to rotating energy. The combustion chamber also includes a variable compression ratio system that constantly adjusts the compression ratio within the combustion chamber for optimum performance of the engine under all variables.

The Green Engine has six phases which occur in the following sequence.

- Intake
- Compression
- Mixing
- Combustion
- Power
- Exhaust

3.1 Intake

The air is admitted directly inside the compression chamber. The air does not undergo any treatment before entry. The air filter is directly connected to the entry of the intake pipe.

3.2Compression

The air admitted in, then enters into the compression chamber. The compression chamber has variable area. The central disc having arms pushes the air in the compression chamber. The compression chamber is connected to the combustion chamber by a small diameter duct which is tangent to the combustion chamber. So as arm pushes the air in the compression chamber the pressurized air is forced to flow through this duct.

3.3 Direct Fuel Injection

One more facility is provided in the green engine is that of direct fuel injection. The fuel injected is also variable. The amount of fuel injected is varied as per the mode of the vehicle.

3.4 Combustion

The charge is ignited by the spark plug. The combustion time can be varied to burn different grade of fuels. The controlled combustion time gives the complete burning of the charge. The emissions are greatly reduced.

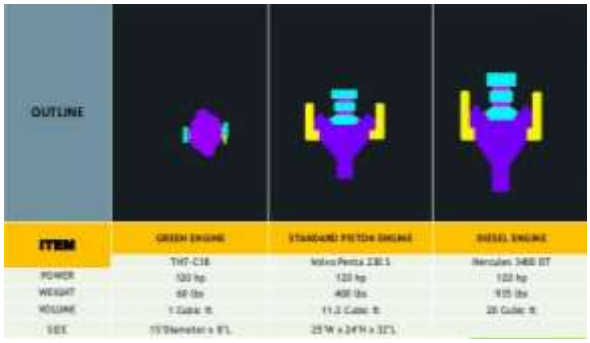
3.5 Power

The burned products of the combustion are expelled out of the combustion chamber. The high pressure gases push the arm of the compression chamber causing work output. The power is obtained in the form of the power pulses.

3.6Exhaust

The burned gases are expelled out. The gases are first expanded in the expansion zone. The expansion ratio is more which ensures the maximum work output. Also the maximum energy is gained from the gases. The temperature also reduces and hence an optimum utilization of the burned gases is achieved. The burned gases after expansion are pushed into the exhaust pipe and released into the atmosphere. Thus the six-phase cycle is completed.

4. Comparison



5. Advantages

1) As Green Engine is very compact with multi-power pulses, the Size and Weight could be only 1/5 to 1/10 of the conventional piston engines on same output.
2) The Thermal Efficiency of the Green Engine could be potentially as high as 65%, even more if water add-in technology is to be considered.
3) Due to Six Phases of Working Principle, Super Air-fuel Mixing Process and Constant Volume Combustion with Controllable Time the Green Engine becomes the only real Multi-Fuels Engine on our planet; any liquid or gas fuels can be burned well.
4) With perfectly air-fuel mixture, complete combustion under lower peak temperature and free of quenching effect, the Emissions of CO, HC and NOx could be near zero, thereby a catalytic converter could be not required at all.
5) Due to inherence of good dynamic and static balance the performance of the Green Engine is as smooth.
6) Nearing 70% of fuel is saved.

6. Applications

The Green Engines could be used as the ideal power plants on a very wide range of applications in transportation, communication, farm, mine, engineering, military uses, such as automobiles, aircrafts, boats, ships, hovers, tractors, locomotives, generators, snowmobiles, chainsaws, helicopters, tanks, torpedoes, submarines etc

7. Conclusion

The environmental problems can be effectively overcome by the use of Green engine. It can use almost any type of fuel available. It is superior to the conventional I.C. engine in terms of smooth operation, efficiency and cost. Compared to conventional piston engine operated on four phases, the Green Engine is an actual six-phase internal combustion engine with much higher expansion ratio.

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