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Concept, design and fabrication of a very lean burn internal combustion engine

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Since the invention of first spark ignited internal combustion engine (SI-ICE), it has improved remarkably over the last eighty years and all these improvements have resulted in modern SI-ICEs that are more environment friendly, efficient and reliable than ever. To take a meaningful, vital and resolving leap towards a more sustainable technology, it has become almost critical to move towards better thermally efficient SI-ICEs on an immediate basis. To address the shortcomings of existing SI-ICEs, it is apparent that the need for an ignition system that allows fastest possible burns in minimum duration is imminent and is possible without completely replacing the existing technology. The proposed system addresses these problems in two simultaneous manners. Firstly; by being modular and compatible with existing SI-ICEs without requiring considerable changes in existing assembly lines and secondly; as one complete SI-ICE unit with all systems/sub-systems tuned to harness the best of the proposed technology. This paper presents the concept and design of new methods and technologies to make existing SI-ICEs more environment friendly / efficient and additionally; the conceptual design of a new SI-ICE unit complete with high energy ignition system, lean fuel delivery system and an Engine Control/Management (ECU / ECM) system to achieve better fuel saving; depending on engine/operating parameters; over existing SI-ICEs; without compromising on the power/torque output for given chamber volume. The test results of proposed system shows significant fuel saving under different settings.

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