



STARTING A FOUR- STROKE INTERNAL COMBUSTION ENGINE IITM Technology Available for Licensing

Problem Statement

- Efficient conversion of chemical energy to mechanical energy in four-stroke internal combustion engines.
- Optimization of air-fuel mixture intake, compression, and combustion processes.
- Further, improvement in fuel injection and ignition systems for better engine starting and performance.

Intellectual Property

- IITM IDF Ref. 1262
- IN 377679 - Patent Granted

Technology Category/ Market

Category- Advanced Engine Management Systems, Automobile & Transportation

Applications - Automotive, Agricultural Equipment: Tractors and Harvesters.

Industry- Automotive, Heavy Machinery

Market - The global internal combustion engine market size is expected to reach USD 228 Billion in 2032, and register a revenue CAGR of 5%.

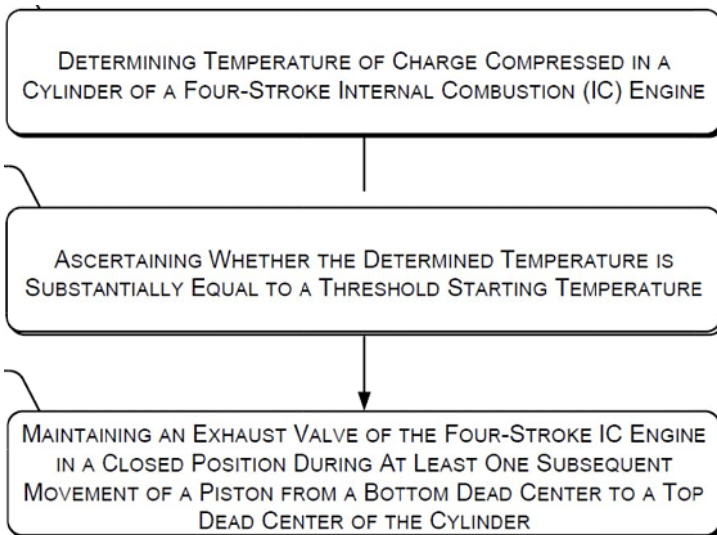


FIG. 1. illustrates a method for starting the four stroke IC engine.

TRL (Technology Readiness Level)

TRL - 4: Technology validated in lab scale.

Research Lab

Prof. Ramesh A,
Dept. of Mechanical Engineering

Technology

The present invention relates to a **four-stroke internal combustion (IC) engine** and, in particular, to **starting of the four-stroke IC engine.**

1

Engine Start in Cold Conditions:

- The method uses multiple compression strokes to incrementally increase the temperature of the air inside the cylinder, aiding engine start in cold conditions without external devices.

2

Collection Chamber Utilization:

- Compressed air is routed to a collection chamber after each compression stroke, and re-compressed in subsequent strokes until it reaches a threshold starting temperature for ignition.

3

Controller and Sensors:

- A controller, coupled with temperature sensors, monitors and manages the compression cycles and valve operations to ensure the air reaches the required temperature for starting the engine.

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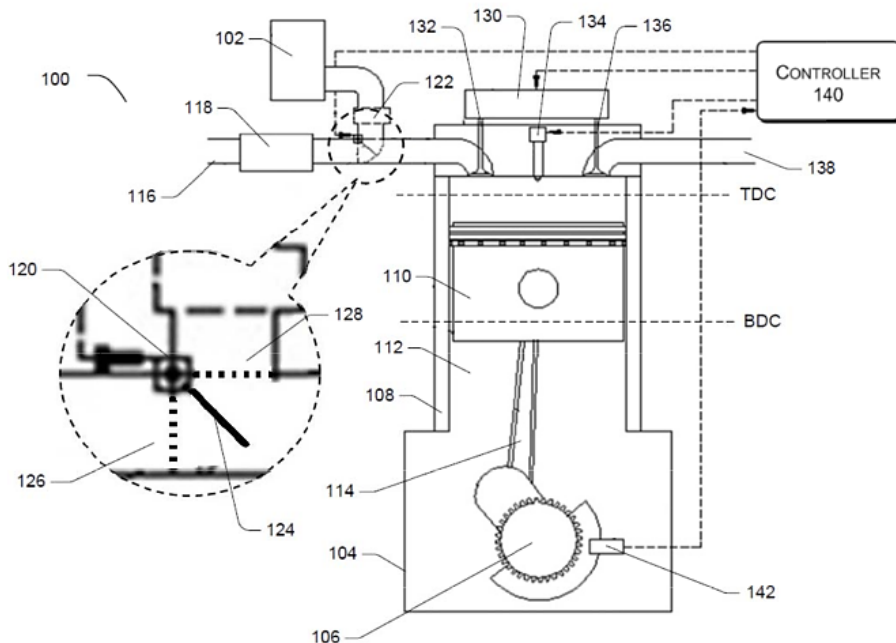


FIG. 2. illustrates a four stroke internal combustion (IC) engine equipped with a collection chamber.

Key Features / Value Proposition



a) Enhanced Cold Start Performance: Utilizes multi-stage compression to ensure reliable engine starts in low temperatures without external aids.



b) Fuel Efficiency
Optimizes initial combustion conditions, reducing the need for excess fuel during start-up.



c) Reduced Emissions
Improved combustion efficiency minimizes emissions during engine start, aligning with stringent environmental regulations.



d) Integrated Control System
Employs advanced sensors and a controller to precisely manage compression cycles and temperatures.



e) Durability and Longevity
Minimizes wear and tear associated with cold starts, enhancing engine longevity.



f) Scalability
Applicable to various engine types and sizes, making it versatile across different market segments.



g) Cost-Effectiveness
Eliminates the need for additional starting aids, reducing overall engine and maintenance costs.

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