A SYSTEM AND A METHOD FOR DETECTING KNOCK IN INTERNAL COMBUSTION ENGINE OF A VEHICLE

IITM Technology Available for Licensing

Problem Statement

- Developing a knock detection system that doesn't rely on dedicated devices like accelerometers or in-cylinder pressure sensors to reduce cost and maintenance.
- Designing a faster regulation mechanism to eliminate the negative effects of knocking on internal combustion engines over the long term.
- There is a need for creating **a knock detection technology** that provides both detection and quantification of knocking for accurate identification and swift regulation.

Technology Category/ Market

Category - Engine Control Systems
Applications- Automotive, Power Generation
Industry- Automotive Industry

Market- Global automotive test equipment market size was valued at USD 3.0 billion in 2020 and is expected to reach USD 3.7 billion by 2025, at a **CAGR of 4.1%.**

Technology

The present method and system for detecting knock in internal combustion engines utilize high-frequency speed oscillations obtained from a crankshaft sensor, comparing them to pre-stored threshold amplitudes to identify knock occurrences.

The system can regulate fuel injection and spark generation in real-time based on knock detection, preventing knock in subsequent engine cycles.

By utilizing a filtering process and analyzing high-frequency speed oscillations, the system offers a cost-effective and efficient solution for knock detection without requiring additional dedicated sensors.

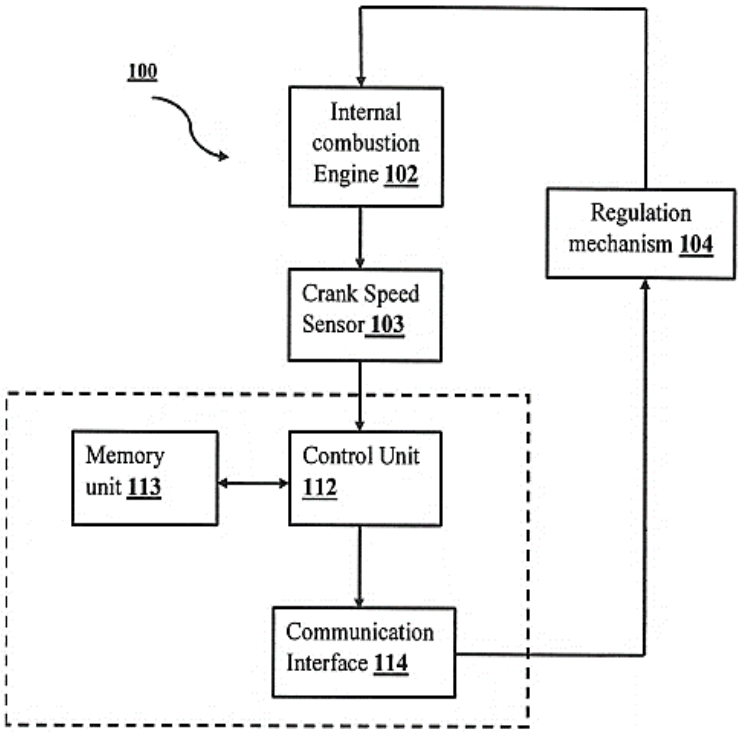

Fig.1 Block diagram of a system for determining knock in an internal combustion engine.

Intellectual Property

- IITM IDF Ref. **1852**
- **IN 490440 - Patent Granted**

TRL (Technology Readiness Level)

TRL - 3, Proof of concept stage

Research Lab

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Key Features / Value Proposition

1. Enhanced Knock Detection: Utilizes high-frequency speed oscillations for accurate and timely detection of engine knocking.
2. Real-Time Regulation: Enables immediate adjustment of fuel injection and spark timing to prevent knock in subsequent engine cycles.
3. Cost-Efficient Solution: Eliminates the need for dedicated knock detection devices, reducing overall system costs.
4. Pre-Stored Thresholds: Utilizes pre-stored threshold amplitudes for comparison, ensuring adaptability to various engine operating conditions.
5.Comprehensive Analysis: Analyzes multiple engine operation cycles to determine threshold amplitudes, enhancing detection accuracy.
6. Seamless Integration: Easily integrates with existing engine control systems, minimizing implementation complexity for manufacturers.

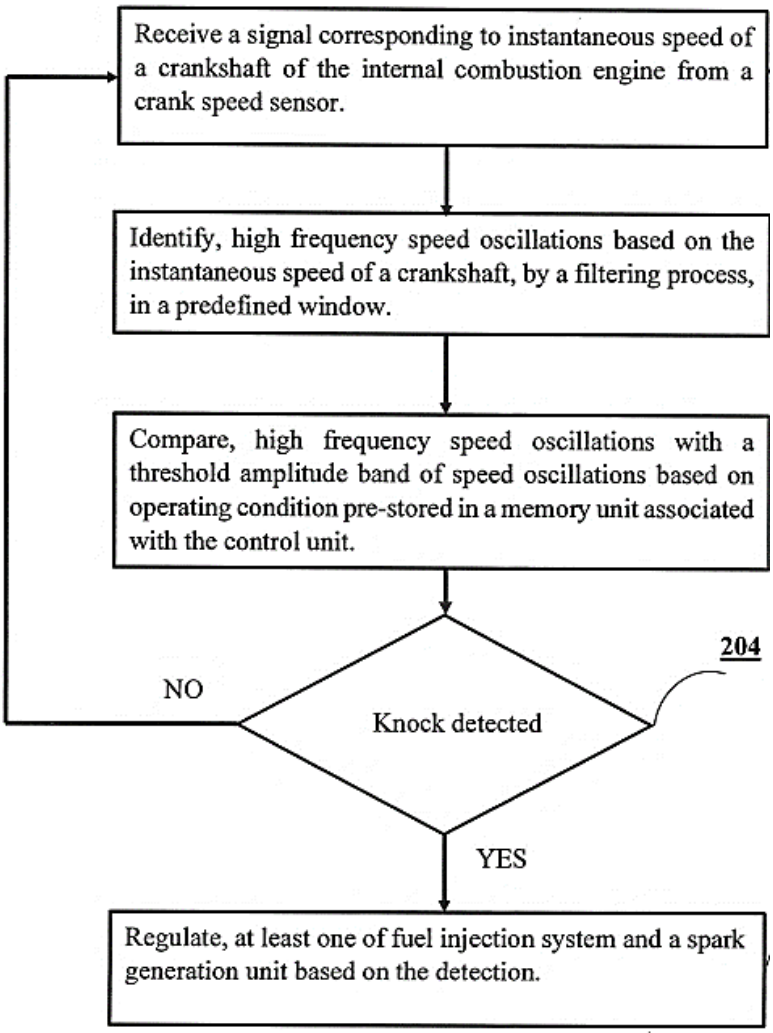

Fig.2. Flow chart illustrating method of detecting knock in an internal combustion engine.

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