



### Industrial Consultancy & Sponsored Research (IC&SR)

## A CONTINUOUSLY VARIABLE VALVE DURATION MECHANISM FOR THE INTERNAL COMBUSTION ENGINE IITM Technology Available for Licensing

### PROBLEM STATEMENT

- ❖ The **internal combustion engine** basically works on a **four-stroke** process of induction, compression, combustion, and exhaust.
- ❖ The **valves (intake and exhaust valves)** are one of the **major components** of the engine and are **characterized by valve duration**, which describes how **long a valve is open**.
- ❖ Continuous variable valve lift (**CVVL**), adapted to change valve lift according to the engine speed.
- ❖ **Later**, a continuously variable valve timing (**CVVT**) device, adapted to **enable different valve timing operations**.
- ❖ However, **CVVT devices are complex to design, high cost, and have a shorter valve operating range**.
- ❖ The present invention **is to overcome the configuration** of continuous variable valve duration mechanism for the internal combustion engine.

### TECHNOLOGY CATEGORY MARKET

**Category:** Internal Combustion engine and Transportation /Assistive, Test Equipment and Design Manufacturing

**Industry:** Automotive Industry.

**Application:** Internal Combustion(IC) Engine.

**Market:** The global Automotive Market size was valued at **USD 108.10 Billion in 2022** and is poised to grow from **USD 116.86 Billion in 2023 to USD 217.90 Billion by 2031**, at a **CAGR of 8.1%** during the forecast period (2024-2031).

### INTELLECTUAL PROPERTY

IITM IDF Ref. 2086;

Patent No: IN 530846;

### TRL (Technology Readiness Level)

TRL-4, Technology validated in Lab;

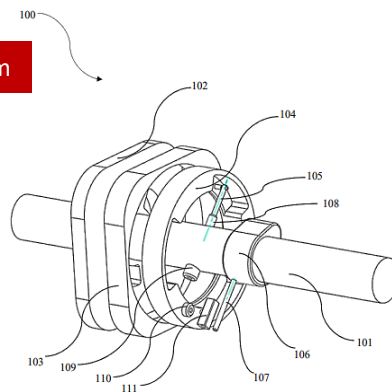
### Research Lab

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### TECHNOLOGY

- 1 The **continuously variable valve duration mechanism** includes a camshaft, a fixed member and a movable member adjacently mounted to each other on the camshaft.
- 2 The movable member is **configured to displace** between a first position and a second position relative to the fixed member.
- 3 The mechanism further includes a **disc** which is **rotatably positioned** within the movable member and coupled to the camshaft by a **first pin**.
- 4 Furthermore, the mechanism includes a **cam**, which is **connected to the disc by a second pin** and configured to rotate corresponding to the rotation of the disc.

### Mechanism



Referral numeral	Description
100	Mechanism
101	Camshaft
102	Fixed member
103	Movable member
104	Disc
105	First pin
106	Cam
107	Second pin
108	First hollow projection
109	Second hollow projection
110	Cylindrical protrusion
111	Bracket
112	Protrusion
113	Slots

Figure. 1 illustrates an exploded view of a continuously variable valve duration mechanism.

### CONTACT US

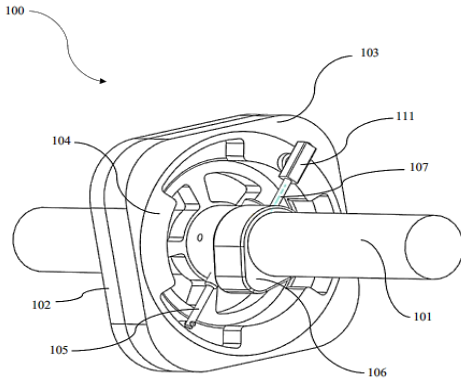
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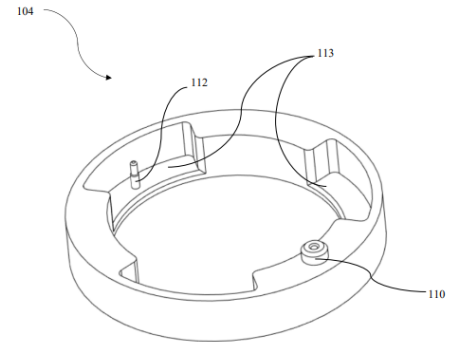
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**Figure. 2** illustrates a perspective view of the continuously variable valve duration

Image



**Figure 3** shows a disc of the continuously variable valve duration mechanism

The cam can rotate at **rotational speeds higher or lower than the rotational speed of the camshaft** depending on position of the movable member between the first position and the second position based on duration of the valve (i.e., for how longer the valve must be opened).

The movable member can be **displaced to desired position/location between the first position and the second position** and the first pin and the second pin displaces to **adjust the relative velocities between the cam and camshaft**.

Therefore, this configuration of the **continuously variable valve duration mechanism** is **customizable and results in providing a wide operating range of altering the valve duration**.

### Key Features / Value Proposition

**New configuration** for continuously variable valve duration mechanism for IC Engine.

The **displacement** of the movable member between the **first** position and the **second** position results in **changing centre of rotation** of the **camshaft and the cam**.

The **change in centre of rotation** of the camshaft and the cam facilitates in **changing relative velocities** of the **camshaft and the cam**.

**Less cost** for manufacturing due to **simple design**  
**High engine efficiency**

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