SEAT BELT LOCKING MECHANISM

IITM Technology Available for Licensing

PROBLEM STATEMENT

- It is noted that sudden braking/stopping and/or collision/crash of the vehicle, especially when the vehicle is **cruising at higher speeds**, results in passengers experiencing **inertial forces** towards front the vehicle, which leads to severe injuries or even deaths depending on speed with which the vehicle collided.
- Conventional seat belts make use of **a friction type spool mechanism** to dispense & retract the seat belts. Said friction-based seat belt mechanism is **extremely tough & complicated,** especially when the ranges are too small, & may **lead to hazards**. Hence, there is a need to address the limitations.

INTELLECTUAL PROPERTY

IITM IDF Ref. 2225; IN Patent No. 496128

TECHNOLOGY CATEGORY/ MARKET

Technology: seat belt locking mechanism;
Industry & Application: Automobiles, Passenger vehicle, Civil Vehicle;
Market: The global automotive seat belt retractor market is projected to grow at a **CAGR** of **6.72%** during **2024-2028.**

TRL (TECHNOLOGY READINESS LEVEL)

TRL-4, Proof of Concept ready, tested in lab.

TECHNOLOGY

- Present invention describes a **mechanism for locking a seat belt in a vehicle comprising a shaft,** where the shaft rotatably engages the seat belt**.**
- The one part of the shaft is disposed on a **connecting body** comprises of a **first** profiled section & a **second** profiled section.
- The **compliant body** coupled to the **connecting body.**

IMAGE

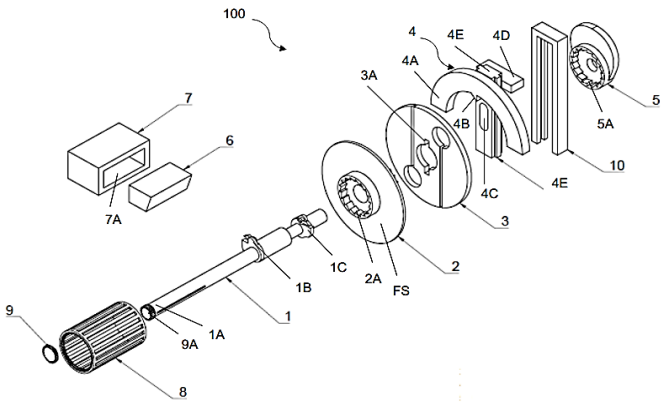

FIG.1A : Illustrates exploded perspective rear view of a mechanism for locking a seat belt in a vehicle;

- A **clip** disposed proximally to the compliant body where the clip is actuatable to a first portion through a contact by complaint body.
- **A follower** movable disposed on the shaft and it's **one arm** is supported on the clip and its **toothed element** engages with the connecting body.
- As the **seat belt** is pulled **above a predefined velocity** it rotates the connecting body which is responsible to expand the complaint body that **actuates the clip** to the first position**,** and it disengages the follower from **the clip.**
- Hence causing the follower **to engage the connecting body** to arrest rotation of the **connecting body and the shaft.**
- Therefore, in case of an impact**, sudden stop or a collision of the** vehicle the seat belt is pulled above **a predefined velocity leading to the locking of the belt.**

RESEARCH LAB

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KEY FEATURES / VALUE PROPOSITION

❖ *Technical Perspective & Indusrty Perspective:*

- Present invention facilitates the locking mechanism which is the **simplicity in constructions** using readily available & **easy-to-manufacture members** like shaft, gears, cam, etc.
- The claimed invention **eliminates the frictional contact between the elements constituting the mechanism.**
- **Ensures reliable operation** of the mechanism & also **ensures durability** of the members/elements constituting the mechanism.
- Use of gravitational force & centrifugal force operating the mechanism makes the mechanism **highly reliable & ensures** proper response of the mechanism in proportion **to pulling force of the seat belt**.
- Applicable in the **automobile manufacturing industries e.g.** 12/8/6 wheeler vehicles, Four/two/ three wheeler vehicle manufacturing industries, & others.

❖ *User Perspective:*

- The claimed invention is having high demand for the use of Individual vehicle, rental vehicle and commercial vehicles.
- Eliminate the need of seeking assistance during **any uncertain condition** such as **sudden stop or a collision** of the vehicle, the seat belt is pulled above a **predefined velocity** leading to the **locking** of the belt**.**
- By utilizing the belt, easily avoid the major accident or death calamity.

IMAGE

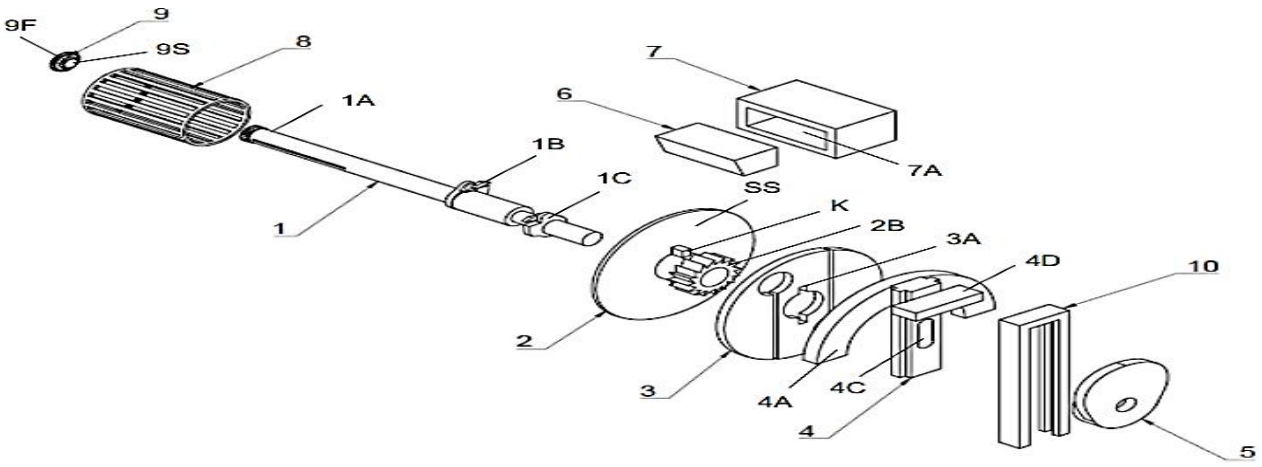

Fig. 1B(Above): Depicts exploded perspective front view of the mechanism for locking a seat belt in a vehicle

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