

SPLIT FIFTH WHEEL COUPLING

IITM Technology Available for Licensing

Problem Statement

- The **tractor-semitrailer combinations** are becoming larger and longer, face the problem of **off tracking**, which is the ensuing difference in path radii between the front & rear axles as it **manoeuvres** a turn.
- Despite steering the rear axle of the semitrailer, a way of mitigating off-tracking is to shift the **fifth wheel coupling rearwards**. But, it is limited by the distribution of the semitrailer's load; any rearward shift of the fifth wheel coupling results in reduction of the **total static load** on prime mover's front axle and available traction, leading to directional instability of the vehicle.

The aforesaid issues are eased with a mechanism to **reduce off tracking** without affecting the **load distribution** among the axles of the tractor.

Technology Category/ Market

Manufacturing/Mechanical Engineering

Industry: Automobiles, Vehicles Designing

Applications: To connect the tractor and trailer of an articulated semitrailer.

Market: The global automotive fifth wheel coupling market is projected to record a **CAGR of 5.8%** from **2023 to 2033**. The market is valued at **US\$ 637.1M** as of 2023, and by 2033, the market might reach a valuation of **US\$ 1.1B**.

TRL (Technology Readiness Level)

TRL – 3; Proof of Concept

Technology

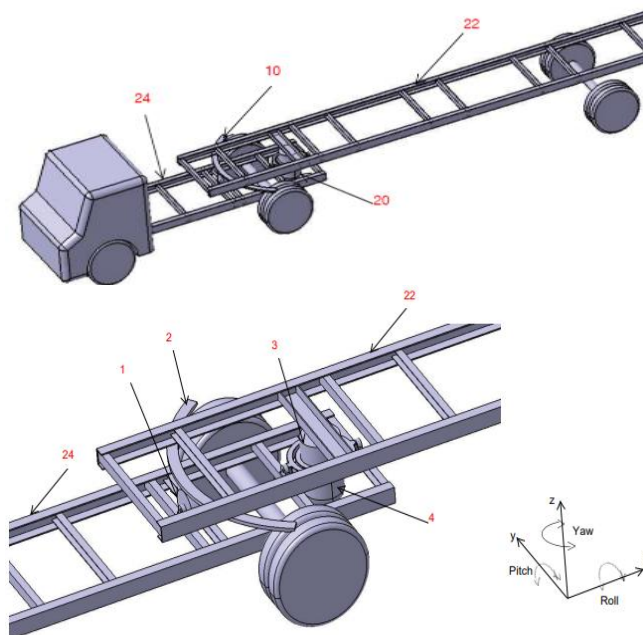
The Present Patent discloses a **Split fifth wheel coupling mechanism** for coupling a tractor and a semitrailer comprising of a roller mechanism and a cylindrical joint. The **method** for above mentioned subject matter comprising:

• A roller mechanism and a cylindrical joint on either side of the rear axle of the prime mover.

• Roller mechanism comprising plurality of rollers rotatable around their axis, fixed to chassis of prime mover, a track fixed beneath chassis of semitrailer, where rollers roll on track disposed above while articulating.

• The cylindrical joint comprises of a kingpin, a cylindrical mating part adapted to engageably receive the kingpin, guide plate to guide the kingpin, a locking mechanism to lock kingpin in position.

FIG. 1 is the zoom view of the invention.



Key Features / Value Proposition

> Technical Prospective:

- A **hitch mechanism** to join a tractor and a semitrailer consist of the **cylindrical joint** that offers **reaction forces** in the **x-y plane** of the vehicle and most of the **vertical forces** are taken care of by the **roller mechanism**.
- The roller mechanism is to **enable load transfer** even when the vehicle is **articulating**.
- The weight of **semitrailer** is distributed between its axle and the roller mechanism according to their respective distances from semitrailer's center of gravity (**CG**).

> User Prospective:

- It does not involve any **hydraulic/pneumatic circuits**, nor **Complex control circuits**. It is of simple mechanism and requires **minimal maintenance effort**.
- No **additional drives** or actuators are needed and hence it is **economic**. Also, no extra power is required, hence **running cost is negligible**.

Intellectual Property

IITM IDF Number: 1481

IP Patent Number: 418981 (**Granted**)

Research Lab

Prof. Sujatha C

Dept. of Mechanical Engineering

CONTACT US

Dr. Dara Ajay, Head
Technology Transfer Office,
IPM Cell- IC&SR, IIT Madras

IITM TTO Website:
<https://ipm.icsr.in/ipm/>

Email: smipm-icsr@icsrpis.iitm.ac.in

sm-marketing@imail.iitm.ac.in

Phone: +91-44-2257 9756/ 9719