ACTIVE WHEEL ALIGNMENT MECHANISM FOR CHANGING CAMBER ANGLE IN A VEHICLE

IITM Technology Available for Licensing

Problem Statement

- The quality of a vehicle's ride, handling, and safety depend on the suspension system and wheel alignment, but finding the right balance between these factors is challenging.
- Traditional preset camber angles for wheel alignment offer a compromise that may not be optimal for various driving conditions, potentially leading to performance issues and tire wear. **Fig. 1 illustrate negative camber and positive camber configurations of the front wheels of a vehicle respectively.**
- Thus, there is **a need for a dynamic wheel alignment system that can adjust alignment** angles based on internal vehicle conditions and external road conditions to enhance overall vehicle performance.

Intellectual Property

- IITM IDF Ref**. 2277**
- **IN 401713 - Patent Granted**

Technology Category/ Market

Category - Automobile & Transportation
Applications - Automobile suspension, wheel alignment, toe, camber, steering system
Industry - Automotives, Commercial Fleets

Market- The global fleet management market attained a value of USD 22.28 billion in 2022 and is expected to grow at a **CAGR of 18%** in 2023-2028 to reach USD 59.87 billion by 2028.

TRL (Technology Readiness Level)

TRL - 4: Technology validated in lab scale.

Research Lab

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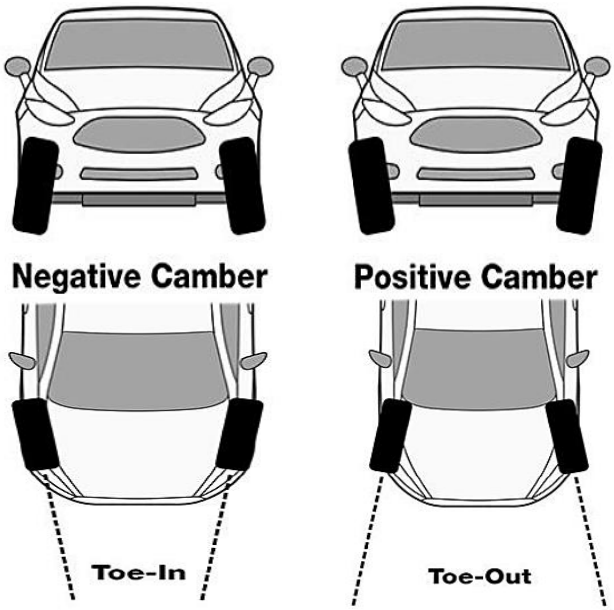

FIG.1.illustrate negative camber and positive camber configurations and representation of toe and camber of the front wheels of a vehicle.

Technology

1. The present invention relates to a camber adjustment mechanism of the front and rear wheels of a vehicle, in an active manner while the vehicle is in motion.
2. The camber adjustment mechanism comprises an upper suspension arm using a triangular wedge.
3. A slidable mounting is integrated with a base of the triangular wedge.
4. A first surface of the slidable mounting has gear teeth for coupling with a steering system and a second surface of the slidable mounting has a slant surface.
5. A slider is positioned between an apex of the triangular wedge and the second surface of the slidable mounting.
6. Change in position of a slider over the second slant surface of the slidable mounting based on steering movement causes variation of a camber angle.

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Key Features / Value Proposition

1. Dynamic Camber Adjustment:
The invention offers a camber adjustment mechanism that dynamically adjusts the camber angle of a vehicle's wheel based on steering system input, enhancing handling and tire wear optimization.

2. Improved Suspension Control:
By changing the effective length of the upper suspension arm through the movement of a triangular wedge and slider, the mechanism optimizes wheel alignment for positive and negative camber angles, improving vehicle performance.

3. Tailored Camber Control:
The system allows for precise control of camber angles, creating a positive camber for specific conditions like high loading and a negative camber for cornering, **ensuring optimal tire contact and grip** on the road surface.

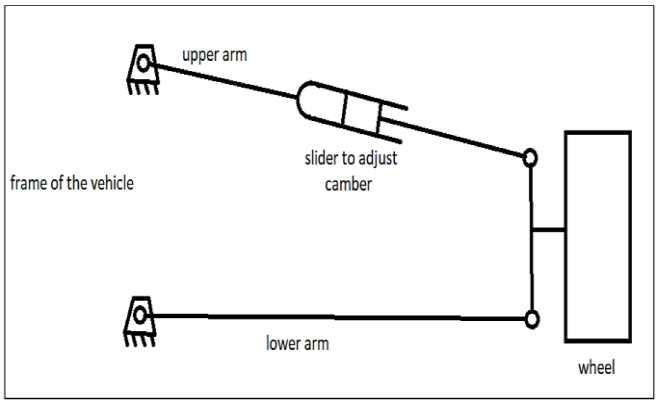

FIG. 2. illustrates a kinematic diagram of camber adjustment mechanism.

Zero Displacement- Neutral Position:

FIG. 3A. illustrate a front view and a top view of the camber adjustment mechanism depicting wheels in a neutral position.

Positive Camber Position:

FIG. 3B. illustrate a front view and a top view of the camber adjustment mechanism depicting wheels in a positive camber configuration.

Negative Camber Position:

FIG. 3C. illustrate a front view and a top view of the camber adjustment mechanism depicting wheels in a negative camber configuration.

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