



A New Crank Arm Mechanism

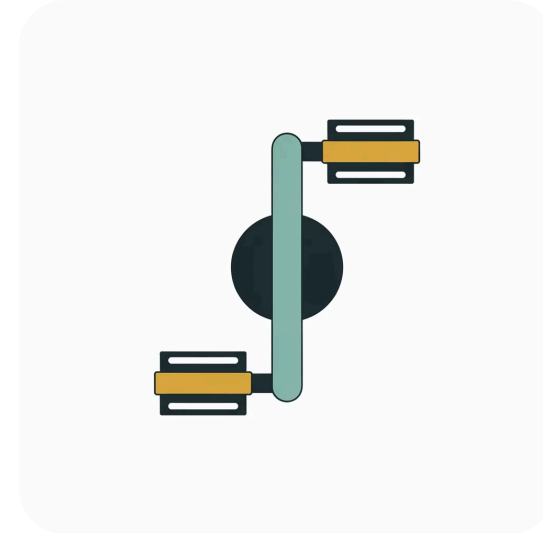
Patent No. 436717

Optimizing human power through superior geometry. A revolutionary approach to **bicycle propulsion** that transforms wasted energy into forward motion.

The Problem: Wasted Energy

Bicycle pedals suffer from critical inefficiencies at the top (0°) and bottom (180°) of each rotation, the notorious "dead spots."

In these positions, riders have virtually no leverage to propel the bike forward, resulting in wasted effort and uneven momentum throughout the pedal cycle.



- **Top Dead Center (0°)**

Minimal torque transfer

- **Power Zone (90°)**

Maximum efficiency

- **Bottom (180°)**

Second dead spot

A New Shape for Better Performance

Asymmetrical Innovation

We replace one standard straight crank arm with a precisely engineered curved, semi-circular arm that fundamentally changes the torque profile.

Lightweight Engineering

The curved arm utilizes advanced composite materials and lightweight alloys, ensuring perfect balance without adding weight to the drivetrain.

Rotational Asymmetry: By strategically using lighter materials for the larger curved component, we maintain optimal rotational mass distribution while dramatically altering the torque delivery profile throughout the pedal stroke.

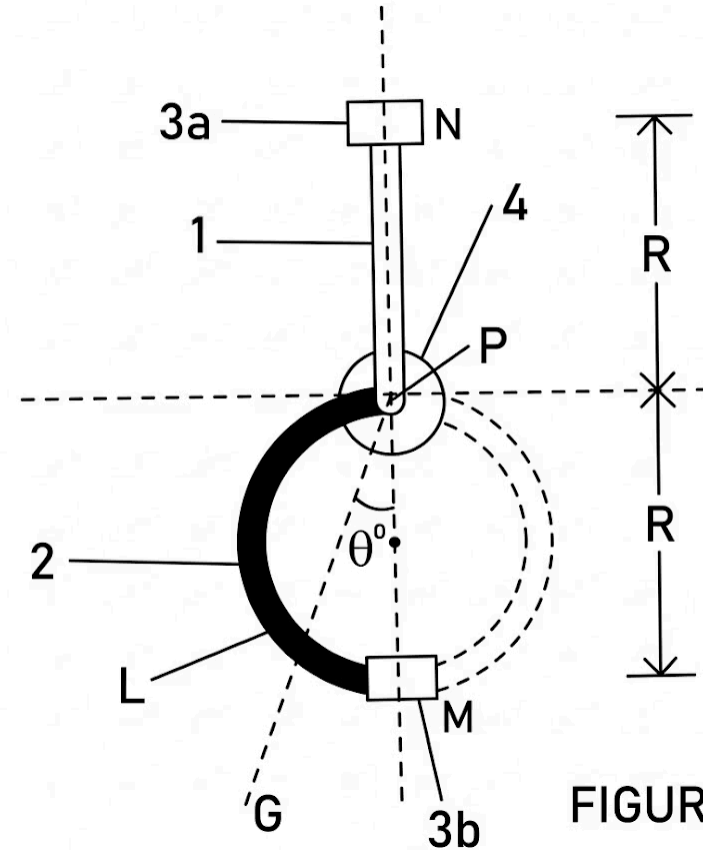


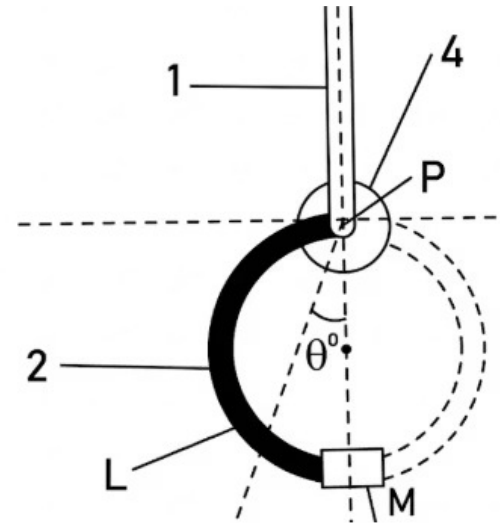
FIGURE-1

The "Deflected Angle" Advantage

Understanding the Geometry

The curved shape creates a critical "deflected angle" (θ) that functions as a timing shift in the crank mechanism.

This geometric innovation positions the lever at a mechanically superior angle earlier in the pedal stroke, engaging the drivetrain more effectively than traditional linear cranks.



Geometric Phase Shift: The mechanism creates an advantageous angular offset, allowing the crank to deliver torque at angle θ when a standard crank would be in a less efficient position.

$$\tau = r \times F \times \sin(\theta)$$

Where torque (τ) is maximized by optimizing the deflected angle (θ) throughout the rotation cycle.

Optimizing Your Effort

01

Energy Conservation

We don't create free energy, we redistribute leverage from weak dead spots to strong power zones.

02

Smooth Power Delivery

The system smooths out power transfer, making pedaling feel more consistent and natural throughout the entire rotation.

03

Instantaneous Torque

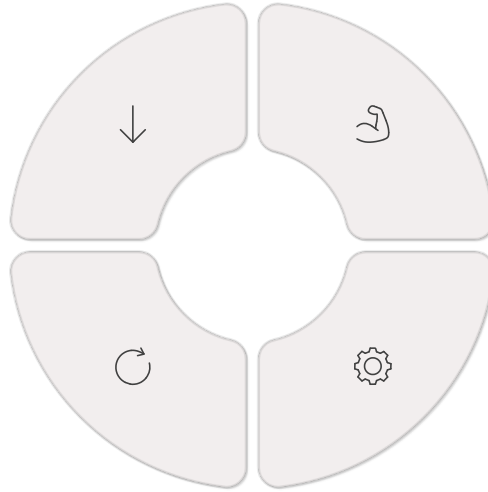
Total energy remains constant, but we optimize instantaneous torque delivery to match human physiology.

The broadened effective power curve eliminates the pronounced peaks and valleys of traditional drivetrains, delivering consistent force application that aligns with natural human muscle recruitment patterns.

Maximizing the Downstroke

Zone FED

Peak biological output: 1-5 o'clock position



Maximum Force

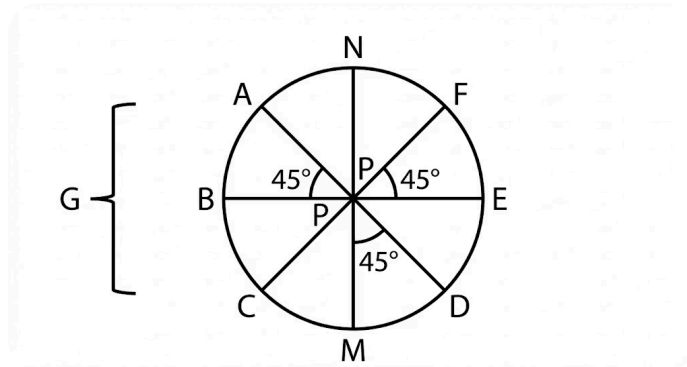
Riders generate highest power during downstroke

Enhanced Rotation

More angular displacement per unit of effort

Mechanical Advantage

Design amplifies leverage precisely in this zone



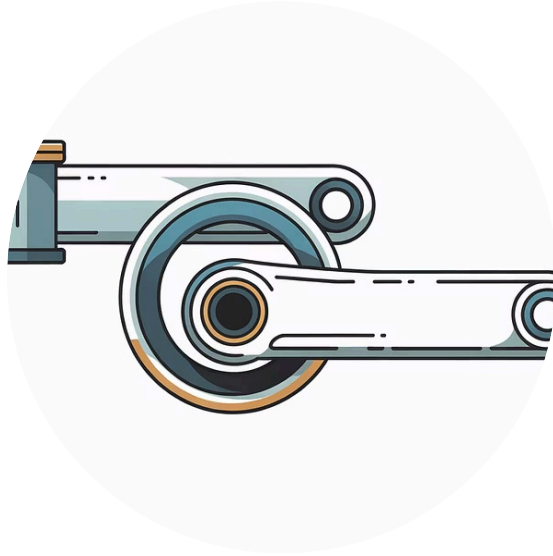
The phase shift strategically aligns peak mechanical advantage with the rider's strongest natural output zone, delivering maximum efficiency exactly where it matters most.

Built for Real Riders



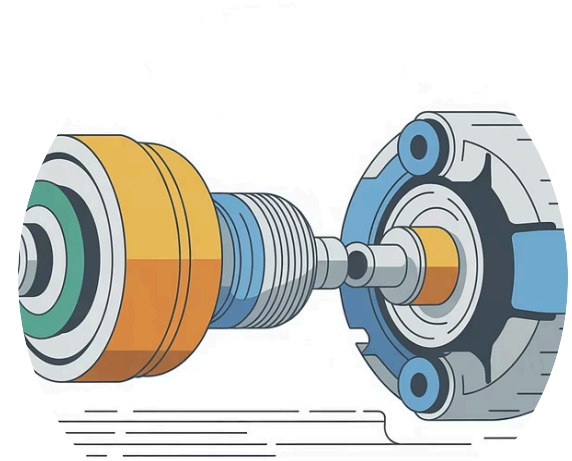
Lightweight Construction

Advanced carbon fiber composites and aerospace-grade aluminum alloys ensure the curved arm adds zero weight penalty to your drivetrain.



Universal Compatibility

Engineered to work seamlessly with existing bike frames and bottom bracket standards, no special modifications required.



Dynamic Balance

Mass-matched manufacturing with precision density control eliminates rotational vibration, ensuring smooth, wobble-free performance at all cadences.

Prototype-Ready

● Patent Secured

No. 436717 provides comprehensive IP protection

● Scientifically Sound

Based on proven leverage geometry and biomechanics

● Universal Benefit

Making pedaling more efficient for every rider

📌 **Next Step:** Approval to proceed to Phase 2 for prototyping and comprehensive field testing with rider feedback.

