



The Mule: Master Provisional Patent Summary

The Technical Problem

- Global micro-mobility rental fleets suffer from severe operational friction, including manual retrieval overhead, abandoned devices cluttering pedestrian walkways, component theft, and a catastrophic lack of verifiable user oversight or meteorological failsafes.
- Operators face soaring Operating Expenses (OPEX) due to the manual labor required to swap dead batteries, rebalance scattered vehicles, and replace stolen or unsanitary helmets.
- Existing systems lack robust physical ground-to-chassis locking mechanisms to prevent physical theft from docking hubs, offer no automated remedy for en-route battery depletion (causing range anxiety), and provide no parental governance over dependent users.

The Autonomous Fleet & Infrastructure Solution

- **Biometric Tethering & Parental Oversight:** Integrates cryptographic parental oversight and biometric user verification to govern fleet access, set geofenced safe zones, and apply real-time velocity throttling.
- **Active Infrastructure Lockout & Inductive Docking:** When battery thresholds fall below operational limits, the vehicle executes an un-crewed "Municipal Compliance Repositioning" sequence back to a wireless inductive charging base station. Upon arrival, an active electromechanical or electromagnetic locking restraint physically anchors the chassis to permanent ground infrastructure, preventing physical asset theft until unlocked via an authorized mobile command.
- **Predictive Relay Battery Swap:** To eliminate range anxiety, the network monitors vehicle battery levels against user routes; if a deficit is calculated, a secondary fully charged vehicle is autonomously dispatched to intercept the user's live GPS coordinates for a seamless en-route swap while the depleted vehicle returns autonomously to a hub.
- **Dual Mechanical Kickstand & Stabilization Array:** Outfitted with an automated motorized rear stabilization array and multi-directional micro-casters that deploy automatically when proximity tethers are severed or when throttles are governed due to detected biometric impairment, ensuring static multi-point balance.

Safety, Hygiene & Ecosystem Integration

- **Stacked Biodegradable PLA Hygiene Matrix:** The interior crown of the protective helmet houses a multi-layered, single-use tear-away hygiene matrix comprising

alternating permeable absorbent liners (biodegradable PLA infused with cornstarch and baking soda) and non-permeable cellulose safety layers, featuring opposing pull-tabs to reveal sterile layers successively.

- **Personal Crisis Extraction Protocol (PCEP):** Allows riders to trigger an emergency extraction via a rapid tactile cadence or acoustic wake-word, immediately suspending billing and speed throttling, routing telemetry to emergency dispatch, and guiding the vehicle toward a designated municipal safe zone.
- **Jamatcha Protocol & APE-X '564 Integration:** All biometric handshakes, bystander reward tokenizations (for uprighting fallen vehicles or scanning canopy QR codes), and fleet telematics are encrypted and validated through the APE-X digital ecosystem and Jamatcha verification protocol (USPTO Patent #12,333,564).

Representative Claims Overview

- **Claim 1:** A micro-mobility vehicle apparatus comprising an onboard drivetrain, Micro-Controller Devices (MCU), a localized biometric verification module, a multi-spectral sensor array, and a gyroscopic self-balancing mechanism enabling un-crewed autonomous navigation, summoning, and municipal compliance repositioning.
- **Claim 9:** An autonomous municipal compliance repositioning protocol wherein the vehicle automatically navigates to a centralized wireless inductive charging base station that engages an electromechanical physical lock.
- **Claim 12 & 13:** A protective helmet containing a localized hygiene matrix of stacked, detachable biodegradable PLA bioplastic liners featuring extended opposing pull-tabs for sequential sterility exposure.
- **Claim 16:** An autonomous battery-relay protocol where the network predicts range deficits and automatically dispatches a secondary fully charged vehicle to intercept the user's GPS coordinates for a seamless mid-route swap.
- **Claim 55:** A user-activated Personal Crisis Extraction Protocol triggered via a rapid tactile cadence or acoustic wake-word that suspends billing, overrides speed limits, links to municipal emergency dispatch, and guides the vehicle to a safe zone.

This summary encapsulates the comprehensive engineering, autonomous fleet logic, and safety systems of The Mule master filing. Let me know what you would like to review next!