Airless Terrain Wheel With Adjustable Articulating Arms Enclosing Multi-Suspension System

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The invention is an airless all-terrain wheel, which is designed to be compatible with off-road vehicles without any modifications. It consists of adjustable articulated arms with spring suspension and a hub. Since the wheel is airless, its sensitivity to external factors is reduced. The invention is modular, if any part of it becomes dysfunctional, a new part can be replaced. The inclination of the wheel arms can be adjusted, allowing the wheel to be configured according to the terrain to be driven. As the arms of the wheel unfold, the maximum speed of the vehicle will decrease due to the shape of the wheel. On the other hand, the ability to overcome obstacles will increase. The maximum speed will increase as the levers of the wheel are closed. In addition, the attachment of the joints with springs ensures that the wheel has an internal suspension. Thus, the forces on the vehicle and the wheels are softened and comfort and durability are increased. Also, with the ability to independently control the height of the wheels, we have the power to keep the vehicle stable on an X-Z plane while operating on rough and high inclined terrains. We have two primary opening system designs for adjusting the inclination of the wheel arms. The first of them is the full mechanical design which takes power from the vehicle's axle shaft. This way it doesn't require any additional motor for the operation of the arms. But the pilot needs to physically interact with the wheel in order to operate the arms. To counter that problem we designed a hybrid system that uses 2 electric motors to drive a hydraulic arm opening system. In this way, the pilot can adjust our wheel's arms' angle of attack without getting off the cockpit.

Awards Won:

Fourth Award of $500

China Association for Science and Technology (CAST): Award of $1,200