On the Mechanism Investigation of the Internal Speed Gear Hub System for Chainless Bicycles

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ABSTRACT

In recent years the bicycle derailleur gears are specified by the government as the key parts to improve. Although the academy and industry are taking research and development on it, most of them focus on the detail design improvement of derailleur gears, which are also extensively sold in market. But this kind of derailleur has already been well developed and is hardly improved any more. So the chainless bicycles should be a good point of view to focus on. For chainless bicycles, transfer the power is transferred to the wheels directly via a rotating shaft without any chain, so it is clean, noiseless, and without any chain-misengagement. The bicycle''s internal speed gear hub with epicyclic gears have some good properties:1. It takes less volume, so they can easily be setup inside the rear wheel without space limitation.2. More stability when changing speed, and this would improve the mechanical efficiency.3. The shaft and the gears are protected by covers, and would neither easily been damaged by outside particles, nor polluted by the dirty environment. Therefore, the use of internal speed gear hubs is an important alternative for the bicycle''s transmission system, and the research on them will make the industry of bicycles more flourished. In this research, we deeply study both chainless transmission and internal multi-speed gear hubs, and derive some theorems to analyze the results. By taking on the type synthesis and number synthesis, we construct the atlas of chainless transmissions and internal speed gear hubs. And we devise many new internal multi-speed hubs to get more speed shifts of bicycles. Keywords: bicycle, chainless bicycle, internal speed gear hub, type synthesis, number synthesis.

Keywords : 自行車 ; 拓樸構造合成 ; 變速花轂 ; 內變速器 ; 無鏈式自行車

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