The Wheel for Moving on the Floor and Stair, the New Solution for Wheelchairs

Khanh, Nguyen Cong (School: Bac Ninh Specilaized High School)
Dat, Nguyen Huu Thanh (School: Bac Ninh Specilaized High School)

How can a wheelchair move both on floor and stair easily, quickly and comfortably? To answer this question, our project will design and fabricate special wheels for this target. Our wheels are designed for converting from normal wheels for moving on the floor into three-spoke-star wheels for climbing up or down stairs. The key idea is that, the rim of wheel is divided into three arcs of circle. Each arc of circle is contacted with the hub on axis by spokes. The spokes in a star-shaped wheel can be adapted in length by linear guide mechanism. When moving on the floor, the spokes are the shortest; three arcs of circle are closed together as a circle. So, this makes the wheelchair move on the floor easily. On the other hand, when the wheelchair reaches the stairs, the spokes are the longest and the wheels become the three-spoke-star wheels. Now, three arcs of circle are converted into the cap on the end of each spoke, they are contacted with the tread of stair directly on moving. With the three-spoke-star wheel, the wheelchair can move on the stairs easily. After finishing the climb up or down stairs, the spokes are shortened again; the wheels will return to the original shapes and continue moving on the floor. Due to the convert between two modes by adapting the length of spokes in the wheel, the users can control wheels easily, quickly and comfortably.