

Industry Problem

Traditional shopping carts comprise two wheels, one on each side. There are also multi-wheel (eg. 3-wheel) designs available. Unfortunately, these traditional designs pose certain disadvantages. In traditional two wheel trolleys, the user has to put in more effort to overcome obstacles and experiences jerks when trying to pull the trolley on uneven terrain. In multi-wheel designs, the trolley has two contact points at each side of the trolley cart which constrains the trolley movement along a straight line path. Hence, the user needs to exert a larger force to turn the trolley if he/she wants to change the trolley heading. The effort also increases with the load which are carried by the trolley.

Solution

A novel shopping trolley design which adopts a wheel-in-wheel mechanism is described. The wheel mechanism composes of a smaller inner wheel which is free to roll along the inner track of a bigger outer wheel. The trolley cart structure is connected to the inner wheels directly as in a normal trolley. The inner track of the outer wheel provides a smooth rolling path for the inner wheel to travel. When the trolley is pulled on a normal flat ground, the inner wheel will roll within the outer wheel, and this in turn causes the outer wheel to roll on the ground. When the outer wheel encounters an obstacle, for example, when it hits a small step, the inner wheel will continue to roll along the inner track of the outer wheel until the resulting position of the inner wheel with respect to the outer wheel enables the outer wheel to rotate over the step. As such, the user will experience lower jerk when trying to pull the trolley on uneven terrain.

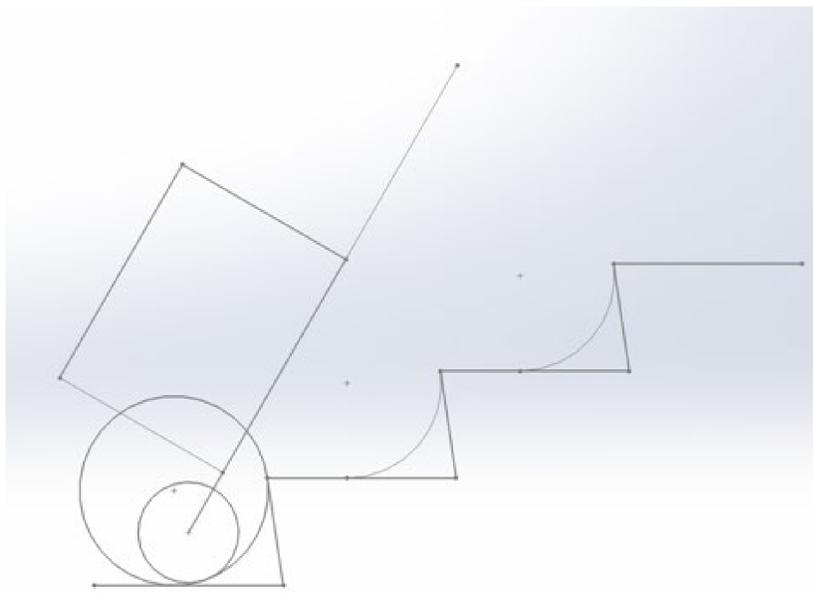


Fig. 1: Trolley concept



Fig. 2: 1st Prototype

Value Proposition

- The proposed trolley system enables smoother effort for a user to pull it over uneven terrain. It reduces the effort and jerk while overcoming obstacles compared to the conventional single wheel trolley.
- Compared to the multi-wheel (e.g. 3-wheel) design, it is easier to turn the trolley on the spot. The multi-wheel design has two contact points at each side of the trolley cart which constrain the trolley movement along a straight line path. Hence, the user needs to exert a larger force to turn the trolley if he wants to change the trolley heading. The effort also increases with the load which are carried by the trolley.