Hill trolley with triangular wheels

Challenge Award

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Background

Three friends *viz.*, Balaji, Kunal and Arun have designed an innovative trolley design for hills, where the effort required to push it is quite less than the conventional ones and the trolley does not skid even on slopes.

Growing up together in Bangalore, they went to the same school. Playing and studying together, they qualified the Joint Entrance Examination for Indian Institute of Technology and were lucky enough to get admissions together in Chennai IIT.

Balaji T.K, a native of Chennai did his Bachelors of Technology in Civil Engineering. Kunal Kumar hails from Munger in Bihar and he did Bachelor of Technology in mechanical Engineering while Arun Roshan, coming from Kerala, completed his Bachelor of Technology in Biotechnology and Engineering.

Balaji is presently working in Bangalore while both of his friends, Arun and Kunal have left for foreign shores, in search of more challenging opportunities.

Genesis

People in the mountains have to carry large quantity of firewood or fodder over slopes on their head. The strain is enormous. No low cost trolleys are available to negotiate stony path. These should be easy to take up and equally easy to bring these down.

To meet this specific need, these innovators were given the challenge of designing a solution. They had invited NIF's Exec Vice Chair to address them and also pose problems faced by common people which had eluded solution so far. Among twelve problems posed by NIF, IIMA and Honey Bee network, this group presented this solution at the Indian Institute of Technology, Madras's Technical Festival, '*Shaastra- 2004'.* Banging their heads together, they tried solving the problem on a train to Bangalore from Chennai and eventually came up with this solution.

They have designed a trolley with a unique front wheel mechanism to be able to move on undulating terrains.

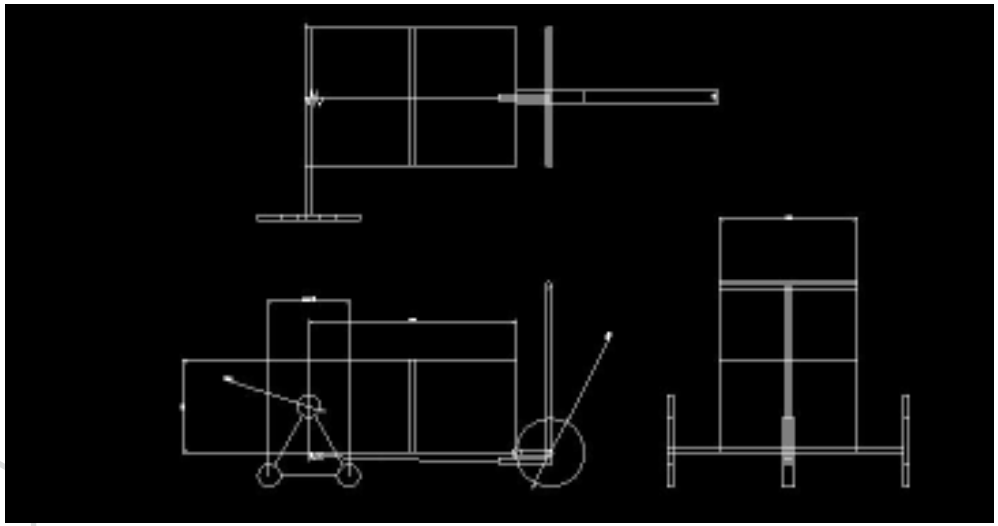
Innovation

The solution is a trolley concept with three iron wheels and adequate load carrying, turning and braking capability. The trolley handles uneven topography by its unique mix of front wheel combination sets and swiveling back wheel. The spring loaded handle actuates the drive to the front wheels to move forward.

The innovativeness lies in having the front frame fitted on either side with an equilateral triangle frame fixed with three wheels at the vertices. This unique three in one rotatable wheel arrangement, contributing towards movement of trolley over boulders and uneven topography, is coupled with a free swivel wheel at the back suited for turning.

It has a spring-loaded braking system to keep control and has easy turning mechanism with special wheels allowing movement on boulders up to a height of 20 cms.

Even if the handle slips or it is left free, weight of



hook shaped bar causes the spring to go to normal position for brakes to be applied automatically. Subsequently, the bar digs into the ground and the trolley stops.

The force needed to actuate the handle and move forward is not much. For loading wood logs, smaller ones are placed at the bottom and larger at the top and end hooks can be used to fix a covering sheet across the top.

Compared to the painful way of carrying upto ten kilograms on head, this trolley can handle upto forty kgs and is estimated to cost Rs 750 only, for a cast iron/steel based trolley solution. Current steel-based trolleys in market are in the range of Rs 1,500.

The entire trolley collapses into a box, which can be transported easily. Whole assembly resting on three wheels makes it a stable transportation device, to be propelled uphill.