Completion and improvement of Wheel to hub alignment tool

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Aim of the Project

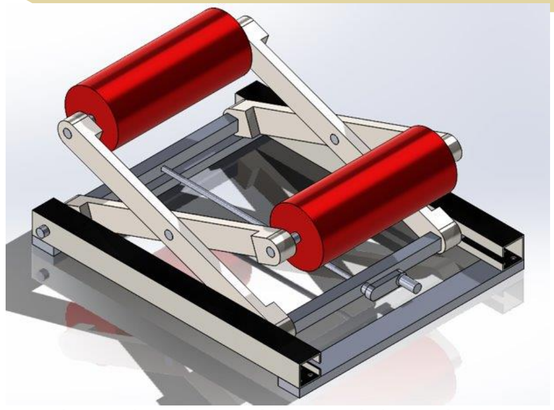
The Aim of the project is to design, build and test a previous project that was to design and build a “wheel to hub alignment tool to help in the aid of punctures” this project was still in the construction stage. The aim of this project is to finish the existing build, test the design and add any necessary or beneficial improvements to the design to allow the tool to function.

Background

The aim of this project is to create a tool to aid in the event of punctures. The aim of this project is to make the task of changing a wheel easier for the user a survey was conducted from a previous project and showed that the weight of the wheel was an issue for the user the average weight od a wheel is sixteen kilos. This project has to be lighter than a wheel otherwise if it is heavier, it is counter productive. A puncture can occur at any time, so this tool needs to be able to fit in the boot of a vehicle so the user can have it with them whenever necessary the project needs to be compact and easily stored away. The project needs to allow the wheel to move in all directions and allow the wheel to rotate to make it as easy as possible for the user to align the wheel with the hub.

Completion of Design

The preexisting design operates by allowing a threaded bar to passing through the bottom of the support arms. By turning the threaded bar, the threads in the supports will move along the threaded bar. One of the supports are fixed and the other is able to slide along the track in the box iron at either side. This allows the height of the wheel to be easily adjusted to the desired height. The wheel will sit on top of the nylon rollers allowing the wheel to rotate. This will align the holes in the wheels to align with the studs on the hub ensuring the wheel is mounted correctly.



The previous design of the preexisting project

The majority of parts for this existing design were previously made apart from the four support arms that hold the rollers, the mechanism that allows the height of the rollers to be adjusted and due to these parts not being made the previous design had not been assembled or tested in the previous project.

Design Improvements

The preexisting design works in concept but when it came to assembling the design there was issues to address. The threaded bar going through the two base supports was too weak. The threaded bar design was replaced with a larger thread from a m12 to a m16. The threaded bar was also only fitting through 20mm of aluminum so it had very little contact with the thread, by increasing the surface contact area of the thread the mechanism has greater strength and can support more weight.

Lifting mechanism

The two rollers that the wheel sits on in the initial design they are 100mm diameter. These are adding excess weight to the project and the extra size provides minimal structural benefit to the project, so the size of the rollers was reduced reducing weight within the project.

Testing

The project is designed to hold wheels of different sizes and allow the wheel to move in all directions. The project was tested with four different wheel sizes, three times each. Testing the project brought up minor errors that needed to be adjusted for the final design. The different size wheels ranged from a 14inch alloy to a 24inch alloy.

Final Design being tested on different wheel sizes

Final Project Design