

DYNAMIC FRACTIONAL GEAR

Abstract

In different challenges of the seasons of VEX Robotics, throwing objects has become a solution to solve the problem. Different mechanisms have been implemented with cams, launchers, pneumatic etc.

The design of this piece proposes a way to modify the traditional gears of VEX EDR and converts them into an efficient option when putting flying objects on the playing field.

Introduction

During the previous season of VexU (Nothing But Net), we built a system based on a catapult that used a cam, the system was very efficient and allowed to record all the preloads in approximately 25 seconds.

Thanks to this system the team won the build award, we decided to transfer the system to the challenge of the 2017 season, but it was not possible. The system did not provide the necessary torque to overcome the inertia of the game objects.

Problem Statement

The cam system does not provide the torque needed to launch the game objects of the Starstruck 2017 season.

Objective

Design, print and implement a gear that allows you to automatically release and throw objects.

Hypothesis

With the help of a split gear this makes it possible to build launch systems with greater torque and faster.

Results

We propose the design of a fractional gear that allows different configurations and find the exact point of launch.

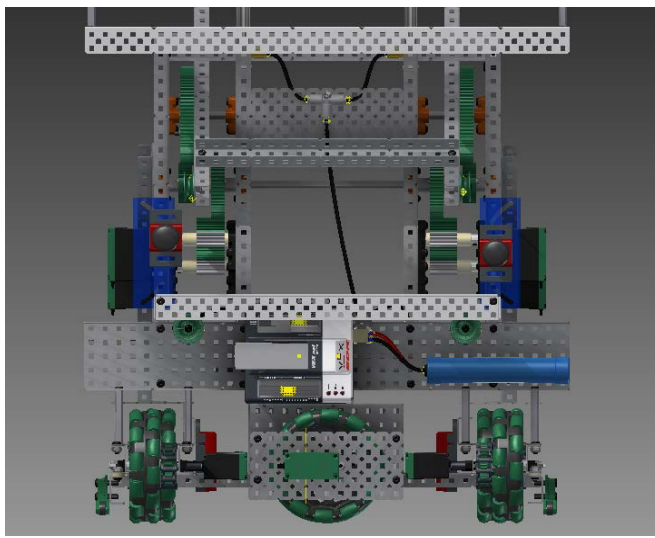
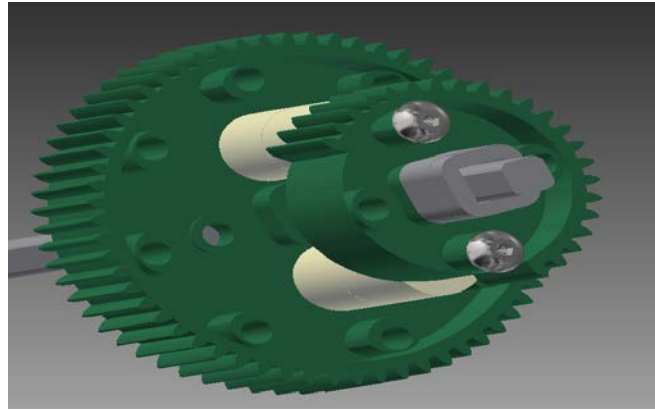
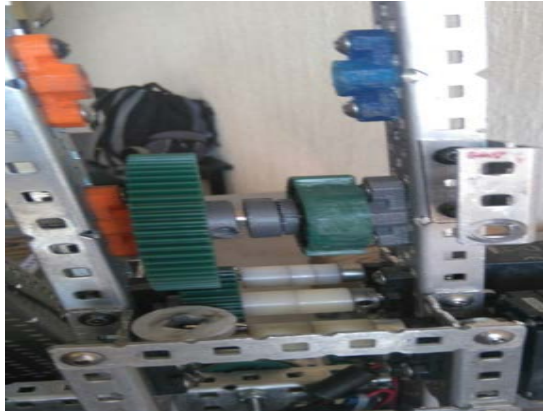
The dynamic fractional gear was used in the first prototype robot VEX STARSUCK, these gears were responsible for releasing the loads when the gear teeth lost contact. The game elements are thrown to the opposite side of the field at that time.



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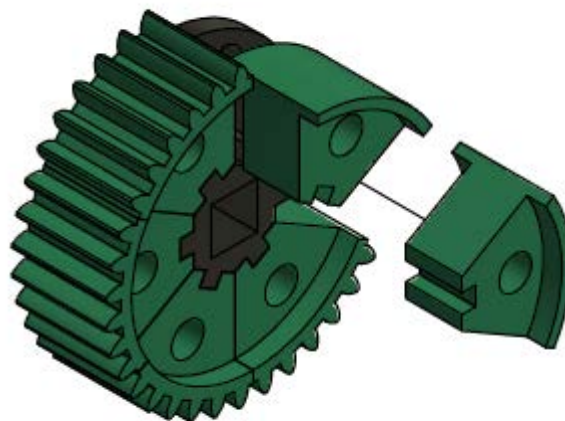


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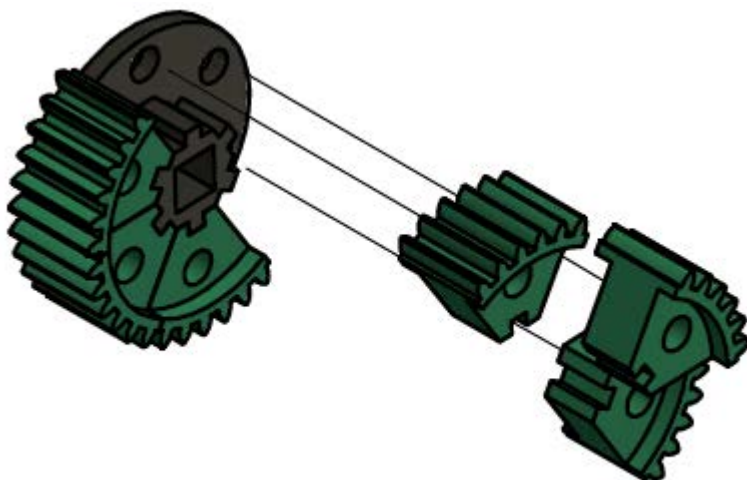
Design

Dynamic fractional engagement was performed using the Autodesk Inventor 2014 tools, and the final design is presented below.



Assembly Instructions

I.

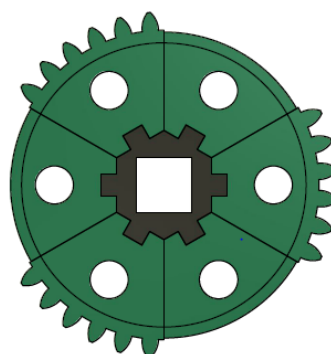
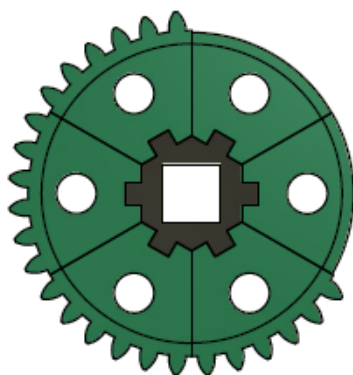
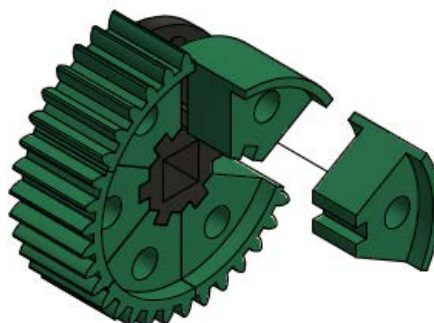
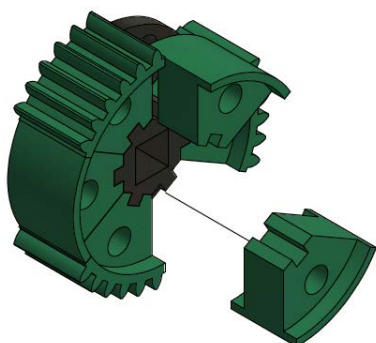




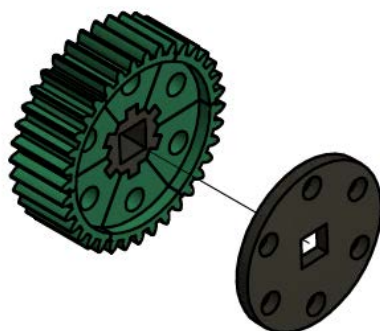
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2.-

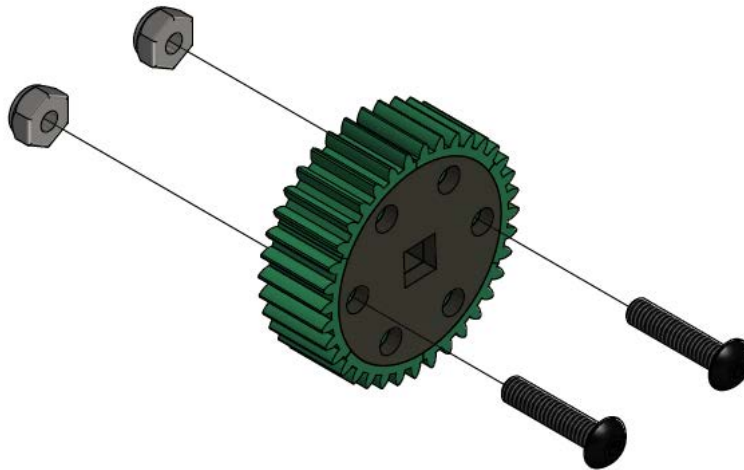




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3-.0.75" screws



CONCLUSION

The implementation of the dynamic fractional gear, allowed the construction of our first robot prototype for the VEX Robotics Starstruck season. This demonstrated that the conceptual idea of a smooth gear can be used as a component for launch or repeat systems. The design was presented in such a way that it can be adapted to any VEX EDR component and could be expanded to more tooth gears.