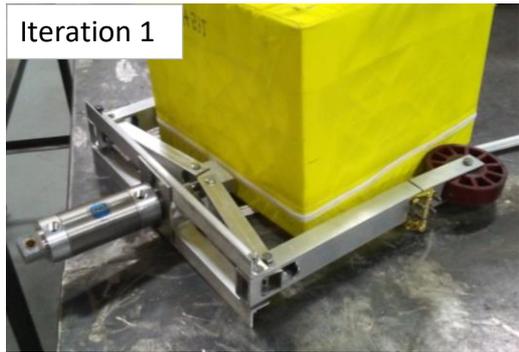


FIRST Robotics Team STEMPunk #4531

Intake Iterations - 2018 Power Up



Iteration 1

Description:

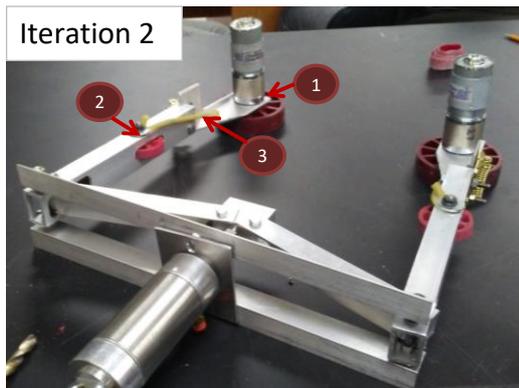
This initial concept was our first application of a pneumatic gripper. The wheels at the extreme edge are directly driven to suck the cube in. The structure that houses the wheel pivots on a spring hinge to allow the wheel to extend around the cube.

Testing:

Minimal. Did not power the wheels or test the piston. Test fit the structure to the cube

Problems:

Supports for the wheels physically incompatible with motors, tension is loose, gripping strength is minimal.



Iteration 2

Description:

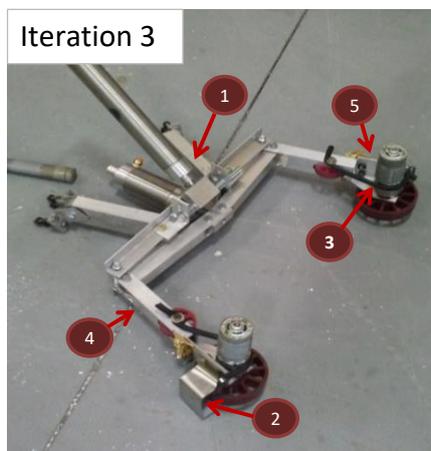
- (1) Adjusted pivot structures to work with the motors.
- (2) Wheels were introduced on the intake bars to improve gripping.
- (3) Surgical tubing was used to improve the tension on the pivot structures.

Testing:

Minimal. Started troubleshooting methods to power the deployment of the

Problems:

Extremely heavy at the furthest extent of the intake structure, making it very difficult to power the deployment. Wheels aren't



Iteration 3

Description:

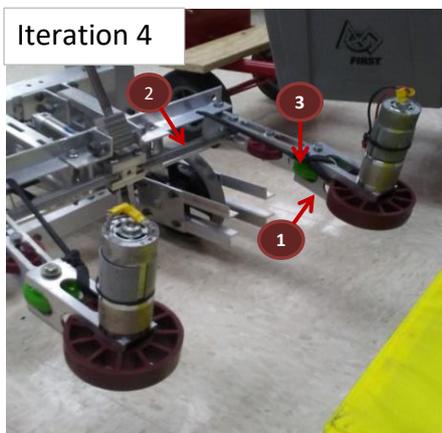
- (1) Piston structure was developed to control the arm deployment.
- (2) Stainless steel retainer bent and positioned to hold the wheel in place on the motor shaft.
- (3) Tensioning bands adjusted to better streamline the system.
- (4) Intake bar shortened to reduce load on the deployment mechanism.
- (5) Pivot support shortened and adapted to fit to the system.
- (Not shown) Keyed motor adapter milled out to support the wheel.

Testing:

Extensive. Performed decently at practice mock regional, struggled to suck cubes

Problems:

Too heavy for weight limit. Gap between pivot structure and intake bar catches. Too short to grip the cube at furthest extent. Pivot structures exposed and poorly supported.



Iteration 4

Description:

- Weight reduction:
- Smaller piston
 - Slotted intake bars
 - Replaced stainless bracket with new slotted pivot structures

- (1) Pivot structure supported on both sides and retains wheel.
- (2) Actuator bars replaced with solid aluminum hex shaft.
- (3) Wheel added on pivot joint to increase grip and streamline cube acquisition.
- (Not shown) Lexan guards to bridge gap between pivot structure and intake

Our latest design, this mechanism retains some of the initial concepts' features while enabling us to suck cubes in, spit them out, and grip them securely. We will test and adjust this system during practice matches at the Northern Lights Regional.