

Automated Silverware Wrapper

Advisor
Dr. Stalford
Graduate TA
Emmanuel De Leon

Industry Sponsor
Cory Beckner



GALLOGLY COLLEGE OF ENGINEERING
**SCHOOL OF AEROSPACE
AND MECHANICAL ENGINEERING**
The UNIVERSITY of OKLAHOMA

Project Team 24

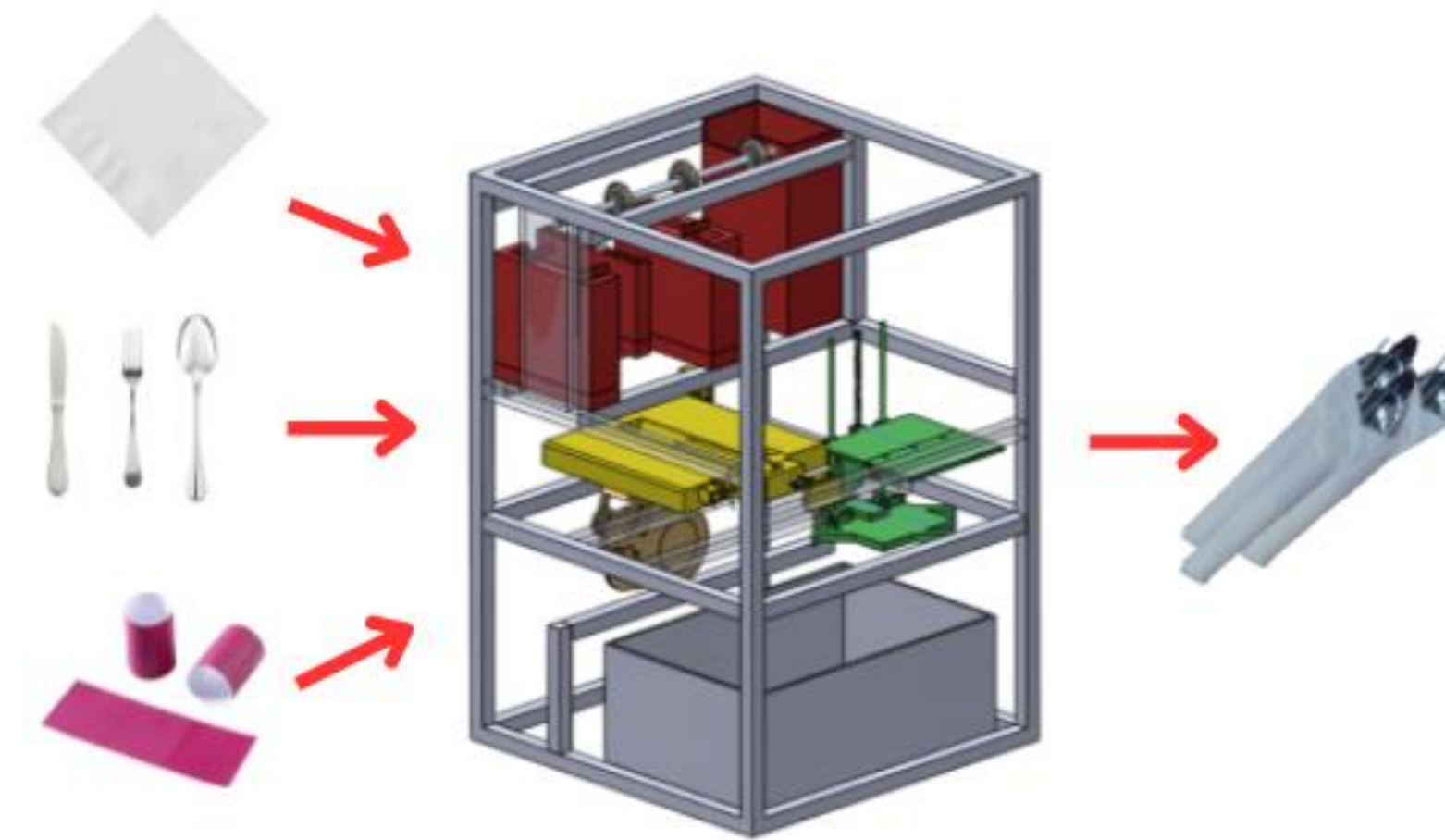
Members (left to right)

Jessen Pratt
Kris Osegueda
Ihab Abdel Samad
Ryan Francis
Brian Varva



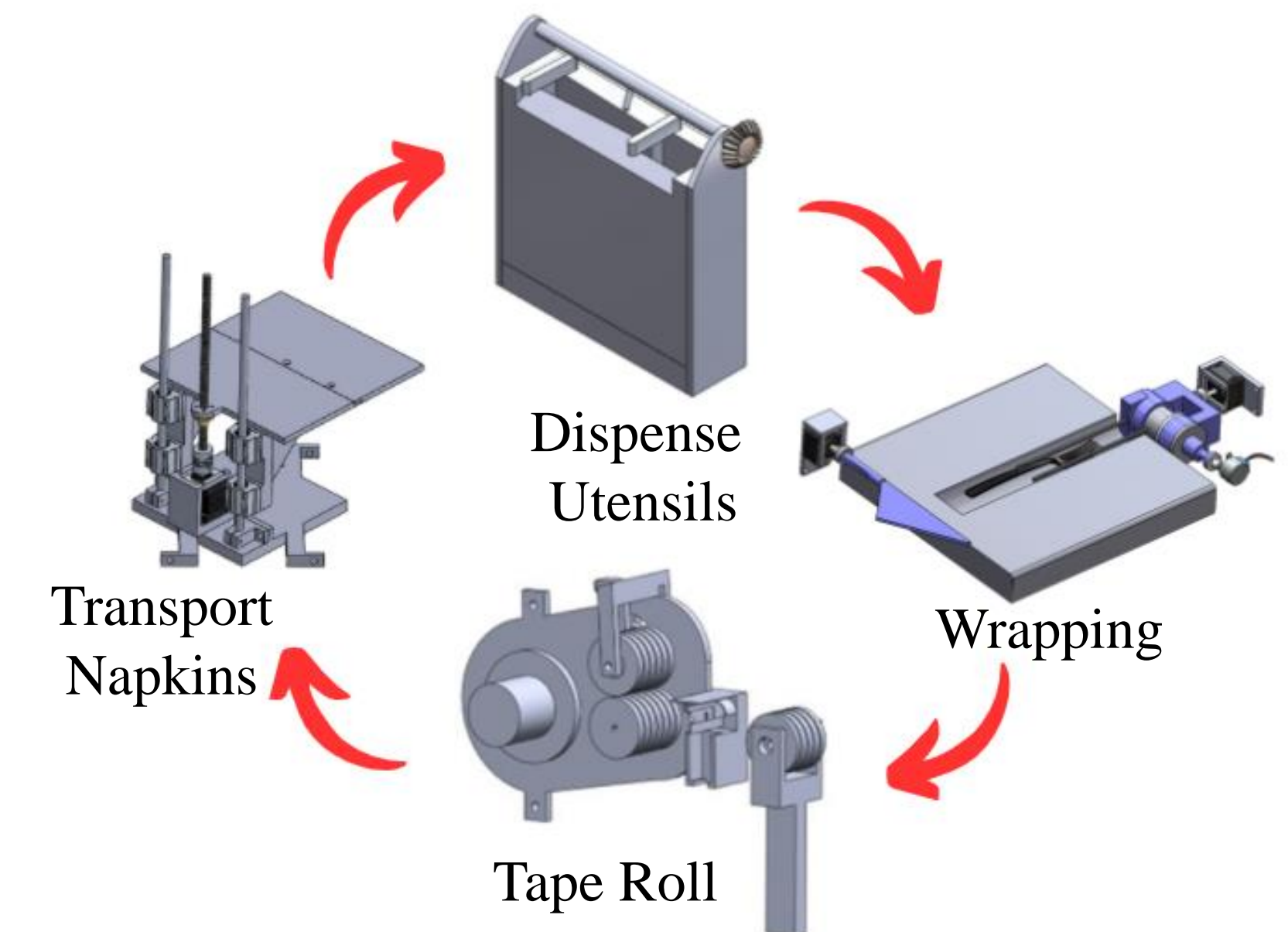
Problem Statement

Construct a prototype that automates the silverware wrapping process that is normally done by hand, allowing restaurants to save time, money and eliminate a tedious task for their employees.



Design Approach

Design and assemble four primary subassemblies that perform the necessary actions to automate the silverware wrapping process. Then, integrate the subassemblies to perform in a loop.



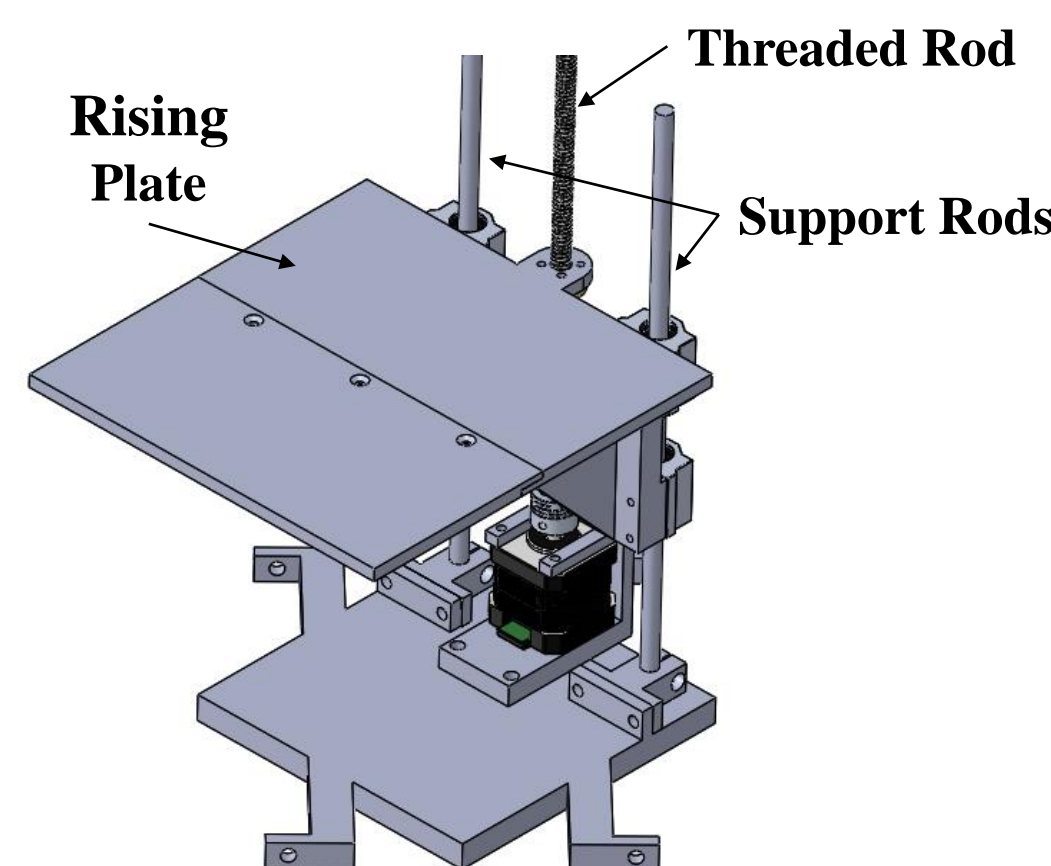
Four Primary Subassemblies

Step 1: Transport Napkins

Function: The Riser assists in transporting a singular napkin from a stack into position to catch the silverware on the roller

Features:

- Uses a fan to suction up a singular napkin each time
- Move one napkin at a time to the wrapping device using a Lego clamp
- Uses a rubber 3D printer belt to move the Lego clamp from side to side

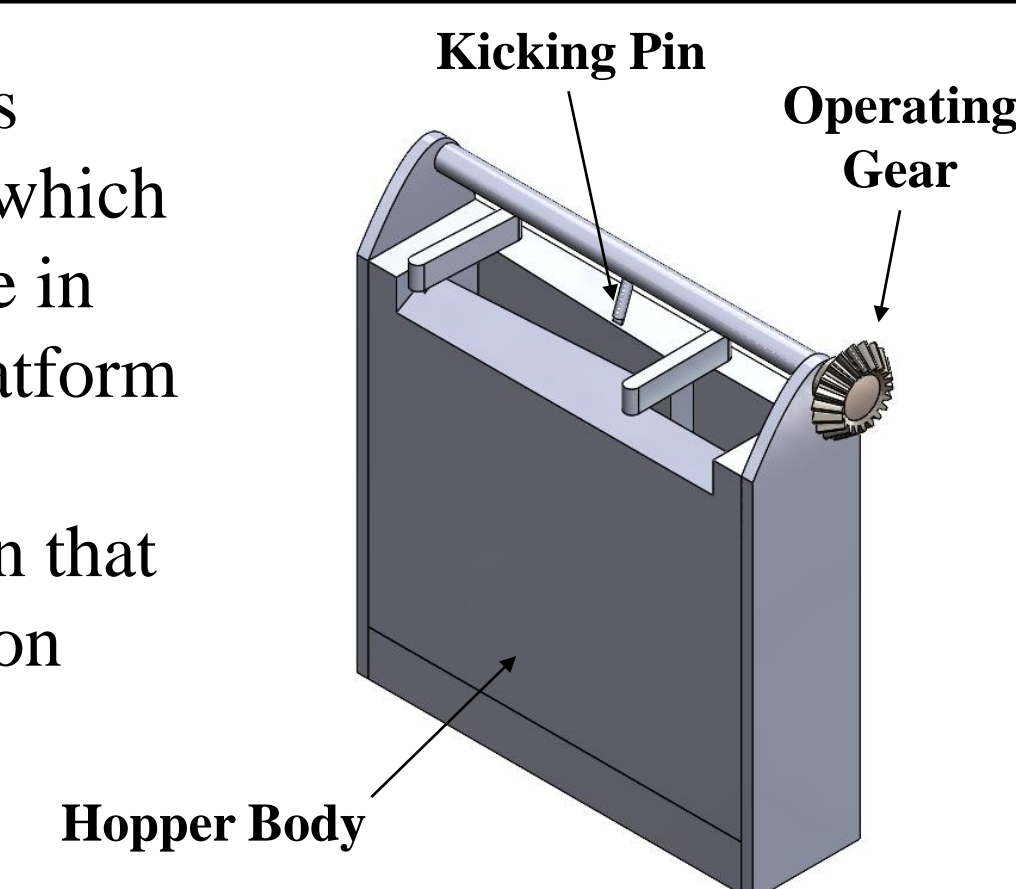


Step 2: Dispense Utensils

Function: Restaurant employee inserts silverware into the respective Hopper which is automated to dispense the silverware in the correct order onto the wrapping platform

Features:

- Dispenses a knife, fork, and spoon in that order onto napkin on wrapping station
- Holds up to 25 units of each utensil
- Dispense a singular unit at a time

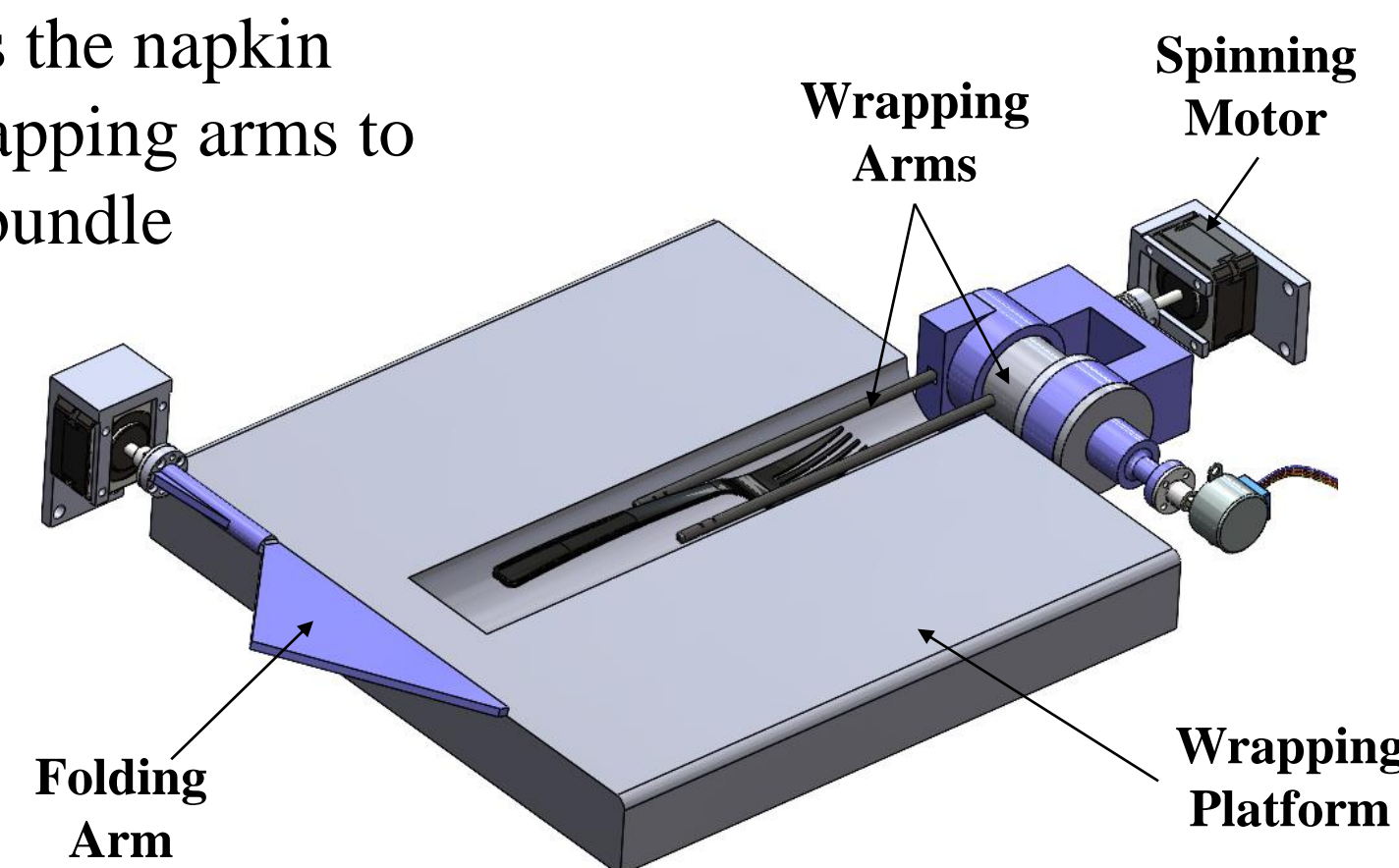


Step 3: Wrapping

Function: The Wrapper receives the napkin and silverware, then uses the wrapping arms to spin them into a tightly wound bundle

Features:

- Makes a pre-fold on napkin prior to spinning
- Consistently wraps tight bundles
- Dispense completed rolls into container for use

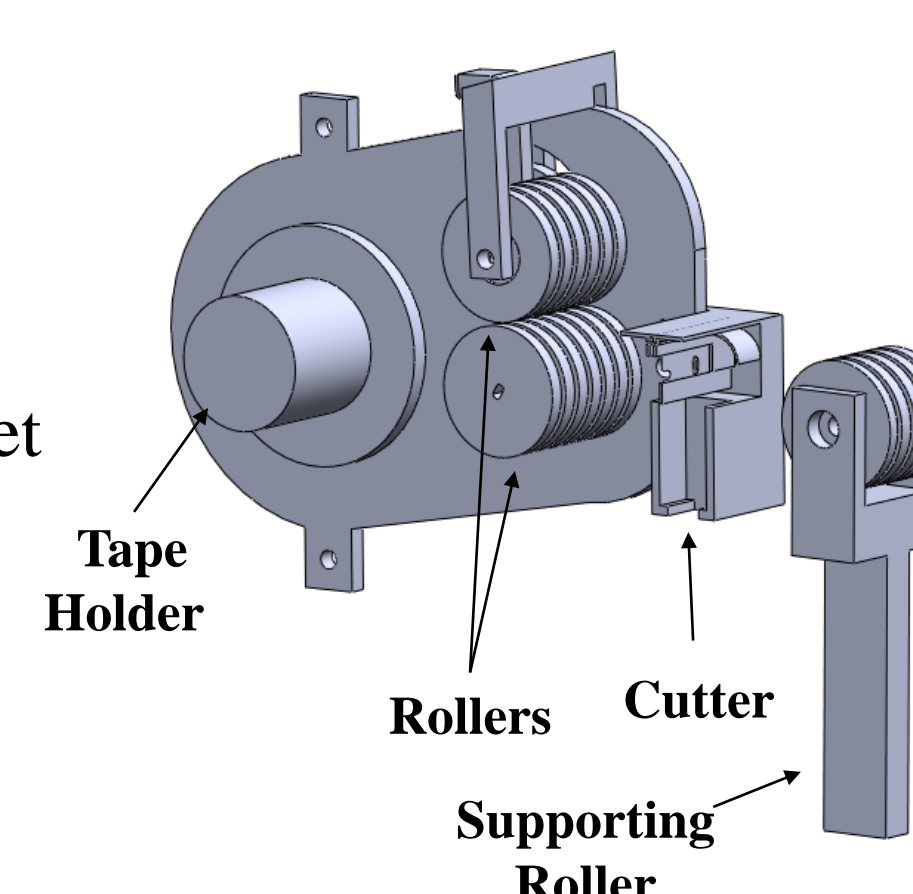


Step 4: Tape Roll

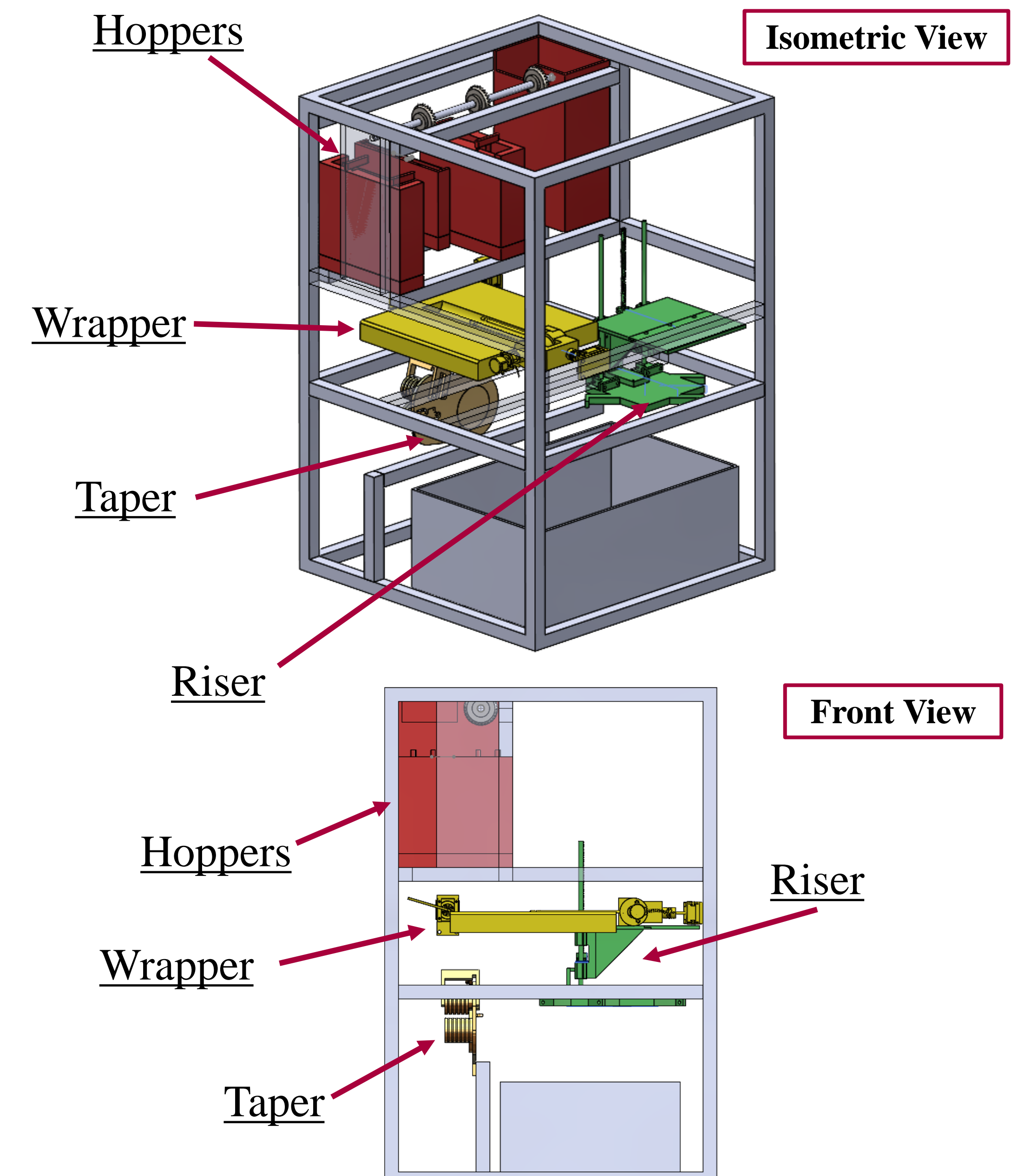
Function: The Taper secures the wrapped bundle of silverware with an adhesive band until ready for use

Features:

- Applies adhesive band to each rolled set
- Ensures bundles are tight and presentable
- Allows completed rolls to move from basket to table and utilized by restaurant guests



Full CAD Assembly



Conclusion

Progress Made: Each subassembly has been designed and put together as independent mechanisms. The subassemblies that are designed for transporting napkins and dispensing utensils have made extensive progress stemming from failed designs. A simple and promising mechanism for the wrapping sub-assembly was also totally redesigned and assembled. Along with the taper, each subassembly is planned to be integrated within the same aluminum frame body to form a complete prototype.

Value to Sponsor: With a completed product based on our prototype, it is expected to save a business owner around \$7,650 and 1,200 hours of work per year in an average American restaurant. The prototype is also meant for our sponsor to take to market and sell. It would increase efficiency in restaurants that purchase the product while generating profit for our sponsor. Our sponsor plans to patent our prototype and continue to move forward with its development.