

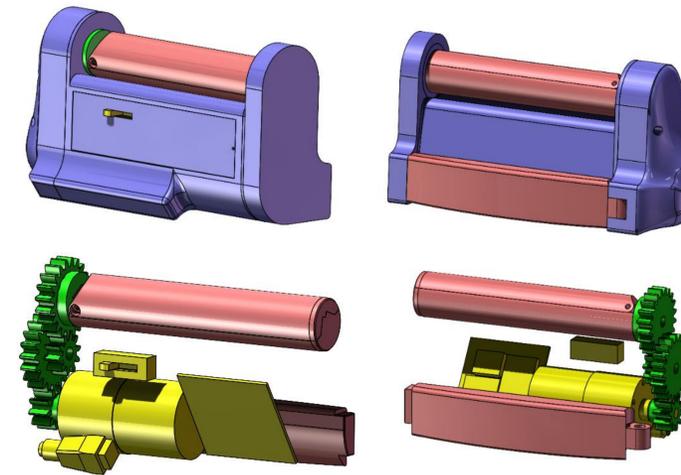
Crown Icing Dispenser

Project Description

- Baking has become a popular hobby or lifestyle worldwide. Piping bags are the go-to tool for decorating baked goods.
- By using these piping bags throughout the workday, it creates a lot of stress and wear on bakers' hands.
 - Arthritis, joint or hand pain, and muscle fatigue are common ailments among full-time bakers
- Given the lack of available products addressing this issue, we worked together with our sponsor to develop a design that could assist bakers to help prevent hand discomfort and injury.
- Our task is to create a product that enables bakers to use piping bags without applying pressure, thus relieving strain on their hands.

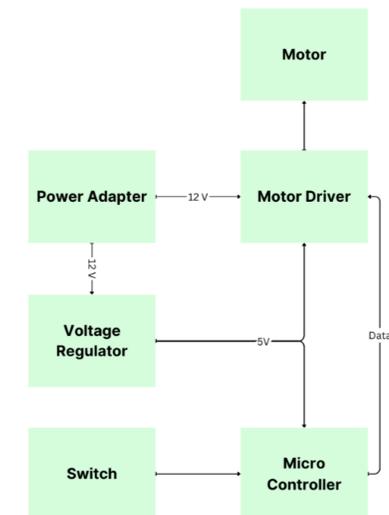


Design Description



Dispenser design and system breakdown:
 Housing (purple)
 Pressure system (red)
 Mechanical power transfer system (green)
 Electronics system (yellow)

Electronic System Block Diagram



Performance Review

Performance Overview						
Requirement	Measurement	Units	Target	Threshold	Predicted	Actual
Easy to open device	Force to take cap off	N	<1	3	1	12
Easy to place piping bag	Area of opening	cm ²	50	20	33	63
Easy to close/secure piping bag	Force to secure cap	N	2	0.2	1	12
Light and easy to lift	Weight of device	N	5	8	6.8	5
Easy to hold and maneuver	Surface area of hand contact	cm ²	115	40	95	45
Dispenses at a constant flow	Flow rate does not deviate	g/s	1	2	1	5
Easy to store/small product	Volume	cm ³	200	1700	800	1208

Conclusions

How Were Requirements Met

- Prototype is easy to use
- Compact design
- Need to reduce weight
- Enhance grip
- Implement a more efficient pressure system
- Improve consistency of frosting flow rate

Lessons Learned

- Involve sponsor sooner and communicate better
- Begin designing and testing earlier
- Send prototypes sooner for feedback
- Focus less on exploring many designs at first
- Spend more time refining sponsor's original idea
- Prioritize early testing over design exploration

Recommended Future Work

- Optimize components for mass production with custom parts
- Improve Arduino code for motor speed
- Find better materials/designs for rollers and consider gear-like rollers for better bag grip
- Get help from a process engineer for mass production and cheaper production