DALHOUSIE UNIVERSITY
FACULTY OF ENGINEERING
Department of Mechanical Engineering

MECH 10
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OVIPOST

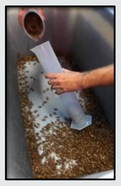
Automated Cricket Packaging System

Industry Background

- Crickets are a sustainable and nutritional food source that could revolutionize the way we eat
- A pound of cricket powder costs an average of $40 USD while a pound of beef costs an average of only $6 USD [1,2]
- Labour costs account for 60 - 80 % of farming expenses [3]

Current Cricket Packaging Practices

- Ovipost uses an Automated Cricket Harvester to sort live crickets from dead matter and waste
- Once sorted, crickets are packaged by hand into boxes. One box requires 3 - 5 minutes of manual labour to package [4]
- Crickets are packaged by volume, yet sold by mass, leading to inaccuracy in the labelled amount [3]



Design Features

A. User Interface

Operator can input a desired mass of crickets to weigh and package, execute a system evacuation, and read interface displays and prompts

B. Cricket Reservoir

Crickets are initially poured into holding area for subsequent weighing and packaging

C. Reservoir Trap Door and "Faucet"

Crickets are moved into measurement channel using choke point mechanism, vibration motors, and a translating door to control flow

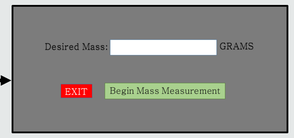
D. Measurement Channel

Vertical column mounted to system frame using four load cells which average the weight of the channel and crickets within

E. Measurement Channel Release Plate

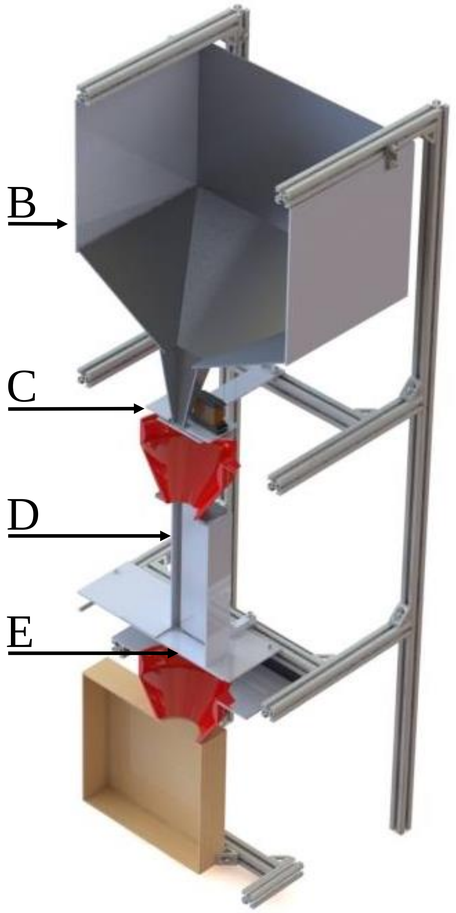
Manual release of crickets from channel into shipping box

A

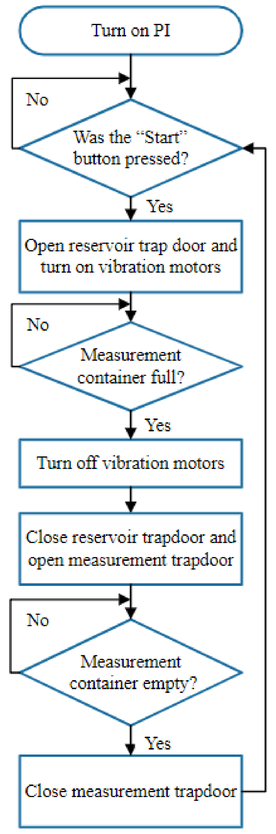


Packaging System

Cross Section 3D Model



Logic Flowchart



Design Requirements

1. Shall fill a shipping box with 1000 crickets in less than 3 minutes
2. Shall measure and display weight of 1000 live crickets (+/-20 %)
3. Shall not incur a death count of more than 5 % of cricket input
4. Shall be able to contain up to 5000 crickets in initial holding area
5. Shall be able to wipe down entire system in under 10 minutes
6. Shall weigh 100 lbs or less for ease of transportation

System Verification

1. Full system cycle completed in 90 seconds
2. Weight measurement accurate within +/-0.5 g of 1000 g (+/-0.5 %)
3. Maximum death count of 0.5% of cricket input
4. System can contain over 6000 crickets in holding area
5. System can be cleaned as required
6. System weighs under 30lbs

References

All images are original content produced by the design team
1. Retrieved from http://coyotecreekfarms.org/beef/pricing/
2. Retrieved from https://slicesofbluesky.com/tracking-cricket-flour-prices/
3. Trina Chiasson, Ovipost, interview September 9, 2018
4. Scott Campbell, Ovipost, interview November 6, 2018

Acknowledgements

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