Inner Ring Wax Applicator

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Project Description

Bee Scientific's modular beehive, the Bee Barrel, requires beeswax to be applied to the inner surface of each ring. The current process is slow, inconsistent, and a bottleneck to mass production. The challenge is to design a system that applies an even layer of wax to rings efficiently and reliably.

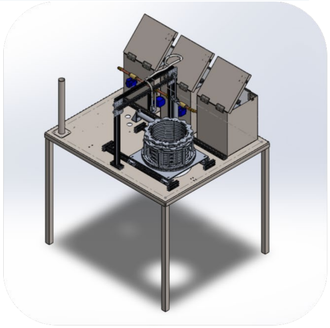
Design Description

The Inner Ring Wax Applicator is a system designed to streamline beeswax application for the Bee Barrel. The system melts and sprays wax onto the inner surface of plastic hive rings using a pressurized delivery mechanism and a motorized carriage.

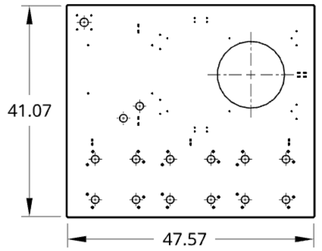
Key components of the wax applicator include a wax melting system, a gantry and carriage that cycle rings, and an operator interface. By spraying multiple rings per cycle and using retention-based cycling, the design minimizes wax waste and operator effort.

Primary Requirements and Constraints

- Solution shall fit within the footprint of a pallet (48"x40")
- Solution should store sufficient wax for a full day of production
- Minimum application time should be less than 2 minutes/ring



Performance Review



- The final design is 1.5" longer than a pallet
- The solution cycles between kilns to allow a constant supply of wax
- Ring application time is approx. 5.5 seconds/ring

Conclusion

The Inner Ring Wax Applicator met its requirements well.

The team learned the importance of testing early and often and how to communicate effectively as a team.

The design could be improved upon by implementing automatic ring loading, including another ring carriage on the opposite side of the gantry, and adding more kilns to store wax.