

Movable Oven Tray

Contributor: Feng Lin
Affiliation: Dept. of Mechanical, Civil & Industrial Engineering
Indiana Institute of Technology
Fort Wayne, IN 46803
Telephone: (219) 422-5561
FAX: (219) 422-7696
e-mail: lin@indtech.edu

Type: Design Problem
Time: 2 weeks
Location: Take home

Summary

It is frequently reported that people are burned when they try to take food out of a hot oven. One way to solve this problem is to redesign the tray so that when one opens an oven's door, the tray automatically swings out and carries the food out of the oven. This project requires the student to design a movable tray which satisfies following requirements:

- The tray should carry food out when the door is opened, and return to its original position when the door is closed.
- Foods should remain in the tray during the door-opening/closing process, no matter how fast one opens or closes the door.
- The space occupied by the device should be minimized.
- The cost should be minimized too.
- The tray should be easy to clean.

ABET Descriptors

Engr. Sci. Content: First year engineering, kinematics of mechanism
Type: Component
Elements: Analysis, establish objectives, synthesis.
Features: Problem formulation, consideration of alternatives, feasibility, open-ended, creativity, design methodology
Constraints: Cost, reliability
Effort: Individual

August 9, 1996

Movable Oven Tray

FROM: Feng Lin
Oven Manufacturing, Inc.
TO: All Engineering Staff
Engineering Consultants, Inc.

Dear Sir,

I recently received several complaints from customers. Several accidents has been reported. The problem is that the oven is designated to be installed under the stove, which is too low for an adult. When an adult tries to take food out of the oven, he may accidentally touch the oven's body and get injured.

Since the location and the size of the oven cannot be changed, one way to solve this problem is to redesign the tray so that when one opens the oven door, the tray automatically swings out and carries the food out of the oven. The following restrictions are applied:

- The tray should carry food out when the door is opened, and return to its original position when the door is closed.
- Foods should remain in the tray during the door-opening/closing process, no matter how fast one opens or closes the door.
- The space occupied by the device should be minimized.
- The cost should be minimized too.
- The tray should be easy to clean.

This design problem has already caused serious damage in our sales. I have to make a presentation to senior management in two weeks regarding this issue, and need you to work up some engineering design, cost and manufacturing data for me.

1. Take a measurement of the oven, make engineering sketches or engineering drawings.
2. Redesign the tray so that it meet the above restrictions, using engineering drawings to present your design.
3. Come up with at least one alternative design and evaluate both your designs.

Should you have any questions, please call me at 1-888-for-oven.

OMI

Feng Lin

FY-47

[Filename: OVENTRAY.DOC]

August 9, 1996

Movable Oven Tray

Engineering Notes:

Objectives/Comments:

This would be a good project for freshmen or junior and senior engineering students. For students who are taking the advanced course such as Theory of Machines, quantitative design is required.

Discussion/follow on activities:

The students are encouraged to make prototypes.