# Concept Development of Multi Blade Potato Slicer

**Manjunatha B S[1], Yogishkumar S V[2], Raveendra K S[3], Dr. Sharanraj V[*4], Mahadevswamy K[5]**

[1] Senior Grade Lecturer, Dept of Mechanical Engg. (W&SM), S.J. (Govt.) Polytechnic, Bangalore-01.
[2] Senior Grade Lecturer, Dept of Mechanical Engg. (Machine Tools), S.J. (Govt.) Polytechnic, Bangalore-01.
[3] Lecturer, Dept of Ceramics Technology, S.J. (Govt.) Polytechnic, Bangalore-01.
[4*] Senior Grade Lecturer, Dept of Mechanical Engg. (W&SM), S.J. (Govt.) Polytechnic, Bangalore-01.
[5] Senior Grade Lecturer, Dept of Mechanical Engg. (HPT), S.J. (Govt.) Polytechnic, Bangalore-01.

## ABSTRACT

In Domestic field & Professional life situations like that where a home maker or Professional may need to use potato slicer to make potato chips. Usually, regular potato slicer is used by small and medium range hot potato chips maker, but it consumes both time and energy of the chips maker because of its single blade. By introducing multi-blade in potato slicer, we can save the energy and time of the chips maker. Potato slicer with multi blade will not only save the energy and time of the chips maker, it also increase the production rate of the potato chips. For example slicer with three blades will increase the 3 times production of the regular slicer.

## INTRODUCTION:

The planning of this project is based on the below mentioned criteria **:**

1.Target Cost of the project less than one thousand rupees.

2.Development time less than two months.

3.Project to be simple.

4.Project to target FMCG Segment (Fast Moving Consumer Goods)[1].

Considering the above points, we decided to develop concept potato slicer to attract the Home makers, Professionals, and develop a simple cost effective product which will find immediate use in the market.[2].

Identifying the customer Needs:

The below points are the feedback from the customer survey (Direct interview with Home makers, Professionals)

| Mission statement: "potato slicer" | |
|---|---|
| Product Description | A hand-held, man assisted potato chips maker |
| Key business goals | • Product<br>• Cost<br>• Quality and market share |
| Primary market | • Do it yourself consumer |
| Secondary market | • Home makers and light duty professionals |
| Assumptions | • Slicer with multi-blade<br>• Easy to handle while using |
| Stake holders | • User<br>• Retailer<br>• Sales force<br>• Customer care<br>• Production |

- deen to slice my potato easily
- deen to increase my profit
- ecuder time

Need Statement:

Base on the customer statements, need statements have been listed as below.

- Slicer should easy to handle
- Slicer should have high production rate
- Production should be fast.

MATERIAL AND METHODS:

Establish target specifications:

Process / Steps:

1. Prepare list of metrics.
2. Collect competitive benchmarking information.
3. Set ideal and marginally acceptable target values.
4. Reflect on the results and the process.

Customer needs and their relative importance:

| SL.NO | PRODUCT | NEED | IMPORTANCE |
|---|---|---|---|
| 01 | Potato slicer | Slicer should easy to handle | 1 |
| 02 | | Slicer should have high production rate | 2 |
| 03 | | Production should be fast | 2 |

Metrics for Attractive Potato slicer:

| Metrics no | Need no | Metrics | Importance | Units |
|---|---|---|---|---|
| 01 | 1 | Product grip | 1 | Subjective |
| 02 | 2,3 | Number of slicing blades | 2 | Subjective |

Target Specifications:

| Metrics no | Need no | Metrics | Importance | Units | Marginal value | Ideal one |
|---|---|---|---|---|---|---|
| 01 | 1 | Product grip | 1 | Subjective | ** | *** |
| 02 | 2,3 | Number of slicing blades | 2 | Subjective | ** | *** |

Legend: * : Good , ** : Very good , *** : Excellent

Final Specification:

Process / steps involved:

1. Development of technical models
2. Development of cost model
3. Refine specifications , making tradeoffs where necessary
4. Flow down the specifications as appropriate
5. Reflect on the results and the process.

| Sl.no | Metrics | Units | Specifications |
|---|---|---|---|
| 1 | Product grip | Subjective | *** |
| 2,3 | Number of slicing blades | Subjective | *** |

Legend: * : Good , ** : Very good , *** : Excellent

From the analysis of the need statement, “Potato slicer” is selected for further development. Since need statements other than the one selected are already addressed by manufacturers.

METHOD OF CONCEPT GENERATION:

Process / steps involved:

1. Clarify the problem.
2. External search.
3. Internal search.
4. Explore systematically.
5. Reflect on the solutions and the process.

Concepts generated for Potato slicer in different techniques are as below:

**A.** Multi-blade Potato Slicer with a Wire beading as a gripper
**B.** Multi-blade Potato Slicer with a Sheet metal frame as a gripper
**C.** Multi-blade potato slicer with a embossed Sheet metal act as a blade

Explanation about of all above concepts:

**A.** Multi-blade Potato slicer with a wire beading as a gripper

A concept Developed in potato slicer has a single wire which act as a handle and continuous to become a frame.

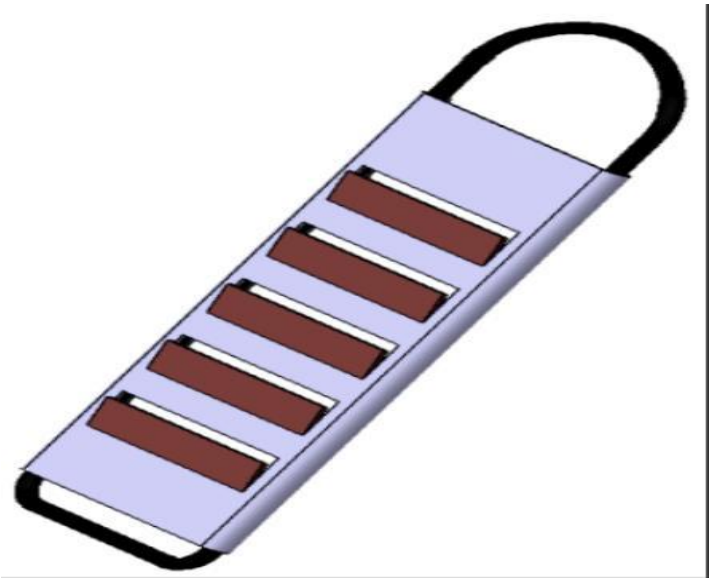

Figure NO: 1 (Multi-blade Potato slicer with a wire beading as a gripper)

**B.** Multi-blade potato slicer with a Sheet metal frame as a gripper

In this concept, the Sheet metal body itself act as frame.

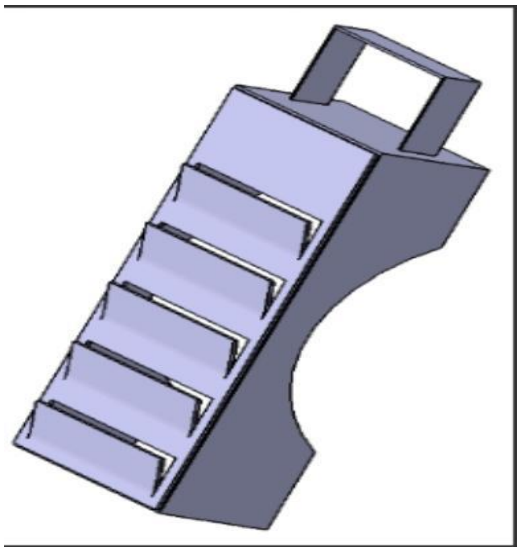

Figure no: 2 (Multi-blade potato slicer with a Sheet metal frame as a gripper).

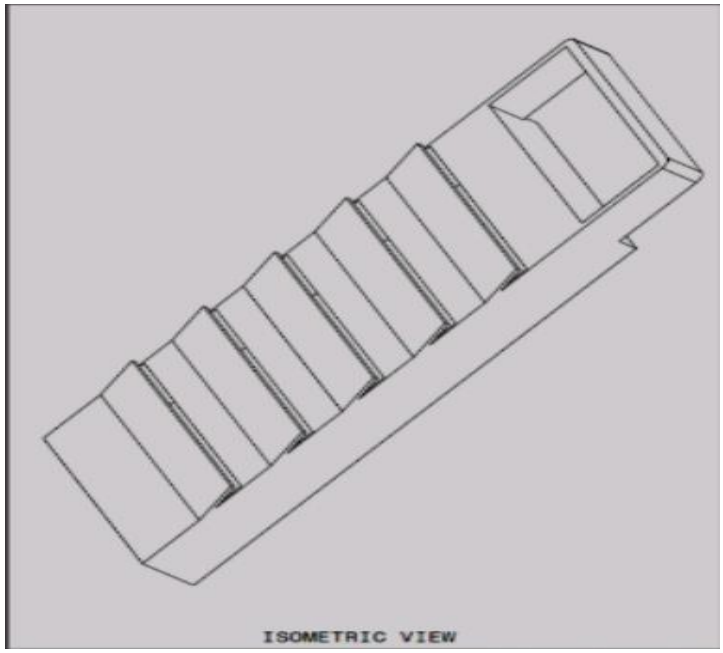


Figure no:3 (Multi-blade potato slicer with a embossed Sheet metal act as a blade).

**C.** Multi-blade potato slicer with a embossed Sheet metal act as a blade

In this Concept, the embossed sheet metal in a cutting slot will act as a slicing blade

CONCEPT SELECTION:

Concept selection is represent in a form of cone as shown below.

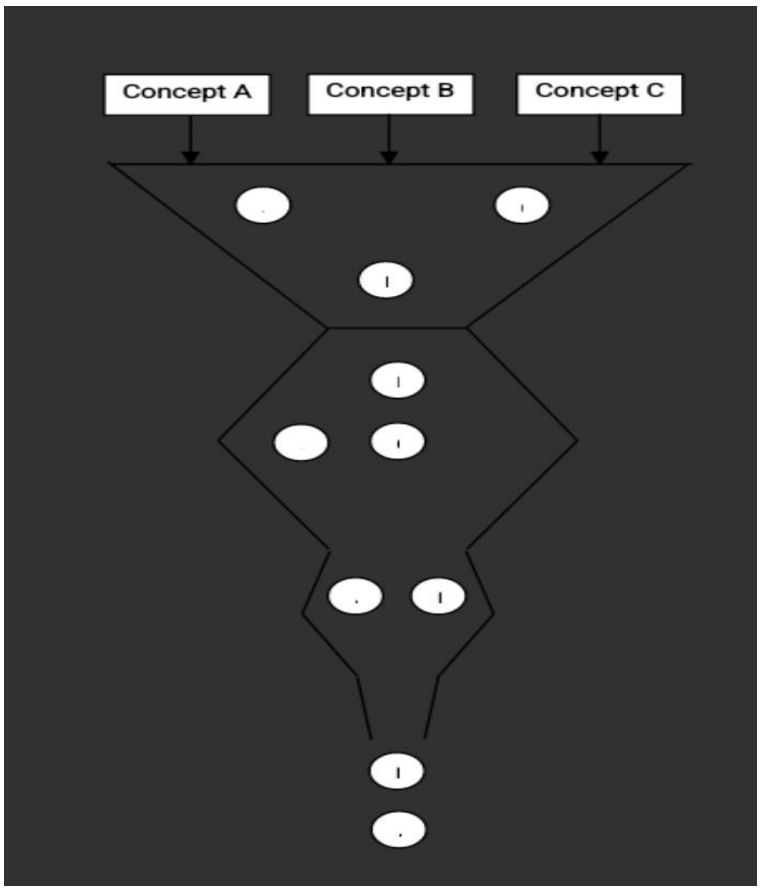


Figure no:4 Concept selection

Process / steps involved:

Concept screening.

A. Prepare a selection Matrix.
B. Rate the concepts.
C. Rank the concepts.
D. Combine and improve the concepts.
E. Select one or more concepts.
F. Reflect on the results and the process.

Concept scoring.

A. Prepare a selection Matrix.
B. Rate the concepts.
C. Rank the concepts.
D. Combine and improve the concepts.
E. Select one or more concepts.
F. Reflect on the results and the process.

Since we have only 3 concepts, we have not considered concept screening process. We have directly gone to concept scoring. The concept scoring matrix is as below.

Concept Scoring Matrix:

| | | **Concept** | | | | | |
|---|---|---|---|---|---|---|---|
| | | A | | B | | C | |
| Selection criteria | Weight | Rating | Weighted score | Rating | Weighted score | Rating | Weighted score |
| Ease of use | 15% | 4 | 0.6 | 5 | 0.75 | 3 | 0.45 |
| Cost | 25% | 3 | 0.75 | 5 | 1.25 | 4 | 1 |
| Ease of manufacturing | 20% | 4 | 0.8 | 1 | 0.2 | 4 | 0.8 |
| No of options | 40% | 4 | 1.6 | 1 | 0.4 | 4 | 1.6 |
| | Total score | | 3.75 | | 2.6 | | 3.85 |
| | Rank | | 2 | | 3 | | 1 |
| | Continue? | | Can be refined | | No | | Develop |

Based on the concept scoring matrix, we have selected the concept C to proceed and develop.

DETAIL DESIGN:

Now that the system level design is completed, detail design need to be started. In this concept it is considered that the Slicer is standard parts.

Potato slicer body made of Mild steel. Details of Design shown below .

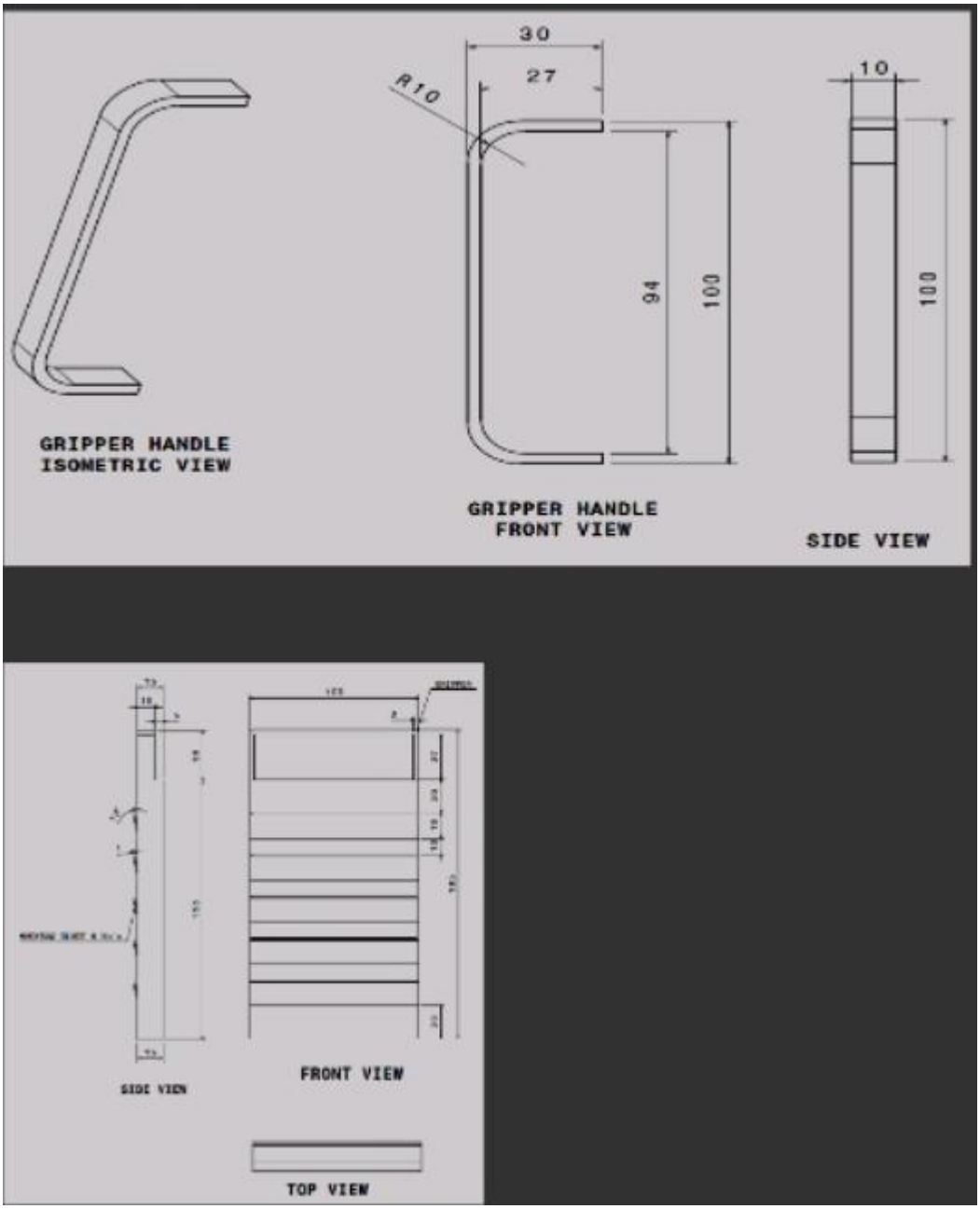


Figure no:5 Details of Design

PROTOTYPE:

Now that the detail design is completed, prototypes have been made. For the prototyping, we selected available Potato slicer which modified according to our design.

The Photos of the same are as show below.

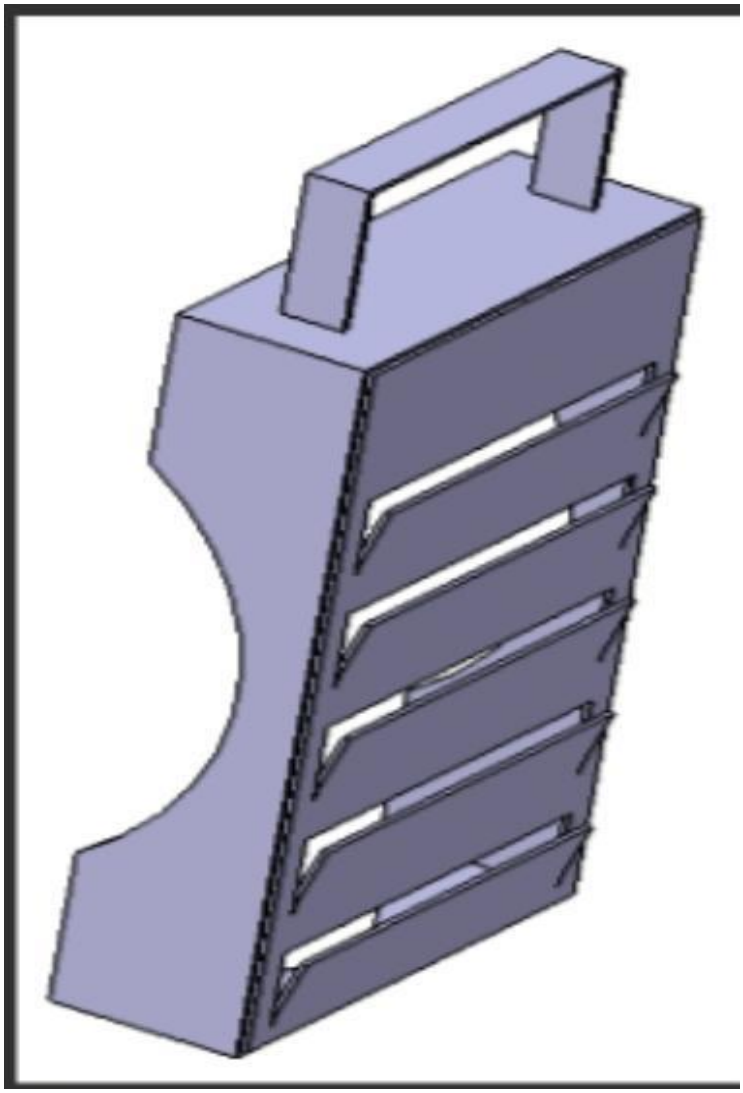

Figure no:6 Prototype of Design

RESULT AND CONCLUSION:

After the fabrication is over, trial has been done. We tested with potato which found satisfactory result.Thus we have achieved the target of high rate production of potato chips with lesser time and low energy.The scope of the project was to "develop a Potato slicer to attract home makers and Professionals to give high rate production of potato chips with a lesser time and low energy & offer special feature not available in the market which will be translated into higher sales".

REFERENCES:

1. Karl T Ulrich & Steven D Expunger, Product design and development, 4th edition, TATA McGraw hill publication, 2009.

2. http://en.wikipedia.org