ISSN No: - 2456 - 2165

Design and Fabrication of Apple Peeler/Slicer-Green Engineering

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Abstract-The lathe design considered to be the most common, because it is also easy to incorporate a corer and a slicer into the rotary mechanism. The basic rotary mechanism is a threaded rod that is initiated by cranking rod that passes a peeling blade. The rod is cranked and it spins the apple with low torque and steadily moves it in forward direction. The peeling blade is torsion spring-loaded against the fruit and also has a type of depth stopper to keep it from cutting in too deep inside the fruit. It also has a corer and slicer attachment and a ring shaped blade fastened to a vertical blade. The circular ring blade peels the corer and also the vertical blade that slices the apple fruit into a helical spring shaped as it it spins forward.

Need of the Mechanism : *Removal of harmful fruit skin of artificial Wax coatings in Apples.*

I. INTRODUCTION

A mechanical apple peeler is a crank operated device that peels and slices the apples in one single motion. When the slicer is enacted ,it cuts a normal apple into a helical spring shape. It is specifically designed to work on apples but the will work on other vegetables such as pears, beetroots, potatos, and thick carrots too.

Numerous amount of designs and methods of apple peeler has evolved over a period of time, the ultimate goal is to achieve the final destination of extract and also to retain the purity of remains. Efforts , and a larger number of times researches have taken place over a period of time scale to curb all the lacking features for the apple peeling techniques .
The user wants to peel an apple and the reason they do is because they do not want to taste the wax coating of the skin. The current apple peeler out in the market do not constrain or satisfy these
needs and there is a potential to enter the market with a new design that can better fulfill the needs. This concept will allow users to analyze the cored/non-cored, sliced/non-sliced and peeled/non-peeled apples.

Over the last few decades there have been many automated and semi automated apple peelers.

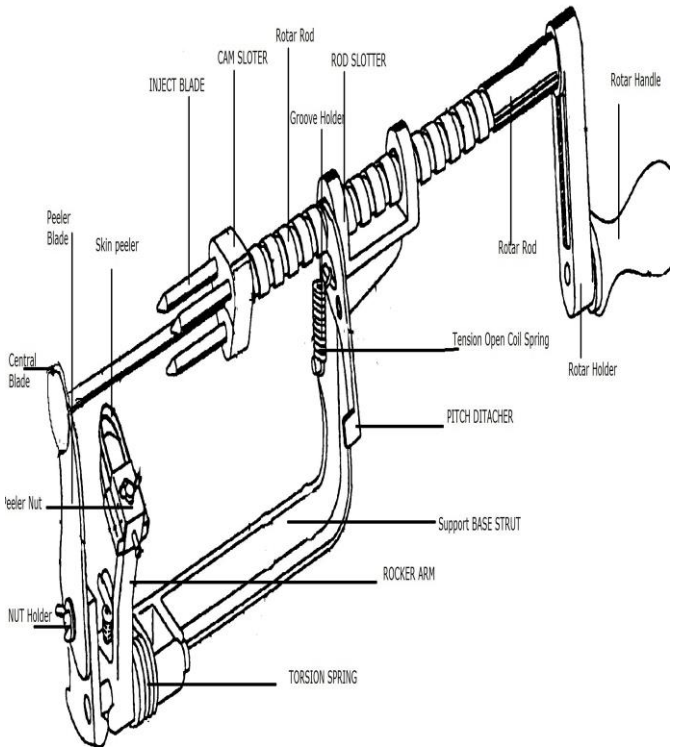


Fig.1 Peeler Isometric View

Manual Technique is generally a safe and fastest method , but accidents always happen through human error or mechanical failure.

This trend is in no means an indication of carelessness on the part of a individual rather it can be considered as the safety measures in the past has reached its saturation limit of effectiveness .A Process that ameliorates the time of the user by accelerating the efficiency.

Small scale Juice Industries, beverage industries, domestic efficiency on over all is empowered.

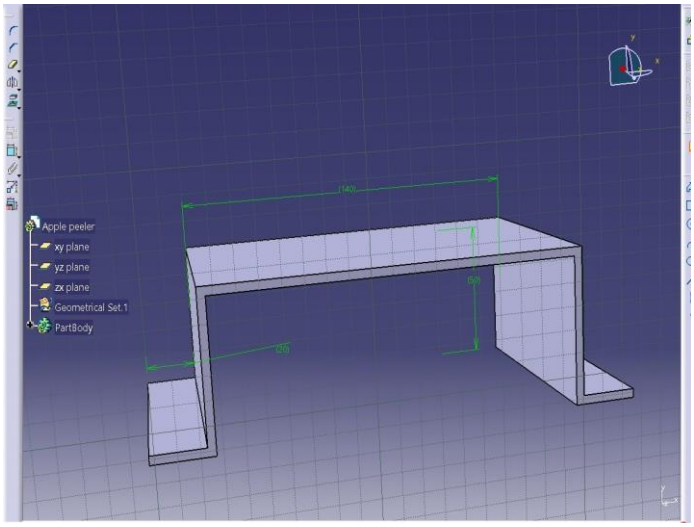


Fig.2 Apple Peeler Base (Software Catia)

II. SS304 MATERIAL IN APPLICATION

SS304 is not fully stain-proof in low-oxygen, high content of salinity, or less air movement environments. There are various and larger number of grades of SS series and surface finishes of stainless steel to suit the circumstances the alloy must endure. Stainless steel series is used as both the properties of steel and anticorrosivity are required. They can meet a wide range of design criteria, including heavy loads, service life and low maintenance.

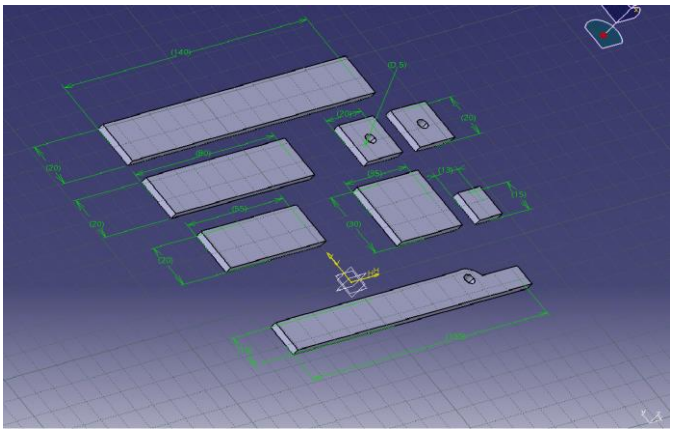
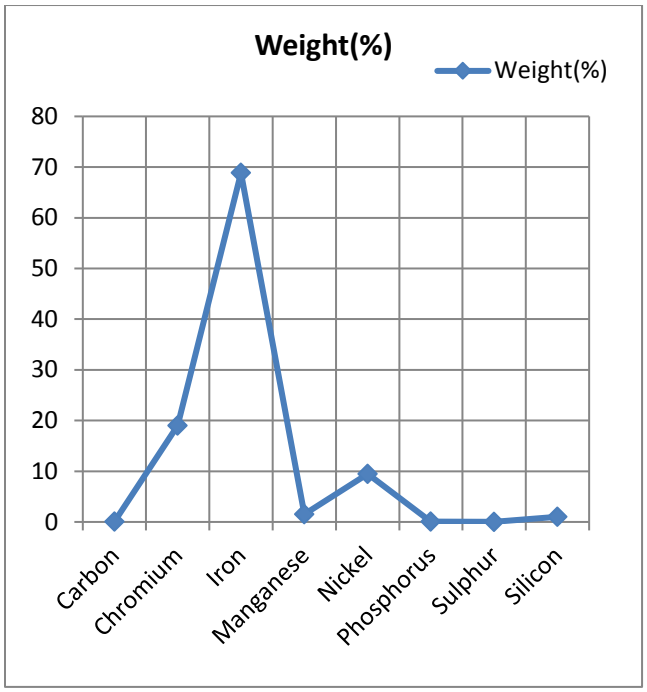


Fig.3 3Dimensional Extruded part Drawing(Software CATIA)

III. CHEMICAL PROPERTIES

TABLE 1 :SS304

Component	Weight(%)
Carbon	0.08
Chromium	19
Iron	68.845
Manganese	1.5
Nickel	9.5
Phosphorus	0.045
Sulphur	0.03
Silicon	1



Graph 1:Component **Vs**. %Weight

IV. PHYSICAL PROPERTIES SS304

This crystal structure makes the SS series steels non-magnetic and less brittle at reduced temperatures. For requirement of greater hardness and strength, more amount of carbon is added. Significant amount of manganese is used in many stainless steel compositions in the SS series.

Table2:SS304

Property	Metric	English
Hardness, Brinell	123	123
Hardness, Knoop	138.5	138.5
Hardness, Rockwell B	70.5	70.5
Hardness, Vickers	129	129
Tensile Strength, Ultimate	505Mpa	73200 psi
Tensile Strength, Yield	215Mpa	31200 psi
Elongation at Break	70.00%	70 %
Modulus of Elasticity	193 - 200 GPa	28000 to 29000 ksi
Poisson's Ratio	0.291	0.295
Charpy Impact	325Gpa	240 ft-lb
Shear Modulus	86Gpa	12500 ksi
Density	8g/cc	0.289 lb/in^3

ISSN No: - 2456 - 2165

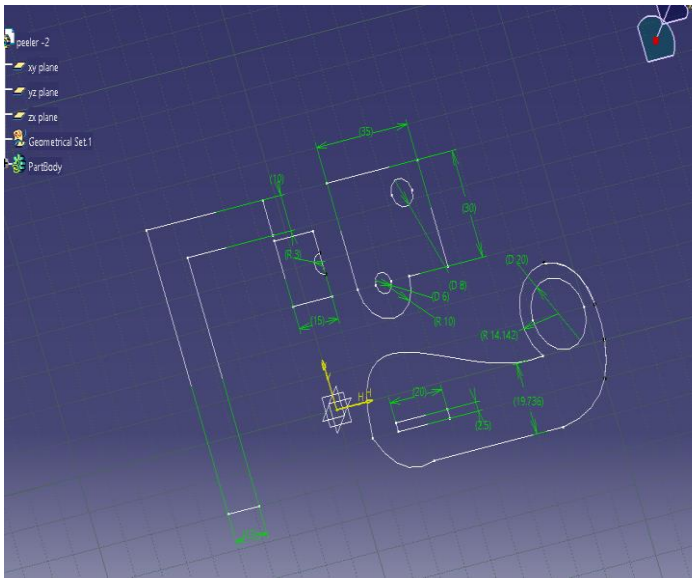
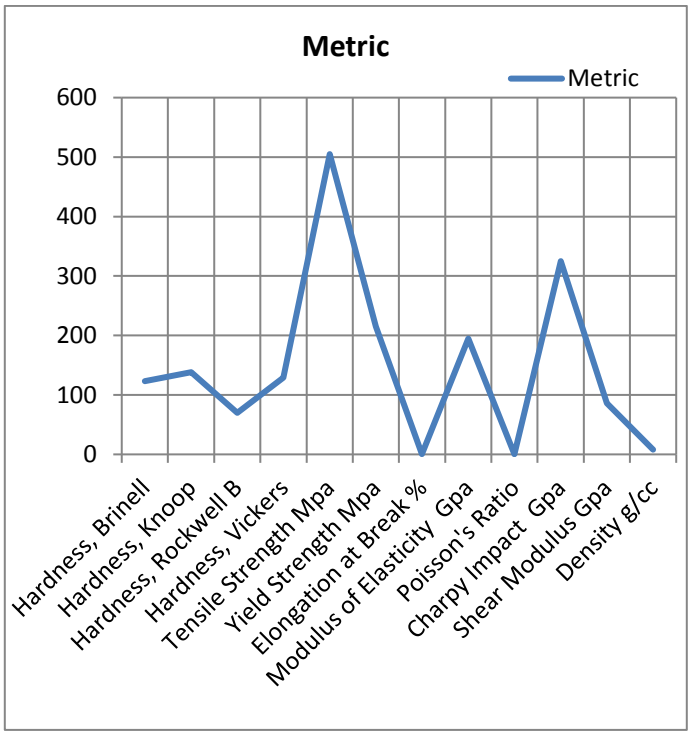


Fig.4 Part Drawing 2 Dimensional



Graph 2:Value Index Vs. Physical properties

V. MECHANICAL OPERATIONS AND FABRICATION

1.Shearing ,Design Structures are were marked on the SS304 Plate and individual pieces were sheared under required dimensions. The actual Dimension of the plate at the Scrap is 430*315*5mm plate. The dimension were calculated using software catia and part drawings of the required dimensions were extruded and denoted in 3dimensional structure. A shown in figure 2 and 3 the shearing operation is performed as shown in figure 5.

Fig4. Stainless steel plate SS304 -430*315*5mm


Fig5. Shearing the SS304 and Drilling hole in a strip


Fig6.Strut and Sheared strip

2.Bending Support Struts were bent on L-Shaped Structures. Figure 5 and Figure 6 shows the bent shape and structure performed using a VBent and an wheel Anvil.

Fig7. Bent support strut of lathe rod

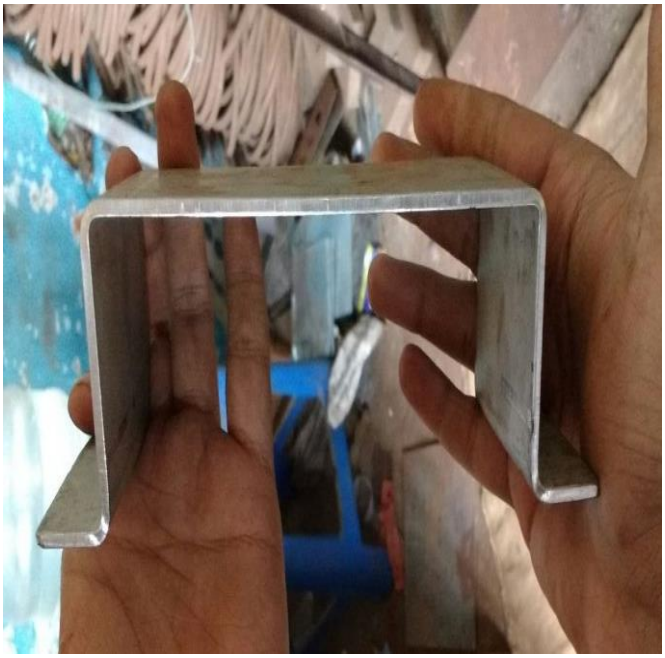


Fig 8. Bent Support Column Base

3.Drilling – 12.5 mm Holes were drilled on column pieces. Figure3 clearly specifies the hole in a strip.

4.Gringing subset columns and surface enhancement technique was applied and grinding operations were carried out.

5.Welding individual column materials as shown in Figure 7 and support struts were assembled together and also complete assembly of the design structure were made.

Fig.7:Support Base Strut (Fabrication)

Fig 9.Fabricated Finished product – Anticorrosive Coating

Fig 10. Prototype Testing – Potato-Helical Structured Output

VI. CONCLUSION

In the above content the development of a conventional apple/potato peeler/slicer is fabricated with the following solution as in shown in figure 8 and figure 9 . While its operational features and functions are reserved, its basic

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structure is modified, improvement is made in the conventional apple/potato peeler/slicer in 7 aspects, according to the present prototype model. The prototype models is equipped with a end centering device. The design of the overall peeling blade is modified. It also has a blade adjustment/ positioning device.

VII. APPLICATION OF RESULTED DATA

This data will account as a potential asset in a reference on Industrial processing. Also, the data will be beneficial in further researches in mechanics of fruit peeling.

In Conclusion, the peeling process applied in fruits does not only reduce the time of fruit extractors, but also enhances the overall efficiency of the user to a defined extent and is a boon to the world of Fruit Lovers.

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