

Design and Fabrication of Tin Crusher

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Abstract -It has been observed that tin cans constitute significant part of garbage at public places. In order to recycle and process these cans their collection and transportation is necessary. This paper talks about detailed design of a tin can crusher. It is compact in size and can be operated manually by hand. It will help to keep earth neat and clean as the model eco- friendly the study of manufacturing was very important in order to carry out this project to ensure that understanding on what are needs to do. and fabricating the Tin Can Crusher to helps people easy to crush the tin and bring anywhere. This project involves the process of designing the crusher using considering forces and ergonomic factor for people to use. After the design has complete, it was transformed to its real product where the design is used for guide the safety for indeed of publishing. Methods and process involve in this project for instance joining using bending, welding, drilling, and cutting process. This project is mainly about generating a new concept of tin can crusher that would make easier to bring anywhere and easier to crush the tin.

I. INTRODUCTION

Surface the main purpose of the project is to get knowledge of design and fabrication. The design is an environment friendly and uses simple properties such as mechanical single slider and automation properties which use crank mechanism. The design is done so that knowledge of designing, mechanism and forces analysis are increased. In order to reduce the waste, we planned to create a can crushing machine that will reduce the volume of aluminum cans by approximate eighty percent. This machine primarily usage is to save space and for recycling. It can be placed anywhere in park, restaurant, canteens, etc. in today's life most of the food items are packed in canned.

II. MATERIAL CHARACTERISTICS

The materials chosen for this analysis is Cast Iron and Mild steal is a medium high strength. Good flow characteristics provided by high Steal content leads.

III. WORKING PRINCIPLE

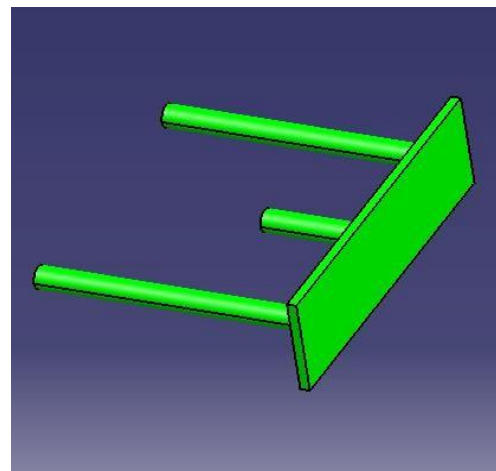
1. he machine is seated without any vibration.
2. The machine can make crushing without giving much effort.

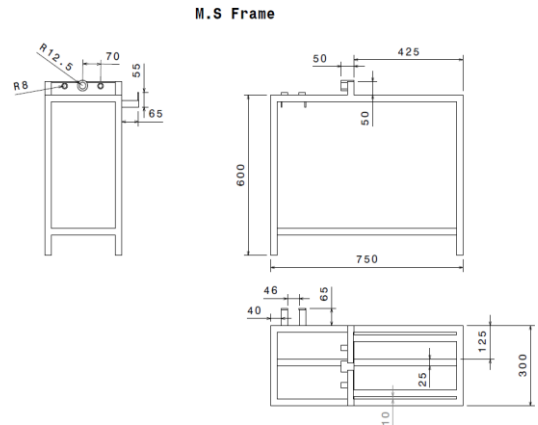
3. The crushing plate placed at the end of the connecting rod which is reciprocated by the crank wheel by the motorized drive.,
4. When the motor is rotated, the crank wheel is rotated and hence the crushing plate with connecting rod also moved.
5. The crushing plate is moved towards the job.
6. During its movement the connecting rod with the crushing plates are forced on the job and thus crushing action take place

IV. MAIN PARTS AND DESCRIPTION

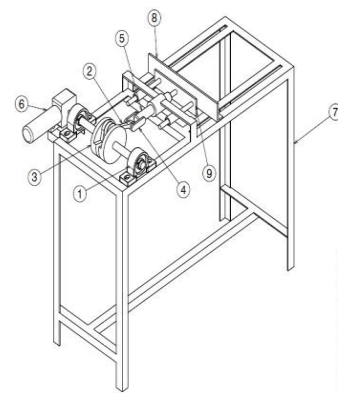
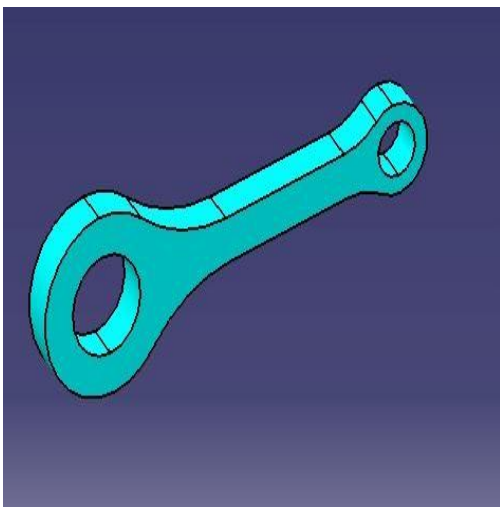
1. Base
2. Crank with sliding shaft
3. Crusher plate
4. Main shaft
5. Dc motor with built in gear box
6. Power supply 24vdc
7. Plummer block
8. Bearings

V. PARTS USED





Motorised tin crushing device



Bill of Material:

No.	Part Number	QTY
1	Plummer Block	2
2	Connecting rod	1
3	Crank shaft	1
4	Connector	1
5	Slider	1
6	Motor	1
7	M.S Frame	1
8	Movable jaw	1
9	Crushing block	1

DESIGN CALCULATIONS

Force required to crush the plastic bottle Force required to crush the Soda/Pepsi Can So, we considering maximum of it.

Torque, $T = F \times r$

Where, r is radius or length of the crank. F is required crushing force.

Power is given by, $P = T\omega/60$ Where,

T is torque required

ω is angular velocity = $2\pi N/60$

Where,

N is speed of the crank.

Again, Power can be calculated by static force analysis

VI. CRANK SHAFT

facilities. The shaft must have sufficient thickness to avoid bending, due to heavy load and vibrations. They supported over the base by means of the sleeve. The pulley is fixed to the main shaft that



transmits the power to the base plate by means of motorized drive transmission.

Rolling element bearing life is determined by load, temperature, maintenance, lubrication, material defects, contamination, handling, installation and other factors. These factors can all have a significant effect on bearing life. For example, the service life of bearings in one application was extended dramatically by changing how the bearings were stored before installation and use, as vibrations during storage caused lubricant failure even when the only load on the bearing was its own weight; the resulting damage is often false brinelling. Bearing life is statistical: several samples of a given bearing will often exhibit a bell curve of service life, with a few samples showing significantly better or worse life. Bearing life varies because microscopic structure and contamination vary greatly even where macroscopically they seem identical.

DESIGN CONSIDERSTION

- Maximum Force required crushing the Can/Plastic bottles
- elements
- Standard size of cans/plastic bottles

SAFETY, CARE AND MAINTENANCE

Before starting the operation, check the following items
 Check the mechanism for proper operation
 .Check the alignment of crank drives, crushing plate and bearing in the unit. Don't insert the any material or object between the during operation of crushing. Check the lubrication of bearing drive in the unit. Handle carefully while crushing the work



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ADVANTAGES

- Maintenance cost is low
- Number of part is less
- Less floor space
- Greater safety to the worker
- Life span of the machine is high

DISADVANTAGES.

1. Timeconsuming
2. Crusher plate wear

FEATURES OF THIS PROJECT

It is compact in size. It can be move.

Low electrical power consumption. It can be utilized at our Place.

CONCLUSION

The above design procedure is been adopted for the fabrication of fully automatic can crusher machine which will make the product durable for the long time as well as make it efficient and also helps to understand the concept of design. Thus with the help of this design we can fabricate an automatic can crusher machine to simply reduce the volume of cans as well as to reduce the human fatigue. Also the automatic operation can be possible using the mechanical power transmission operated by electric motor or electric actuator etc. This solely will reduce the volume of the cans or bottles to reduce the transportation cost by reducing its volume.

REFERENCE

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[2] Mr. Che Mohd Akhairil Akasyah B Che Anuar Faculty of Mechanical Engineering in University Malaysia Pahang in the year Nov.2008 in his project report entitled "Development of the Can Crusher Machine"