



DESIGN AND FABRICATION OF PNEUMATIC AND MANUAL TIN CRUSHER

1-M. VIGNESHPRABHU M.E

Associate professor P.A. College of Engineering and Technology, Pollachi, Tamil Nadu, India.

2-S.Dinesh prabhu ,E.Ragupathi ,V.Sridhar ,S.Sreeabilash.

UG Students Department of Mechanical Engineering, P.A. College of Engineering and Technology, Pollachi, Tamil Nadu.

ABSTRACT

The main goal of this project is to build a can crushing device that will lower the amount of scrap and make it easier to transport cans to the recycling facility. Nowadays, a lot of cans are used in hotels, canteens, and other establishments, and a lot of room is needed to store or dispose of the old cans. This project involves building a can crusher with a single slider crank mechanism that will at least 70% decrease the volume of cans. This paper details the calculations, assembly, and machine manufacturing that were required. There have been two Can Crushers built as part of this project. The first one was manually controlled and was created during the seventh semester.

INDRODUCTION

The Can Crushers be used in mechanical and allied industries which crush cans made of different materials. The Can Crusher machine is widely used in beverage industries or in scrap dealers' shop to reduce the volume of the cans. Consequently, it leads to the reduction of the transportation cost. This machine is primarily used to save space and for recycling. It can be placed anywhere. In today's life most of the food items are packed in cans like Cold and hot drinks and other beverages. Commercial establishments like cafeteria and bars, have to deal with leftover cans. Storage of these cans is often a problem and these increases total volume of the trash. Therefore, using can crusher in such places proves to be advantageous.

WORKING PRINCIPLE

1.Pneumatic Tin Can Crusher:

Pneumatic crushers use compressed air to exert force on a can. When a can is placed in the crusher, a valve is opened, allowing compressed air to flow into a chamber. The air pressure builds up inside the chamber, pushing a piston or crushing plate against the can. This pressure causes the can to collapse or crush. After crushing, the air valve is released, and the can is removed.

2. Manual Tin Can Crusher:

Manual crushers are usually hand-operated and rely on human force to crush the can. You place the can inside the crusher and use a lever, handle, or other manual mechanism to apply pressure. by manually pressing or squeezing the handle, the mechanical advantage reduces the can's volume.

Both types of crushers serve the purpose of reducing the size of the can, making it easier to store and transport for recycling. The main difference is the power source used to apply the crushing force: compressed air in the case of pneumatic crushers and human effort in manual crushers.

LITERATURE REVIEW

Elfasakhan.A, et.al. (2022) presented a new design. This Can Crusher which can crush a single can at a time consists of a hardware and software. The hardware includes mechanical structure, servomotor, light sensor, microcontroller and pneumatic system. The pneumatic system has been used instead of an electrical motor since electrical motor with the needed specification (torque and horsepower) is very expensive.[1]

More.S.R, et.al. (2021) have presented a review on study of jaw plates jaw crusher which tells us that crushers are major size reduction equipment used in mechanical, metallurgical and allied industries which crushes different types of soft and hard materials. This paper provides the background of swing jaw plates of jaw

Crusher and kinematics and dynamic analysis are done to improve the design. [2]

Saif.Set.al. (2020) have proposed a fully automatic Can Crusher using pneumatics and microcontroller sensor.[3]

KhanapureL.R.,et.al.(2019) explains which provide crushing action in both the strokes thus making it a dual stroke Can Crusher and provide automatic falling of crushed cans and automatic feed of new cans to be crushed so as to keep the crushing area free from human intervention thus providing safety to the operator.[4]

Kumar.N,et.al.(2016) says about fabrication of mechanical crusher which would help to crush the used juice cans, paint cans and punched sheet metal waste. The crusher is designed to operate on a crank and slotted

lever mechanism and the power for the electrical operation of the crusher is taken from an electrical motor. This Crusher crush the cans effectively and the manufacturing as well as the maintenance cost is very less which is suitable for small recycling plants.[5]

Wakchaure.Cet.al.(2014) design and fabrication of automatic Can Crusher using double acting cylinder for pneumatic system and ices.[6]

Patel,B.Aet.Al.(2012) explains design and fabrication of automatic can crusher and vending machine using cam and follower mechanism. Total process of 14 crushing is automatic, no manual supervision is necessary for the whole process. Vending mechanism is introduced in project marketing and to create public.[7]

Wakchaure.Cet.al. (2010) design and fabrication of automatic Can Crusher using double acting cylinder for pneumatic system.[8]

Shinde. S, et.al. (2009) the study of the current Can Crushers and the various mechanisms employed. Some of the technological aspects like robust design, volume reduction was successfully implemented. Overall, the project was very enriching in terms of technical fabrication and design process. The current prototype reduces the volume of cans by 65 %. Auto feed mechanism have trouble due to speed which needs some improvement in near future.[9]

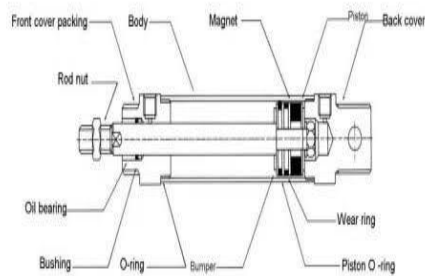
DIAGRAM: Pneumatic Cylinder



Frame Material



Pneumatic Piston



REFERENCE:

- 1 Elfasakhany.A, et.al (September,2022), "Design and Development of an Economic Autonomous Beverage Cans Crusher", International Journal of Mechanical Engineering and Technology.[1]
- 2 Morels', et.al. (January,2021), "A Review on Study of Jaw Plates of Jaw Crusher", International Journal of Modern Engineering Research.[2]
- 3 Ashine, A.D. Lange, A.K. Baradar, S.M. Konda war (April 2020), "Design and Fabrication of Aluminum Tin Can Crusher", International Conference on Ideas Impact and Innovation in Mechanical Engineering.[3]
- 4 Khanapure Laxmikant.R., et.al, (April,2019), "The Dual Stroke Can Crusher", International Journal of Recent Development in Engineering and Technology.[4]
- 5 Kumar.N, et.al. (January,2016), "Design of Mechanical Crushing Machine", International Research Journal of Engineering and Technology.[5]
- 6 Wakchaure.C, et.al. (April,2014), "Design and Fabrication of Automatic Can Crusher", Imperial Journal of Interdisciplinary Research.[6]
- 7 Panelboard, et.al. (October,2012), "Design and Fabrication of Automatic Can Crusher and Vending Machine", International Journal of Emerging Technology and Advanced Engineering,6(10), 59-62. Saiph's, et.al. (October ,2014), Fully Automatic Can Crusher, International Journal of Mechanical and Industrial Technology.[7]
- 8 Wakchaure.C, et.al. (April,2016), "Design and Fabrication of Automatic Can Crusher", Imperial Journal of Interdisciplinary Research.[8]
- 9 Shinde.A. S, et.al. (June, 2009), "Design and Fabrication of Aluminum Tin Can Crusher", International Conference on Ideas, Impact and Innovation in Mechanical Engineering.[9]