



Fabrication of Automatic Portable Sieve Machine

Aryan Mhatre¹, Hrushikesh Parida², Kunal Chavan³, Chinmay Behera⁴, Amit Patil⁵

^{1,2,3,4}U.G Students, Mechanical Engg. Dept, Bharati Vidyapeeth Institute of Technology, Navi Mumbai

⁵Professor, Mechanical Engg. Dept, Bharati Vidyapeeth Institute of Technology Navi Mumbai

Abstract: A sieve was a device that used a woven screen, such as a mesh or net, to separate desired elements from undesired material or to characterize the particle size distribution of a sample. The main problems of the sieve were that it required a lot of human energy and requires a long time to sieve the flour. The sieve could not sieve in a large amount due to their size and capacity and made the user feel tired quickly, making it a massive chore to do. Methodology was the rules or procedures used to implement the project in detail. Dinamo grater was our project concept which was this project used rotation from electric power to make this machine move automatically. The weight of flour that could be sifted by the machine in one time was 5 kg, require 30 minutes to complete one cycle of sieving and estimated 20 kg for this machine eight. Project planning and phases were made and being implemented during the project production in order to ensure the process went smoothly. It also helped to act as a reference to ensure that we achieve the objective on time. For recommendation, our project would sift 10 kg flour in one time, had a 10 kg weight and could sifted 5 - 20 minutes for completed one cycle of sieving.

Keywords: Mild Steel Angle, Sheet Metal, MS Flat, DC Motor/Wiper Motor, Battery (12V), Shaft, Sieve, Nut bolts.

I. INTRODUCTION

A sieve is a device that uses a woven screen, such as a mesh or net, to separate desired elements from undesired material or to characterize the particle size distribution of a sample. This project focuses on the design and construction of the machine's mechanical element as well as the sieve machine's system. To meet this project's goal, the body structure and mechanical system of the sieve machine must consider other factors such as strength, safety, and ergonomic design. A sieving machine is a machine that separates particles into distinct levels based on their mesh size. It is common in many businesses, such as pharmaceuticals, to want to reduce particulate matter in the community. The holes in a little sieve, such as one used for sifting flour, are exceedingly small. Sieves with various types of holes are employed depending on the types of particles to be separated. Separating stones from the sand is also done with a sieve. A metallic plate or sheet, or other similar device, with uniformly spaced perforations installed in an appropriate frame or holder, for separating material by size.

II. DESIGN OF COMPONENTS

The design of automatic portable sieve machine is such a typical task. The design is based on parameters like removing dust from granular products and for grading grains, etc. The components used in this treadmill bicycle are divided into two parts.

1) Structural Parts.:

- i. frame
- ii. mild steel
- iii. ms sheet metal
- iv. ms flat
- v. dc motor/wiper motor
- vi. Battery (12V)
- vii. Shaft
- viii. Sieve

2)Transmission Parts

1.Mild Steel:

The mild steel angles of material of mild steel are selected for the frame. The MS angles are cut into required size by cutting machine. The end of the MS angle cut into 90 degrees(angle) to form rectangular frame. After cutting, the end of the MS angles is grinded so that it became smooth and convenient for welding. The MS angles are welded together to form a rectangular basic frame.



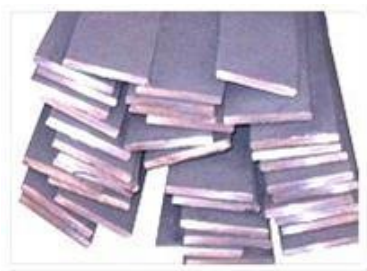
2.MS Sheet Metal:

We can provide these MS sheets and mild steel sheets in different grades, thickness, length and weight as per the requirements. Sheet metal is a metal formed by an industrial process into thin, flat pieces. Sheet metal is one of the fundamental forms used in metal working and it can be cut and bent into a variety of shapes. Thickness can vary significantly; extremely thin sheets are considered foil or leaf, and pieces thicker than 6 mm (0.25 in) are considered plate steel or “structural steel”.



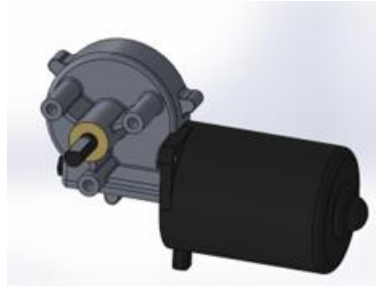
3.MS Flat:

MS Flat are generally used in Industrial gratings, various fabrication works & domestically, it is used in grills outside window. Representation of M.S. Flats is done by the Width (W) & the Thickness (T) of the Flat. For example: When we say 25 X 5 FLAT, it means Width = 25mm & Thickness = 5mm. The weight of flat bar is easily calculated. Simply multiply the appropriate alloy density by the length, width, and thickness of the required part for taking weight of each component. Cross-Sectional size of link used is 18x4 mm.



4. DC Motor:

The standard voltage requirement for the wiper motor is 12 volts DC. The electrical system in a running automobile usually puts out between 13 and 13.5 volts, so it's safe to say the motor can handle up to 13.5 volts with no problem. The minimum required current for the motor is 1.6 amps at 70 rpm, 0.9 amps at 41 rpm. Direct-current motors transform electrical energy into mechanical energy. They drive devices such as hoists, fans, pumps, punch-presses, and cars. These devices may have a definite torque-speed characteristic or a highly variable one. The torque-speed characteristic of the motor must be adapted to the type of the load it has to drive.

**5. Battery:**

The battery is an electrochemical converting chemical energy into electrical energy. The main purpose of the battery is to provide a supply of current for operating the cranking motor and other electrical units. Specification,

1. Voltage 12V
2. Current 7.2 Ah

An electric battery is a device consisting of one or more electrochemical cells with external connections provided to power electrical devices such as flashlights, smart phones, and electric cars. When a battery is supplying electric power, its positive terminal is the cathode and its negative terminal is the anode. The terminal marked negative is the source of electrons that when connected to an external circuit will flow and deliver energy to an external device.

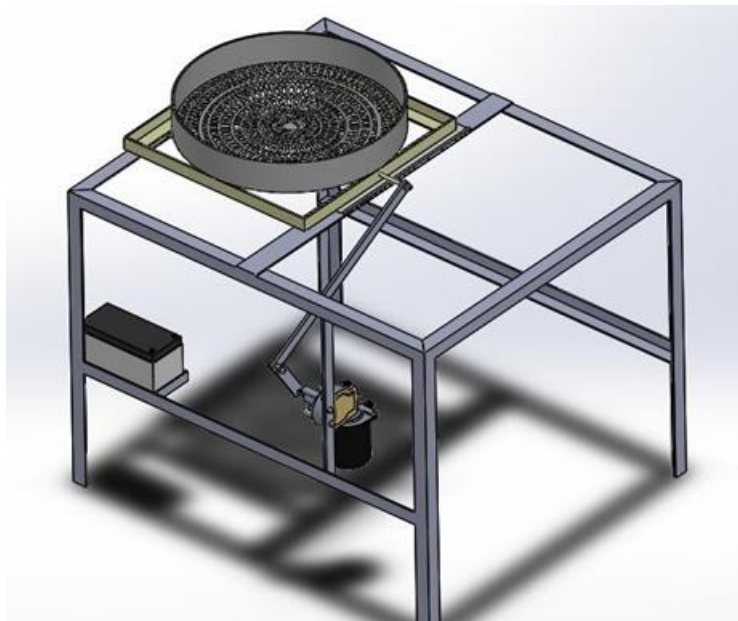
**6. Shaft:**

A shaft is rotating machine element which is used to transmit power from one place to another. The power is delivered to the shaft by some tangential force and the resultant torque (or twisting moment) set up within the shaft a set up within the shaft permits the power to various machines linked up to the shaft. In order to transfer the power from one shaft to another, the various members such as pulleys, gears etc., are mounted on it.



**7. Sieve:**

A sieve, fine mesh strainer, or sift, is a device for separating wanted elements from unwanted material or for controlling the particle size distribution of a sample, using a screen such as a woven mesh or net or perforated sheet material. In cooking a sifter is used to separate and break up clumps in dry ingredients such as flour, as well as to aerate and combine them. A strainer, meanwhile, is a form of sieve used to separate suspended solids from a liquid by filtration.



AUTOMATIC PORTABLE SIEVE MACHINE

III. LINKS AND BOOKMARKS

1. Chakraborty, S., and Banik, D., Design and Fabrication of Sieve Machine.
2. Onut, S., Soner, S. K., & Sinan M., Selecting the suitable material handling equipment in the presence of vagueness, The International Journal of Advanced Manufacturing Technology, vol. 44, pp. 818–828, 2009.
3. Kuluk, O., A decision support system for fuzzy multi-attribute selection of material handling equipments, Expert Systems with Applications, vol. 29, no. 2, pp. 310-319, 2005.
4. Krishnan, V., and Ulrich, K. T., Product Development Decisions: A Review of the Literature, Management Science, vol. 47, no. 1, pp. v-204, 2001.



IV.CONCLUSION

Concluding the project up to now after research four different types of sieving machine was conceptualized to select the best considering every factor to make it more efficient, portable and easily operable. Then the required materials were selected by market study although the fabrication process was undoable due to condition occurred, we continued the design process in Solid works and some preliminary calculations. This report also includes doing method of construction and research design flowchart and the Gantt chart. According to calculations and assumptions, this type of sieving machine will be efficient and easily operable, which can help society to learn new way of sieving. In conclusion, through the researched done to produce this project, we could overcome the problem faced by baker an improved existing sieving machine to made easy to use although the main purpose of this machine to sieve , this project would also ensure that this machine was able to reduce the accident or injury to the user thus the machine had been accompanied by a complete design and safety features. more the improvement that stated conclude that this machine also able to improved productivity hance the sales for the baker. Lastly, lastly, this project would settle any problem that includes sieving.

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REFERENCES

- [1] Shivajirao, S. Design and Fabrication of Automatic Portable Sieve Machine.
- [2] (n.d.). Retrieved from Sieve Image.jpeg
- [3] (n.d.). Retrieved from Shaft Image.jpeg
- [4] (n.d.). Retrieved from Wiper Motor Image.jpeg
- [5] (n.d.). Retrieved from Battery Image.jpeg

BIOGRAPHY



Aryan Mhatre, Diploma in mechanical engineering, scholar in mechanical engineering department, Bharati Vidyapeeth institute of technology, Navi Mumbai



Hrushikesh Parida, Diploma in mechanical engineering, scholar in mechanical engineering department, Bharati Vidyapeeth institute of technology, Navi Mumbai



Kunal Chavan, Diploma in mechanical engineering, scholar in mechanical engineering department, Bharati Vidyapeeth institute of technology, Navi Mumbai



Chinmay Behera, Diploma in mechanical engineering, scholar in mechanical engineering department, Bharati Vidyapeeth institute of technology, Navi Mumbai



Amit J. Patil. B. E. (Mechanical), Lecturer in Mechanical Engineering Department, Bharati Vidyapeeth Institute of Technology, Navi Mumbai