IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Motorized Paper Shredder Machine

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ABSTRACT

A paper shredder machine can be used to cut papers into small strips or pieces. These machines can be used by government associations or other privately-owned companies to destroy their private papers or confidential documents to avoid them from falling into wrong hands. The paper shredder makes use of 2 x rutting blades to achieve the desired paper cutting. The blades are driven by a dc motor. The dc motor is attached to the blades through a bearing arrangement for high stability.

The motor is used to drive one blade which in turn drives the other blade using an equal gear mechanism. This ensures both blades move in desired direction and at the same speed. The shredder consists of a metal drawer with handle that allows user to pull out the shredded paper falling through the blades to be easily removed and disposed off.

The controller panel of the machine consists of switch for turning on and off the machine along with an emergency stop button to pause operation urgently.

1.INTRODUCTION

Paper shredder is a machine that is used to cut unwanted paper into small pieces in order to get rid of the paper. It is basically a mechanical machine that that uses a DC motor to rotate gears that are connected to two shafts covered with sharp metal heads all around. The shafts rotate in opposite directions, while the paper gets shredded when it goes between them. Paper shredder is widely used in offices to dispose papers as waste and also to shred some classified and secret papers in sensitive areas like the military. This shredder is used for security purposes and recycling. Furthermore, the shredder uses a verified shredding standard by the

Netherlands' based website called recycling.com.

Moreover, the standard is internationally approved.

A paper shredder is a mechanical device used to cut paper into chad, typically either strips or fine particles. Government organizations, businesses, and private individuals use shredders to destroy private, confidential, or otherwise sensitive documents. Privacy experts often recommend that individuals shred bills, tax documents, credit card and bank account statements, and other items which could be used by thics to commit fraud or identity theft.

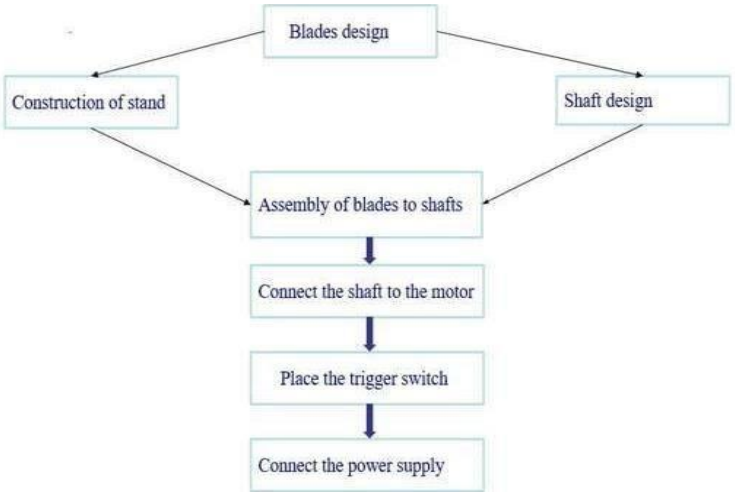
2.LITERATURE SURVEY

GU-Ming Zeng in 2006 presented the blades of the paper shredder that had serrated cutting edges which were formed by bending. This could be done by two methods. The 1st method had a blade body and serrated edge integrally formed and punched from the same base material. Cost of production there was high and even high level material was required. The 2nd method had serrated cutting edges specially thickened to reduce material consumption. They were also complex to manufacture. Ming-Hui

Ho. in 2011 presented the paper shredder which had two rotary cutters each with multiple blades. Each blade had a first cutting blade with multiple first cutting edges and a second cutting blade with multiple cutting edges. Both the first and the second cutting blades were distributed in a nonequiangular manner and each of the first cutting edges was offset to each one of the second cutting edges, so that there was only one cutting edge that engaged with the paper to be shredded. When the amount of shredded paper increased, the paper shredder did not function normally because multiple cutting edges simultaneously engaged with the paper to be shredded paper stuck in the shredder. Willi Strohmeyer in 2014 presented a blade and a stripper assembly for a paper shredder. Between the blades of each shaft in the cutter zone, stripper bars or fingers were provided to prevent the cut material get collected around the blade shaft. Here the stripper block had the row of stripper fingers received in the interstices between the blades. Requisite stability was attained since the fingers were engaged with the support ribs of the opposite housing. Stripper block was an injection moulding part, thus was simple construction and easy to fabricate and also had low cost. Willi Strohmeyer in 2014 presented a blade and a stripper assembly for a paper shredder. Between the blades of each shaft in the cutter zone, stripper bars or fingers were provided to prevent the cut material get collected around the blade shaft. Here the stripper block had the row of stripper fingers received in the interstices between the blades.

Frank Chang in 2017presented the blade assembly for paper shredder is in a juxtaposed manner. Conventional assembly consists of long and short partition rings. The disadvantage was that even if one part malfunctioned, the whole assembly gets loosened. Instead of having partition rings it had long and short plates casted with the blade ring.

3.METHODOLOGY



4.Aim & Objective

To provide alternatives for industries aiming toward reducing human effort and improvement in material handling systems by implementing automation.

Sustainable and practical automation solutions for the future industrial environment.

To cater to the issue of competition in the mechanical industry the need for automation is assessed by all the industry.

To identify the key policy avenues considered to be appropriate to meet the challenge of sustainable manufacturing and packaging industry for the future.

SCOPE

There are various ways to make this project better. The first one is to select materials with better mechanical properties than AISI 304. The project could also be better when using different gearing systems and increasing the DC motor power. Choosing an outer body made of plastic will be much better than using an outer body made of mdf. Finally, the team recommends using paper shredders when there is a need to dispose of paper properly without damaging the environment or creatures or whenever there is a need to destroy sensitive papers.

USES

Fully Motorized Operation

Steel Blades for long life

Geared design for high power cutting

Easy to use compact machine

It is able to cut paper without any jerk and minimum

Vibrations.

It requires less time

It improves the productivity.

The attachment is compact and rigid in size.

Maintenance is low.

Allows the user to dispose of paper very simply and effectively

Can be used by government organizations, banks, and corporate offices to dispose of

documents containing sensitive information

WORKING

Here the working of this project is as follows

the project consists of a motor, an assembly of gears and blades and MS shafts

So the circuit helps to rotate the motion of the motor, there consists of a toggle switch for forward and backward motion and an ir sensor

The project has 2 modes

1st is that the motor can be on and off manually

2nd is that the ir sensor detects if there is any paper which in turn starts the motion of the motor in desired direction.

1st – here the motion of the motor can be changed manually in forward or reverse direction. And the is another switch for mode to switch from normal to IR mode. In this on can keep the direction of the motion all the time and the motor will keep turning all the time so when paper is inserted it can shredded and the shredded paper will fall down.

2nd – here the on and off of the motor is decided by the sensor so when a sensor detects the paper then it will transfer a signal to circuit and the motor will start rotating and cutting. When the paper is over the ir sensor will detect and it will stop rotating after some time.

All the shredded paper can be collected by taking out the top part and can be kept aside

5.PROBLEM IDENTIFICATION

From the reference papers, we find out the problem in the Shredder machine that, due to the load factor noise is generated.

Extreme vibrations are generated and in the case of continues cuting Shredded paper stuck in the shredder machine.

Problem statement

The design problem is to build a model of a paper shredder, the parts of which meet the requirements for size and performance, besides the resulting products are pieces of paper. High-security scrap paper. A seen in Figure 1 a paper shredder machine consists of three main parts: base frame; cutting system; transmission system. Cuttingsystem includes shaft, blade, washer, gear. Drive system: Motor drives the cutting system, auxiliary gear.

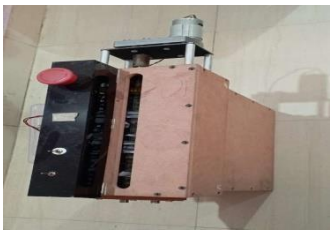
Working principle: Electric motor (1) converts into mechanical energy, transmits torque to main shaft (2), gear,

(3) on main shaft transmits torque through gear (4), shaft, (5) rotates. The two axes rotate in opposite directions. Evenly distributed blades, (6) are attached to each shaft. Alternating blades cut paper into pieces of equal size

To overcome these type of problems we are introducing the strip cut paper shredder which consists of three way operating switch having three modes on ,off and reverse mode operation this will make the shredder to

operate easy to the user in addition with we are providing 360 degrees rotating wheels to the machine stand to make the machine portable. And the main aim of this Paper is to make the machine automation and reduce the power consumption for this we was placed a trigger switch at the cutting edge of the blades this will cut off the circuit. Whenever the paper is placed for the cutting purpose then only the trigger switch will close the circuit and then motor will start working. Even though the power was supplied to the shredder machine. To avoid the paper jam in shredder machine we provide the reverse operation this will help the user to operate the machine easy in the case of continuous paper cutting.

6.DESIGN


RESULTS

In this project the paper gets shredded to very fine parts, which helps in destroying important papers. The project consists of very fine blades and small in size which makes the design very compact. The blades rotate with high precision and cuts the paper in proper distances.

CONCLUSION

In this project we conclude that there are many parameters on which the total project is dependant i.e. total knowledge about the system, design of a single blade and its arrangement of the main shaft, reduction in rotation.

The actual fabrication was started over prototype testing. There was a problem in gear alignment and the bearing plate fitting. Also we need to change our reduction gear position at the end.

There was a problem of paper jamming which was eliminated by the use of rollers. There are very less vibrations in the actual machine.

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