

Review of Design and Fabrication of Paper Shredder Machine

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ABSTRACT-In this paper, we will discuss about review design and fabrication of paper shredder machine. Paper shredder machine is a mechanical device which is used to cut the paper into Chad, typically either strips or fine particles. Paper shredder machine is used to shred the important documents which are misused by some unauthorized person. There are lots of people who spend their day through rummaging garbage to find personal information like social security number, account number, credit card application and other personal information about company to overcome these issues, paper shredders are used. It is categories as personal shredder, office shredder and industrial shredder.

Keywords:- shredding cutter, striper figure, atomization

I. INTRODUCTION

Paper shredder machine is used to shred the important documents which are misused by some unauthorized person. There are lots of people who spend their day through rummaging garbage to find personal information like social security number, account number, credit card application and other personal information about company to overcome these issues, paper shredders are used. The Paper Shredder is equipped by using all necessary items and method such as aluminium sheet metal, rivet, and skills in manufacturing machine to cut and bend the parts and etc. The process of development is started from designing the shape of the paper shredder by considering the function as well. In order to produce user friendly product that is suitable to the consumer, consideration to the ergonomic factor is taken into account. It involves the measurement process before the materials are cut into pieces before assemble together by

using cutting and bending processes. Designing and fabrication process for paper shredder is the main term in this project. The paper shredder need to test to check whether its mechanism is work or not. This project title is Design and Fabrication of Paper Shredder. The project involves small analysis of the paper shredder cutter and fabrication of the paper shredder itself with concerns regarding strength, portability, durability, ergonomic factor and convenience. By modifying design to improve its durability and features. Test need to be done to verify the strength of the paper shredder cutter before the fabrication process started. It is require more knowledge and skill of analysis. Skill how solve the problem is the most important and need to be improve when this project launched.

II. LITERATURE REVIEW

[1] Joseph Y.Ko. An automatic paper shredder is capable of sequentially cutting up to 20 sheets of 20-lb bond paper, up to 9 inches wide. The device has adjustable holders for attachment to conventional water baskets of varying shapes. A feed tray holds the stack of paper. Upon selection of either manual (ON) automatic (AUTO) operation of the machine, a single sheet of paper is fed into the machine by roller as subsequent sheets, if any. With three ways switch set to AUTO, any sheets n a tray detected by a sensor and are automatically fed into the machine for shredding. A plug in motor contained in the housing of the machine drives plurality of shafts for the feed roller and knife rollers. The knife rollers are configured to either shred to the paper into about 3/8 inch wide strips or to cross cut the paper into plurality of smaller pieces.

[2]Ming- Hui Ho A paper shredder has two rotary cutters each having multiple blades Spaced apart from each Other. Each blade has a first Cutting blade with multiple Cutting edges and a Second cutting blade with multiple cutting edges alternate With respect to the cutting edges of the first cutting blade so that when shredding the paper, only one cutting edge engages the paper.The present invention relates to a paper shredder, and more particularly to blades of a paper shredder. The paper shredder has two rotary cutters each with multiple blades. Each blade has 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 are distributed in a non-equiangular manner and each of the first cutting edges is offset to each one of the second cutting edges, so that there is only one cutting edge engages with the paper to be shredded.

[3]Gu-ming ZENG the present invention provides a blade of a paper shredder, characterized in that the serrated cutting edge and the circular blade body are integrally formed from the base material and the serrated cutting edge is formed by bending the periphery of the blade body; the serrated cutting edge has a front face bent from the periphery of the blade body, such that the Width of the cutting edge is larger than the thickness of the blade body. The blade of the present invention requires simple processing and low material consumption, and the paper scrap from the shredder can be discharged smoothly.

[4]Frank Chang worked on the blade assembly for paper shredder. Instead of having partition rings he used long and short plates casted with the blade ring. This arrangement eliminated use of partition rings, reducing cost and enhancing assembly efficiency.

[5]Kent Chen, Shanghai The present invention discloses a cutter structure of a paper shredder, Which comprises a pull rod, paper guide combs cutter arbors , and at least one cutter-blade set com posed of two cutter-blades , With said cutter-blade set being passing through the hole set on said paper guide combs, at least two lugs being set on the bore of said cutter-blade and extending toward a cutter spoke, the height of said lug along axial direction of the cutter is greater than the thickness of said cutter blades With recesses being set on cylindrical cutter arbors, the number of Which is no less than that of said lug Which can be placed into said recess, said paper guide paper guide combs being slipped on said cutter arbor .The present utility model can Omit a Cutter ring used in Conventional cutter structure, thus reducing the components in Whole cutter structure, simplifying the and increasing the radial amount of feed of the cutter-blade While Decreasing the cost.

[6]Simon Huang, Taipei City A system for controlling the rotation speed of a shredder motor is disclosed. It consists of a bridge rectifier circuit, a Forward/reverse controlling switch, a motor speed switch, and AC motor coils. By changing a switch, it is possible to activate the following four modes: forward fast, reverse fast, forwards low, and reverse slow. A user can thus operate a shredder a thigh torque and low rotation speed or high rotation speed and low torque depending on the number of sheets to be shredded.

[7]Tie-Chun Wang present a device for reducing vibration and noise of paper spreaders by means of a buffer device comprised of a rubber cylinder and a spring between core fixing frame and the housing base of the paper shredder. The buffer device is fixed by using screw and washer, enhancing the vibration and noise reduction effect for the paper shredder

[8]Mark S, Allen Paper shredders are maintained using lubrication substrates that have been treated With or that carry a lubricant. The lubrication substrate is fed through the shredding mechanism of a paper shredder. Maintenance and lubrication can be done without disassembling the paper shredder machine by passing the lubrication substrate through the shredding mechanism. The lubrication substrates can take any of a variety of forms, such as a tissue that is encased in a cellophane or plastic envelope and is impregnated with oil. The lubrication substrates can instead have an array of small tubes that carry oil. In another example, the lubrication References Cited substrates can take for them of a bubble sheet that carries oil within the bubbles.

[9] I.M.Sanjay Kumar presenting project was to design and development of paper Shredder machine focus on chopping of coconut leaves, areca leaves. This chopped powder to prepare the vermin compost. The project began with collection of information and data on user lifestyle and current process by which they perform their job. A concept was developed with reference of four different shredder machine and operating processes. Concept was developed considering the safety factor users operating environment and maintenance. Considering the users' needs and buying capacity, a prototype was fabricated. The machine consists of single-phase motor, spur gear, bearings, structural frame, cutter and dual shaft. The machine frame is built using mild steel and tungsten carbide is used for cutter tip preparation. Eight cutters are mounted on two shafts, which rotate parallel driven by a spur gear. The power from the electrical motor is transmitted to cutter shaft through a belt drive. Cut is made inside the chopping house because of the effect of tensile, friction, and impact effect in chopping process.

A. Concluding Remarks from Literature Review

From the study of above research papers following concluding remarks are drawn:

By doing atomization in present machine precious time will be saved and also it can allow multiple paper shredded at a time. By modifying the blade assembly blade related issues will be solved. By implementing the gear box in system control over the speed will achieve .By installation of rubber damper to reduce vibration in system.

III. PROBLEM DEFINATION

The existing system of conventional shredder machine is based on manual operating so it consumes more time for operation. Also the high speed damages the cutter .only one paper can be cut at a time, cause wastage of time. The jamming of cutter is doesn't support more paper introduce in system. Also the noise and extreme vibration produce in machine.

IV. OBJECTIVE OF THE PROJECT

1. To study on different elements of the shredder machine like the blades, frame, transmission system.
2. To reduce the human effort by installation of motor for Paper Shredding.
3. To design gear box for minimizing speed and to solve problem arising due to high speed during Shredding Operation.
4. To modify a machine this will produce less noise, vibrations and to reduce time consumption for Shredding Operation by modifying tool Design.
5. To solve the problem of returning of paper.
6. To construct a machine which will shred approximately 15 sheets (A4 size) at one Stroke.

V. CONSTRUCTION

Construction of machine consists of stand, bearing support plates, Motor, bearings, nuts and bolts, Cutting Blade, Pulley and Belt Design, Gear box, Jaw Type Coupling, spur gear, shaft and key. The machine frame is made of steel angle-shaped profile which is connected through welding process. The material used for the machine frame is ASTM A36 so that the welding process can use arc welding.

VI. WORKING

Paper shredder machine is a machine that converts an A4 size paper into required small strips. The working of this machine is very easy there is no need of any hard work. Just put a paper and get small strip. The machine is run with help of electric motor, pulley is attached to the motor shaft. When motor is start rotating pulley will automatically rotate therefore gear rotate because gear is connected to the pulley. The cutting blade is join on periphery of shaft, when gear rotate the shaft start rotating and hole machine is ready for action. When paper is inserted into machine due to cutting action of blade paper converted into small strip.

VII. CONCLUSION

To minimize the limitation of conventional paper shredder machine, the atomize paper shredder machine is more applicable and economically feasible. We are developing a prototype model to fulfil the requirement. So, this project will more applicable in company application. After discussing with industrial person and after discussion of literature review, it was found that the conventional machine has more limitation. To minimize the limitation of conventional machine, some modification is suggested in review paper, on the basis of the information, we are developing a prototype model of paper shredder machine. Such paper shredder machine is useful for destroying important document, tool drawing in company.

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