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Wood Cutting Attachment on Sewing Machine

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Abstract
We are making wood cutting machine in low cost. The machine is affordable for the poor craftsman. The machine is having the table attached to it. And it is having compact size. It is easily movable. and light in weight.

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I. INTRODUCTION

Wood is a renewable source of energy that is used by everyone and cutting wood is a vast problem in developing countries such as Zimbabwe where manual methods are still been mostly used. Zimbabwe has been facing electricity shortages to the extent of importing 1200 megawatts of electricity from Zambia which is almost half of its peak demand. The aim of the paper is to design an automated wood cutter for cutting wood for domestic use. The objectives were to design a wood cutter which can cut wood of diameter 100mm, to design a wood cutter with an output capacity of (850-1000) kg per hour and to come up with a 3D prototype of the wood cutter. This machine will cut wood with minimum human influence. The objectives were achieved by performing an experiment to come up with the force required to cut the 100mm diameter round-wood and the torque generated was used to design and size the components of the machine. SolidWorks 2016 was used to calculate and estimate the bearing type and life, do the deflections and stress analysis to determine the weakest point on the machine. Automation was done using the SMT Version 3.3 PLC in connection with a shoe brake to protect the machine operator making the machine safer and user friendly. The fuzzy logic controller was used to monitor moisture content of inserted wood to prevent jamming of the machine. DFMA principle was also used to optimize the machine cost without reducing the product quality.

Need and Scope

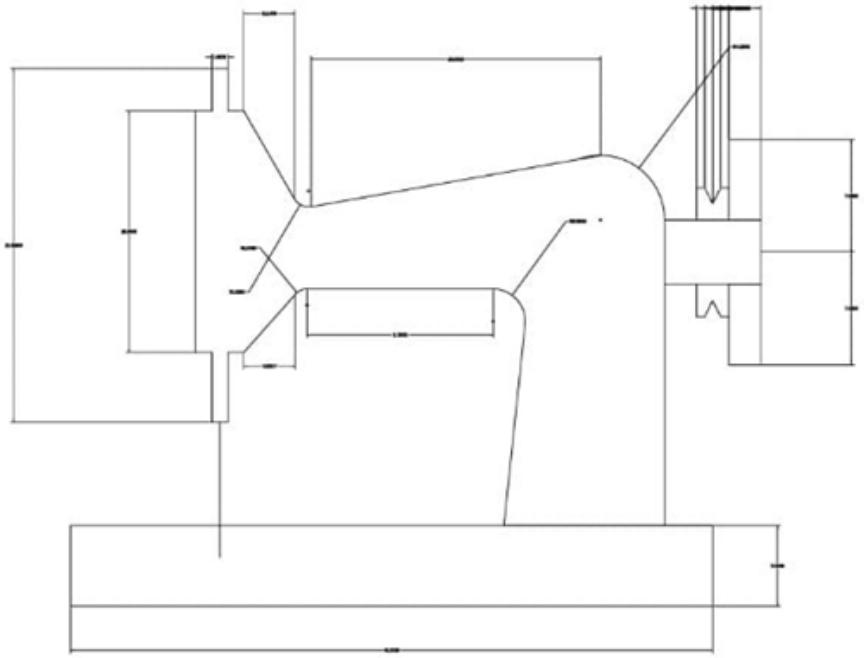
Need:

The every furniture worker can't buy the Plywood cutting machine of the best companies. That's why we are taking this task for those who can't purchase the high cost machine.The maintenance of those high cost Machine is high. And we are trying to reduce the cost of machine and maintenance also.

Scope

The Plywood cutting by hand is harder than the machining.And the efforts for cut the Plywood by handarehigh.The poor craftmens are disable for Purchase the Plywood cutting machine.That's why we taken this task.

Diagram



ADVANTAGES & DISADVANTAGES

Advantages:

Low cost.
Low efforts.
The table is provided with machine.
The machine is compact and mobile that's why we can move the machine from one place to another place easily.
The maintenance cost is low.

Disadvantages

The cutting parameters of machine is low.
The load taken by the machine is low.
The cutting rate of the machine is low.
The maintenance cost is high.

COMPARATIVE ANALYSIS

Machine made by sewing machine	Machine's of other companies
Overall low cost than the machines of other companies.	Costlier than that of machine made by sewing machine.
The machine is compact and easily movable.	The machine is not easily movable.
The space required for this type of machine is low.	The space required for this type of machine is high
The maintenance cost of this machine is low	The maintenance cost of this machine is high

PROBLEM DEFINATION

Wood is a renewable source of energy that is used by everyone and cutting wood is a vast problem in developing countries where manual methods are still been mostly used. The aim of the project is to design an automated wood cutter for cutting wood for domestic use. This machine will cut wood with minimum human influence. The objectives were achieved by performing an experiment to come up with the force required to cut the 100mm diameter round-wood and the torque generated was used to design and size the components of the machine.

A wood cutter is basically known as a machine which cuts wood into pieces of desired sizes depending on the design of the machine for example a band saw which is used to cut logs across into the desired shape. In our country about six million tonnes of wood fuel are used per year for domestic, agricultural and industrial use

due to the power cuts which were being experienced by the country.The wood processing industry focuses mainly on the exotic plantation forestry which is largely based on pines and eucalyptus and the industry is mostly vertically integrated in timber production ,processing ,packaging and marketing.

So our team is engaged in making plywood cutting machine which is more useful. We are making this because past plywood machine are of high cost and need more electricity. But by using plywood cutter one can cut plywood in minimum time and energy.

DESIGN AND FABRICATION

Design and Fabrication of Semi Automatic Eccentric Hacksaw

Mr.Rajive V1 , Dinesh Kumar G2 , Haridoss T3 , Jayakumar R4 , Rubash S5 1 Assistant Professor, Department of Mechanical Engg, Apollo Engineering College 2,3,4,5 Students, Department of Mechanical Engg, Apollo Engineering College Abstract- The hacksaw is a wood cutting machine tool designed to cut wood by applying pneumatic pressure.The machine is exclusively intended for mass production and they represent fasten and more efficient way to cut a wood. Hacksaws are used to cut thin and soft wood. The operation of the unit is simplified to a few simple operations involving a eccentric movement provided by the ac motor. There are numerous types of cutting machines in Engineering field, which are used to fulfill the requirements. In our project metal Feeding mechanism is also attached to this pneumatic hack saw machine so that the machine to be designed to feed the metal.The machine is exclusively intended for mass production and they represent fasten and more efficient way to feed a metal.There are numerous types of cutting machines in Engineering field, which are used to fulfill the requirements. IR sensor unit is used to determine the metal length dimension to be cut. We are interested to introduce eccentric motion for cutting process.

DESIGN AND DRAWING

3.1 Motor Specifications Voltage - 230 V Frequency - 50 HZ Current - 2.5 AMPS Power - ¼ HP Watt - 180W Speed - 1440rpm Phase - 1ph © April 2018 | IJIRT | Volume 4 Issue 11 | ISSN: 2349-6002 IJIRT 146074 INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH IN TECHNOLOGY 1049

3.2 Motor Calculation Electrical power equation: Power P=I*V Where, I=25amps V=230v P=I*V Power P= 5750 Watts To find torque of motor: $P=2\pi NT/60$ $T=5750*60/2\pi*1440$ T=38.15 N-m

3.3 Specifications of Components Used FRAME L-405mm B-405mm H-480mm SQUARE TUBE Thickness-25mm SHAFT Length-180mm Diameter-15mm ROLLER BEARING ID-9.5mm OD-40mm CRANK DISC D-120mm T-3mm LENGTH OF BELT 300mm THICKNESS OF BELT 5mm DIAMETER OF SMALL PULLEY 30mm DIAMETER OF LARGE PULLEY 270mm TYPE OF BELT V-BELT

3.4 Time Calculation Time required for cutting wooden job of 50mm base and 25mm thickness manually = 30.2sec.

WORKING PRINCIPLE

In the conceptual model of "DESIGN AND FABRICATION OF POWER HACKSAW AND SHAPER USING CAM MECHANISM" we are giving supply to the main shaft as we can see that the cam mechanism is directly fabricated to the main shaft and have same angular velocity . When the A.C Motor is started the rotational power is transmitted through the belt drive with the help of pulley to the main shaft.The nob which is present in the scotch plate pushes the yoke to transfer the rotational motion into linear motion for shaping and sawing operation at the same instance.In this project our goal is to cut the wood piece by semi automation method. So we provide a base to withstand the weight of the machine. Then eccentric setup is used to provide the up ad down movement for cutting. Here the ac motor is the source for rotating movement. This rotating movement is transmitted to the disc by the help of belt and pulley setup. Then it will activate the eccentric set up for the up and down movement to cut the wood.

CONSTITUTES

Advantages

• High torque output is achieved. • Fewer moving parts. • Smoother operation. • Simple in construction. • Maintenance is easy. • Reduced friction. • Easy to operate. • Reduces time and high production rate. • Components used for fabrication are easily available.

Disadvantages

• Uneven forces act on the work piece. • Only small components can be machined. • Loading and unloading of work piece done manually.

Applications

These type of Power Hacksaw and Shaper have wide range of applications in the fields like, • It can be used in small, medium as well as large scale industries.Highly suitable for production industries and workshops. • It can

perform variable operation in a single time. • Operations such as grinding, shaping, cutting can be done with a single drive.

II. CONCLUSION

This project work has provided us an excellent opportunity and experience, to use our limited knowledge. We gained a lot of practical knowledge regarding, planning, purchasing, assembling and machining while doing this project work. We feel that the project work is a good solution to bridge the gates between institution and industries. We are proud that we have completed the work with the limited time successfully. The "DESIGN AND FABRICATION SEMI AUTOMATIC OF ECCENTRIC HACKSAW" is working with satisfactory conditions. We are able to understand the difficulties in maintaining the tolerances and also quality. We have done to our ability and skill making maximum use of available facilities. In conclusion remarks of our project work, let us add a few more lines about our impression project work. Thus we have developed an "DESIGN AND FABRICATION SEMI AUTOMATIC OF ECCENTRIC HACKSAW" which helps to know how to achieve low cost automation. The operating procedure of this system is very simple, so any person can operate. By using more techniques, they can be modified and developed according to the applications.

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