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Design and Fabrication of Pneumatic Hacksaw

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Abstract: *In mass production industries and workshops, there is frequent need of cutting objects in a very quick manner so as to meet fast processing tasks. This study aims to create a proto-type pneumatic powered hacksaw that utilizes pneumatics components to provide motion to blade, solenoid valves, an air compressor as a source of power and a programmable logic controller (PLC). This helps in reducing the overall cost of the hacksaw right from designing to manufacturing since expensive electronic circuits are not used. When compared to motorized hacksaw this pneumatic hacksaw with simultaneous and sequential pneumatic circuits is capable of performing the same task automatically with assistance of even an unskilled labour which in turn reduces the running cost of the machine.*

Keywords: Pneumatic cylinder, air compressor, pneumatic hacksaw, reciprocating motion, micro controller

I. INTRODUCTION

Pneumatic hacksaw is a metal cutting machine which uses pneumatic power to cut metals. This machine involves the use of piston cylinder arrangement and a system to provide compressed air for its working. The machine is aimed at achieving mass production along with better and efficient way of handling work piece. It is used for cutting both hard and soft metal. Pneumatic hacksaw can be either gravity fed use hydraulic arrangement for feeding purpose. The solenoid controlled pneumatic cylinder provides a way of controlling the machine by pneumatic cylinder, thus enabling automation to cutting operation.

II. TECHNICAL SPECIFICATIONS

The following table illustrates the technical specifications of pneumatic hacksaw machine.

Table 2.1: Technical Specifications Pneumatic Hacksaw Machine

Sr. No.	Attributes	Specifications
1	Power	1.5 HP
2	Throttle	Roll (Model No. 5 1212 0010 N) Lever (Model No. 5 1212 0050) Lever (Model No. 5 1212 0050A*)
3	Motor Specifications	Air consumption: 51 CFM Air pressure: 90 PSI
4	Strokes per Minute	100-350
5	Blade Strokes	2-3/8"

III. LITERATURE REVIEW

Lambate A.S, Waykar G. B, Shinde S.R &Darekar S.V. The aim of this work is to automate the conventional power hacksaw machine in order to achieve high productivity of work-pieces than the power hacksaw machine using pneumatic power. Pneumatic is a huge topic of engineering dealing with the mechanical properties of air. In our project we take this pneumatic and a hacksaw for cutting purpose, The pneumatic high-speed hacksaw machine has an advantage of working in high air pressure , the hacksaw used in this is reciprocate such that required shape can be cut

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according to the requirement. The hacksaw is the metal cutting machine tool designed to cut metal by applying air pressure. Hacksaws are used to cut thin and soft metals the operation of the unit is simplified to a few simple operations involving a cylinder bore and piston arrangement. There are numerous systems in hacksaw machine

Ashutoshkumar Yadav, Abhishek Tyagi, Ankur Jaiswal, Sandeep Kumar Singh, The project carried out by them made an impressing task in the field of small scale industries and maintenance shops to make them automated. It is very useful for the workers to carry cutting operations with less fatigue and time. Their project was designed to reduce the time and cutting power of the machine. It is very helpful at the place where operating condition and working environment are not so good having high temperature or smoky area where unwanted and toxic gas may be present and life risk can be reduced. Hence, Pneumatic powered hacksaws can be very useful in modern world of automated industries.

R.R. Karthi, B. Tamilarasu, P. Gokul, S. Gokul Raja, S. Navaneethan, Allan Franklin.B. It is realized that traditional power hacksaw machine can be supplanted with robotized control Hacksaw machine. Robotized control hacksaw machine gives high efficiency in brief day and age in examination with the traditional power hacksaw machines. The significant favorable position of this machine is mediation of work is diminished to most extreme level. In this fast developing modern area the utilization of energy Hacksaw machine is wide, time and work assumes a noteworthy part underway process. This can be overwhelmed by utilizing this sort of computerized machines.

Rutuja Phapale, Rajkumar Pawar, Hrishikesh Pai , Niraj Parekh, Ravindra Kurane MCT's Rajiv Gandhi Institute of Technology, Mumbai, Maharashtra, India.The design and manufacturing of automatic bar feeding and clamping mechanism will be very useful for small scale industries, workshops, etc. They have used components for automation of this mechanism such as Pneumatic clamp, Arduino, PMDC motor, Limit switch, etc. The main aim of this machine is to reduce the human effort, time required for cutting, increase accuracy and neglect the time for measuring the workpiece. Their aim is achieved by bringing the automation in the power hack saw machine. There are some machines which has been already designed, but we have introduced some new components and we also have different design which increases the efficiency of the process.

Roshan Raman, Mohit Gupta, Krishan Dagar, Abhishek Kaushik, Department of Mechanical Engineering The North-Cap University, Sector 23A, Gurugram-122017, India

It was found that the machine can cut MS sheet up to 1.2 mm thickness.

- The length of the sheet metal that is to be cut ranges from 55 mm to 330mm.
- The maximum width of the sheet is 180mm
- This automatic sheet metal cutting machine is very useful in small scale industrial applications.
- The following conclusions were made regarding the sheet metal cutting machine
- It is simple in construction.
- It is easy to maintain and repair.

Overall, continuous operation is possible without stoppage.

IV. LITERATURE GAP

There is a trending research gap in Pneumatic Hacksaw performance predicting algorithm It enables us to develop an optimal design of heat exchanger that provides maximum possible heat transfer. Thus, by considering above suggestions, it is possible to develop an optimal design.

V. CONCLUSION

The project carried out by us made an impressing task in the field of small scale industries and maintenance shops to make them automated. It is very useful for the workers to carry cutting operations with less fatigue and time. Our project is designed to reduce the time and cutting power of the machine. It is very helpful at the place where operating conditions and working environment are not so good having high temperature or smoky area where unwanted and toxic gas maybe present and life risk can be reduced. Hence, Pneumatic powered hacksaw can be very useful in modern world of automated industries.

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