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Design and Development of Automatic Bar Feeding Mechanism

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***Abstract*: During the last few decades various automation and rationalization technique has been introduced in the field of manufacturing in order to enhance the overall industrial productivity. For this we have to develop / modify existing system, also new attachment and jigs and fixtures are required. In this modern world, machines play a crucial role in different industries and they have replaced the need for labor work. With the tremendous development in technology dependence on manual work is decreased significantly. Some of the leading manufacturers of material handling equipment, industrial machinery from India is recognized for their high quality products. In this machinery cutting machinery also plays the important roles and the modernization and new technologies are required in this field. The hacksaw is the major cutting machinery used in the industry. In this project we have taken Hacksaw machine and for this machine we are going to develop bar feeding mechanism for better productivity and smooth flow of work.**

***Keywords*: Automatic Bar, Design & Development, Feeding of Mechanism.**

1. Introduction

The sewing machine is a machine tool designed to cut material to a desired length or contour. It functions by drawing a blade containing cutting teeth through the workpiece. The sewing machine is faster and easier than hand sewing and is used principally to produce an accurate square or mitered cut on the workpiece. The power hacksaw and the band saw are two common types of sawing machines used to cut metal in the machine shop. The power hacksaw uses a reciprocating (back and forth) cutting action similar to the one used in a hand hacksaw. The power hacksaw is used for square or angle cutting of stock. The band saw uses a continuous band blade. A drive wheel and an idler wheel support and drive the blade. All the conventional power hacksaw machines contain main four components are Base, Frame, Vise and Speed change mechanism etc. in this machine the processes like frame reciprocation, lifting up of frame after cutting stroke etc. is involved.

2. Objective

1. Improve and optimize the present procedure.
2. To improve accuracy.
3. Minimize the time required by using Mechatronics Technology.

The objectives of the project are to design a system for an automatic wire cutting machine which is:

- Automation
- Efficient
- User-friendly
- Transportable
- Cost-effective
- Reduce strenuous and repetitive task
- Functional requirement of proposed system
- Respond as per user's input
- Display user's input

3. Literature Survey

1) Present theories and Practices

Design Theoretical Analysis of Multi-Way Power Hacksaw Machine:

Author :- Prof. Kshirsagar Prashant , Rathod Nayan , Rahate Prashant , Halaye Prashant ,Surve Sachin.[1]

In this literature author has given information about, the There are many industrial applications where round bar or square bars are required to be operated on different machines to make machine components such as Shafts, Bolts, Screws etc. This needs more and more number of pieces to be cut for mass production of those components. To achieve this goal the Multi-way power hacksaw machine is developed. This paper proposes the model of multi-way hacksaw machine which is able to cut four pieces simultaneously without any jerk and minimum vibrations. The model implies conversion of rotary motion into the reciprocating motion for proper working of hacksaw. This model overcomes the limitations of conventional hacksaw machines which can cut single piece at a time. It is able to cut metal bars of different materials at same time and will be helpful in many industries due its compatibility, reliability and efficiency. In present condition many electrically operated power hacksaw machines of different companies with different specifications are available for the use in shop floor. These machines are so precise that they can cut metal bars with minimum time made up of different materials but they have one

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and major disadvantage that those are able to cut single piece of bar at a time. For industries to achieve the mass production, it is necessary to cut metal bars with high rate. So it is impossible to depend upon conventional single frame power hacksaw machines and need the improvement in technology and design of such machines. With the help of this multi-way power hacksaw machine the four metal bars can be cut simultaneously to get high-speed cutting rate and to achieve mass production for maximum profit in related companies. As this machine overcomes all the limitations and drawbacks of conventional hacksaw machines, it is also helpful for small scale industries due to its simple working and operating conditions along with its compatibility, efficiency and affordable price. Current scenario of industry focuses on the high production rate with less consumption of resources. To achieve this, we need to minimize idle time and machine time per unit. The multi-way power hacksaw improves those factors by reducing time per unit to increase the production.

2) Material Selection and Testing of Hacksaw Blade Based on Mechanical Properties:

Author: - Prof. Nitinchandra R. Patel, Mohammed A. Vasanwala, Balkrushna B. Jani, Miteshkumar D. Rathwa.[2]

3) Design And Fabrication of Automated Hacksaw Machine

Author D.V.Sabarianananda, V.Siddhartha, B.Sushil Krishnana, T.Mohanraj UG Student [Mechatronics], Dept. of Mechatronics Engineering, Kongu Engineering College, Erode, Tamilnadu, India[3]

4) Mechanical Assembly

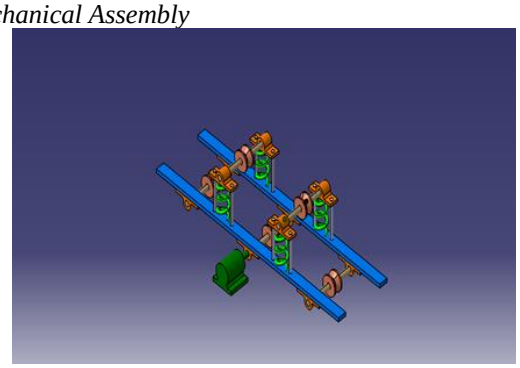

Fig. 1. Mechanical Assembly

In the proposed mechanism we have arranged the roller V – grooved pulleys in such a way that the shaft will sandwich in between these two rollers and the Because of spring action the bar take forward motion on the guide roller due to rotary motion received from PMDC motor. The guide rail bars are provided to slide the sliding bearing assembly up and down as per length of the shaft.

4. Results and Discussions

1) Accuracy of machines

- The automatic bar cutting machine cuts required length of bar in required number of pieces.
- The accuracy of the machine is checked for various lengths of bar and pipes.

5. Conclusion

"Automatic bar feeding mechanism" provides better accuracy and exact cutting of bar than the present cutting system in the market. Thus, due to this the efficiency of production is increased. This system gives exact number of pieces with the required length of the bar. The circuit complexity is reduced in this system. As the complexity in the circuit is reduced, it is easy to understand. This automation can surely reduce the loss thereby increasing the productivity by investing small capital less equipment's. As per Indian content is concern this machine can be very beneficial for virtually all type of power hacksaw machines as it has very low capital investment. This machine may form a simple solution for feeding of bar in the future. This automation also can be controlled by computer programs.

Table 1
Revolutions of Pulley

SNo.	Test specimen	Length	Revolutions of Pulley	Time taken
1	Hollow bar	1 feet	2.5 revl	5.80 sec.
2	Hollow bar	2 feet	5 revl	11.22 sec.
3	Hollow bar	3 feet	7.5 revl	16 .25sec.
4	Hollow bar	4 feet	10 revl	21 .75 sec.
5	Hollow bar	5 feet	12.5 revl	27.12 sec.

6. Advantages

1. Simple in construction than mechanical hacksaw
2. It is a compact one.
3. Less Maintenance.
4. Fast production.

7. Disadvantages

Additional cost is required to do the automation.

8. Applications

1. Small and Medium scale industries Application.
2. Metal Cutting Industries and Work Shops.

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