

AUTOMATED DOUBLE WAY HACKSAW

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Abstract— This project is the design and construction of an automatic power hacksaw machine for cutting of metal to different size and length with the help of hacksaw. The objective of this project is to save man power and time in cutting metals in order to achieve high productivity. Automation plays a dominant role in the world economy these days and in daily application in industries. In automatic hacksaw machine the scotch yoke mechanism is used in two pair and we arrange it with hacksaw. This hacksaw machine has two hacksaw blades which is cut two work pieces with in one time and in accurate number of cycles. So, it will helpful to increase productivity, it save time to stop it and run it again, also less human effort required.

Keywords: Hacksaw machine, scotch yoke mechanism.

1. INTRODUCTION

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 and major disadvantage that those are able to cut two 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 two-way power hacksaw machine the two 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. This project is about cutting the wood, metal, pipe, angle, channel, flat plates, rods and such other things.

2. PROBLEM IDENTIFICATION

Present 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 two way hacksaw blade machine improves those factors by reducing time per unit to increase the production.

In present situation electrical as well as hydraulic operated machines are used but the output

from them is not satisfactory as it has low cutting rate.

3. DESCRIPTION OF COMPONENTS

3.1 Frame Base

We take 75cm x 30cm square steel frame base. We take 75 cm in base length because; we want to give stability our prototype model of four way hacksaw machine not get lot of vibration the machine in running condition.

3.2 DC Motor

The motor we have used is a wiper DC motor of 60 rpm. A machine that converts DC Electrical power into mechanical power is known as a D.C. motor. This operation is based on the principle that when a current carrying conductor is placed in a magnetic field, the conductor experiences a mechanical force. The direction of this force is given by Fleming's left hand rule and magnitude is given by; $F = BI$. There is no constructional difference between a D.C. motor and a D.C. generator. The same D.C. machine can be run as a generator or motor.



Fig 3.1: DC motor

3.3 Hollow Disc

We use the acrylics transparent disc in circular shape (radius of 7.5 cm). On this disc all the bearing is happen. It helps to convert the rotary motion to linear movement.

3.4 Hacksaw Blade

Hacksaw blade is made of Bi-metallic. In hacksaw like most frame saws, the blade can be mounted with the teeth facing toward or away from the handle, resulting in cutting. Action on either the push or pull stroke. In normal use, cutting vertically downwards with work held in a bench vice, hacksaw blade should be set to be facing forwards. Some frame saws, including fret saws and piercing saws, have their blades set to be facing the handle because they are used to cut by being pulled down against a horizontal surface, by the help of scotch yoke mechanism. The hacksaw blade is connected to the link bar by the help of linear bushing.



Fig 3.2: Hacksaw Blade

3.5 Connecting Rods

A hole on at the end of this rod is made for joints and link connections. we have used two of these shaft for two side hack saw. Together with the crank, it forms a simple mechanism that converts reciprocating motion into rotating motion. A connecting rod may also convert rotating motion into reciprocating motion.



Fig 3.3: Connecting rod

4. DESIGN OF DOUBLE WAY HACKSAW



Fig. 4.1: Double way Hacksaw

5. WORKING PRINCIPLE

A hacksaw machine is work on principle of SCOTCH YOKE MECHANISM in this rotary motion of shaft is to be convert into the reciprocating motion of hacksaw frame. Working principle of hacksaw machine is very simple. First of all the hacksaw machine is put on ground and after that whatever metal, wood, pvc, is cut is fixed on vice at required length, After that the electric motor is connect with electricity. Now start the electric motor due to that the shaft of motor and hollow disc will be rotate and also rotate the eccentric Centre and link connect to it. Due to rotation of links the hacksaw frame will be reciprocate on the metal and cutting of metal is done.

6. APPLICATIONS

1. Hacksaw is most commonly used for cutting hard materials. They are used extensively in forestry, construction and demolition.
2. Some hacksaws are used as instruments to make music.
3. Chainsaw carving is a flourishing modern art form. Special saws have been developed for this purpose.
4. In engineering industry.
5. In Workshop.

7. ADVANTAGES

1. Weight of the machine is less.
2. It reduces the work of labor.
3. Easy to make because of simple construction.
4. High production rate.
5. Cost is less.
6. Easy maintenance and maintenance cost is less.
7. It withstand all atmospheric effects.

8. CONCLUSION

To overcome problems in conventional hacksaw machines, due to high efficiency, easy to operate and affordable price the proposed model of two-way power hacksaw machine is helpful and completes all the expectations needed in the mini industries. It can withstand the vibrations, no hazards from jerk, no special training required to operate it. Other hacksaw machines can cut one part at a time but this machine can cut two parts at a time. This hacksaw machine has lighter weight compare to other machine. The cost of machine is less and easy to operate and affordable for all industries.

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