RESEARCH ON DESIGN AND ANALYSIS OF FOURWAY HACKSAW MACHINE

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ABSTRACT

It is required to machine the round or square rod on different machine components like shaft ,bolts and screws etc. for a mass production there is need to cut the row material into number of pieces and this is conventionally perform on a power hack saw or simple hack saw machine which consume more time . To achieve this process within a less time the four way hack saw is developed. This project proposes the model of four way hack saw machine which is able to cut four pieces simultaneously with a very less time consumption. The model using dc motor for its operation ,Conversion of rotary motion of dc motor into reciprocating motion is obtained by using eccentric cam . This model can perform a cutting operation on four different components of different materials simultaneously. It becomes very useful in industry due to its efficiency, reliability and compatibility.

Keyword : - *construction , four way hack saw , safety* **,** *design*

1. INTRODUCTION

There are many electrically operated power hack saw machine of different configuration and different manufactures are available for the use in machine shop. These machine can cut rods of different material precisely at very fast rate but they can cut rods of one material at a time which means they can't able to cut dissimilar material at a same time.
Now in industry, it is necessary to cut metal bars with very high rate to achieve mass production requirement. So there is need to move for a new technology which gives us a mass production with less time and less energy input . It is impossible to depend upon conventional hack saw machine .
By using this four way hack saw machine the four metal bar, pipes or rods can be cut the simultaneously to achieve high speed cutting rate and mass production for maximum benefits in manufacturing industries. This machine overcomes the drawbacks and limitation of single frame hack saw machine. It can be used in a small workshops and industries as it is available in very low price and its smaller size and high efficiency.

2. PROCESS

Manufacturing process are the steps through with row material are transformed into a final product. The manufacturing process begins with the creation of the materials from which the design is made. These materials are then modified through manufacturing processes to become the required part. Manufacturing processes can include treating (such as heat treating or coating),machining or reshaping the material. The manufacturing process also includes the tests and checks for quality assurance during or after the manufacturing and planning the production process prior to manufacturing.

2.1 OPERATION

Project model :

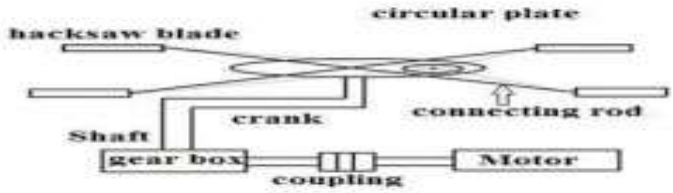
2.2 COMPONENTS

The components that are used in the projects four way hack saw are as follow

- DC motor
- Battery
- Bearing with bearing cap
- Cam mechanism
- Frame
- Machine vice
- Shaft

3. WORKING PRINCIPLE

The experimental setup of our project consist of a frame on which the hacksaw blades are mounted. The hacksaw blades are mounted on four sides of the frame. The circular cam plate is mounted in the center of frame which is operated by a motor. The power to dc motor is given with the help of battery. Connecting rod are used to connect the cam wheel and the hacksaw blades. The cam mechanism is used to convert the rotary motion into reciprocating motion. Hence, when the motor is switched on the power from the motor is delivered to the cam wheel. The cam wheel rotates such that the hacksaw blade reciprocates. The work piece are mounted on the machine vise firmly and the entire system is switched on. Thus the four work piece cut simultaneously using the motor and cam mechanism. The main objective of our is to fabricate a motorized high speed four way hacksaw machine. The objective of this work is to automate and to modify the conventional power hacksaw machine in order to achieve high productivity of work piece than the power hacksaw machine using cam mechanism. The operator need not measure the length of the work piece that is to be cut and to load and unload the work piece from the vise each time after a piece has been cut. This machine is built with the four hacksaw machine such that tall the machines are operated simultaneously with the help of a motor and a cam mechanism. The cam mechanism converts the rotary motion into a reciprocating motion. This concepts is used to converts the rotary motion of the motor to the reciprocating motion of the hacksaw blades. All the four hacksaw blades are connected with the cam mechanism in such a way that when motor is switched on, all the blades receive power and cut the materials according to the requirement.



3.1 ADVANTAGES

- Simple in construction.
- Easy to fabricate.
- Increased productivity.
- The time for cutting operation is less.
- Multiple work piece can be cut simultaneously.
- The component used for fabrication are easily available.
- Repairing and replacing is not a difficult task.

3.2 DISADVANTAGES

- More numbers of moving parts.
- Must be handled with care.
- The loading and unloading of the work piece must be done manually.

3.3APPLICATION

These types of hacksaw machines have wide range of applications in the field like,

- In all industries.
- Small scale industries.
- All manufacturing plants.
- Highly suitable for production industries and workshop.

4. CONCLUSIONS

While observing the time consumed in cutting the variant specimen material I.e. wood , mild steel rod and pvc pipes of hacksaw blades of 18 TPI and 24 TPI in different hacksaw among the four hacksaw , it can be clearly observed that the cutting time per unit would be decreased when the cutting operation is performed. The significant time taken to cut wooden block ranges from 0.55 min to 8.39 min , while time taken to cut mild steel rods range from 16.20 min to 23.27 min and that for pvc pipes , the time range from 1.15 min to 6.07 min with respect to the discrete dimensions of the material. If all the specimen material of the specific dimension each is being cut simultaneously then prolong one would be only mild steel rod. Thus the productivity increase and the product obtain would be incremental as compared to the conventional machine.

5. REFERENCES

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