FABRICATION OF FOUR SIDES POWER HACKSAW BY USING SCOTCH YOKE MECHANISM

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ABSRTACT

In this project we are used scotch yoke mechanism. Scotch yoke mechanism also called as slotted link mechanism. This mechanism using the principle is that the rotary motion of motor is convert in to linear motion by using the connecting rods and links. We are using this mechanism to operate the four hacksaws by the four sides with side by side. The main use of this project to cut different metal bar work pieces with high rate of accuracy to maximum utilization of ideal time. This project is able to cut the wood, flat plates, metal pipes, and other thin materials. This project of four side hacksaw machine is used for cut the metals with four sides in a single time or simultaneously. So the work efficiency of labour is high and productivity improves than the conventional hacksaw machine   with low cost. The fabrication cost of four sides of   power hacksaw machine is less.

Keywords:- Scotch yoke mechanism, Four side hacksaw.

1. INTRODUCTION:-

In present many electrically operated hacksaw machines are available in out side with different specifications and manufactured by the different industries or different companies for different operations. This hacksaw machines are can be cut only one type of materials at every time. So the production time is increasing while the delay or idle time also increases so interval between every operation time is high then the working of labour time is also increasing then the supply of products by using conventional hacksaw machine is very less.

So we introduce the 4 side hacksaw machine with using the scotch yoke mechanism. This machine consists of 4 bench vices. In this type of machine the above disadvantages are overcome with some advantages like production is high with less time.

2. MAINPARTS:-

1. Basic frame (mild steel)
2. Electric motor (single phase,1 hp motor)
3. Gear box
4. Disc (circular)
5. Connecting rods
6. Hacksaws (frames ,blades)
7. Bench vices

3. CONSTRUCTION AND WORKING:-

Fig: FOUR SIDE HACKSAW MACHINE

Motor is input purpose of operation the smaller pulley is attached to the end of motor shaft. This pulley is connected to the lager pulley of gear box by using bell drive. The larger pulley is connected to the worm gear shaft. When this worm gear shaft is rotates 1 complete revolution then worm wheel or helical gear of 1 teeth is rotates then the input power of the worm gear is transferred to the worm wheel then the speed of the worm gear is reduced to the worm wheel the circular disc is attached to worm wheel output shaft this circular disc consist of a link. The all hacksaws are attached to this link by the connecting rods when the disc plate rotates the all hacksaws are operated by the using scotch yoke mechanism.

SPECIFICATIONS OF PARTS:-

1. **Frame Specifications:-**

   - Basic frame (mild steel 2mm).
   - Frame width, lenth (28 Inches).
   - Vertical column hight (30 Inches).

2. **Motor Specifications:-**

   - Motor (1 HP, 1425rpm).
   - Voltage : 220-230V.

3. **Gear Box:-**

   - TYPE:-2.25NU(30:1 Ratio)

4. ADVANTAGES:-

1. Construction of the 4 side hacksaw machine is easy.

2. Less weight.

3. Able to cut 4 pieces simultaneously.

4. The usage of hacksaw machine is more also reduce the labour requirement.

5. It requires less time then conventional hacksaw machine.

6. Productivity is high with less time.

7. The fabrication cost of this machine is less.

8. Maintenance cost is less.

5. DISADVANTAGES:-

1. More power is required at starting time.

2. It is applicable for limited materials.

3. The work pieces are handled by manually.

6. APPLICATIONS:-

1. In engineering industries.

2. In construction industries.

3. In fabrication companies.

4. In welding shops for cutting the materials.

7. CONCLUSION:-

We concluded that the difficulties are overcome in the conventional hacksaw machines by the introducing of 4 side power hacksaw so the work efficiency of group of labour increases after fabrication this project we are learn about the working of this machine mechanism , design and construction. And how to reduce the speed by using the gear box.
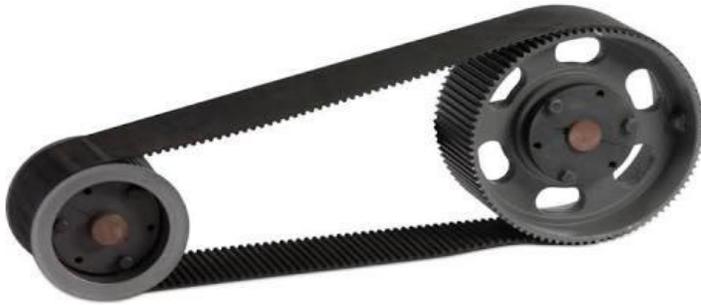
Automatic 4 side hacksaw machines gives high productivity is in short time period compare with the conventional hacksaw machine.

The major advantage is reduce labour requirement.

8. RPM CALCULATIONS:-

8.1 BELT DRIVE:-

D1=Smaller pulley dia (motor) =5 inches

D2=Larger pulley dia (gear box) =8 inches

N1=Speed of the smaller pulley =1425 rpm

N2= Speed of the larger pulley = ?

d= centre distance between the 2 pulleys =12.5 inches

Velocity ratio = N2/N1 =D1/D2

      N2/1425=5/8

      N2 = 890.6 rpm

8.2 Length Of Belt :-

$L = \pi(r1 + r2) + \frac{(r1-r2)^2}{d} + 2d$

  $= \pi(2.5 + 4) + \frac{(2.5-4)^2}{12.5} + 2 * 12.5$

  $= 45.6$ inches.

8.3 Gear Drive Calculations:-

Gear box ratio =30 : 1

Output rpm of motor = 890.6 rpm

Output of gear box = 890.6/30

     =29.6 rpm

9. REFERENCES:-

1. http://www.ssiproject.com = mechanical/production projects.
2. Prof. kshirsagar prashant R en all, "theoretical analysis of multi-way power hacksaw machine", international journal of research in advent technology, vol.3, no.4, April 2015 E-ISSN:2321-9637.
3. http:/en.wikipedia.org/wiki/hacksaw.
4. Rathod Nayan J, Halaye prashant, "Theoretical Analysis of multipurpose hacksaw machine", IJRAT, Volume-3, April-(2015).
5. T. Mohan raj, V.siddhartha, "Design and fabrication of Automated Hacksaw machine", Volume-3, Issue-2, April-(2014).