Design and Development of Fourway Hack-saw Machine

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Abstract- *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 We want to Manufacture Four Way Hack-saw Machine Specially For Cutting Operation. For That We Have Manufacture Hacksaw Machine Which Is Used For Cutting Four Job At Simultaneously. So We Can Save Manpower And Time Also Reduce. Productivity Can Highly Increase Because It Can Cut 4 Jobs At Same Time. By Developing Such A Hacksaw Machine, We Can Save Labor Time And Increase Production Rate And Since It Is Automatic, We Can Use It In Industry Very Easily Where Availability Of Labor Is Very Less*

I. INTRODUCTION

WHAT IS HACKSAW? -A hacksaw is a fine-toothed saw, originally and principally for cutting metal. They can also cut various other materials, such as plastic and wood; for example, plumbers and electricians often cut plastic pipe and plastic conduit with them. There are hand saw versions and powered versions (power hacksaws). Most hacksaws are hand saws with a C-shaped frame that holds a blade under tension. Such hacksaws have a handle, usually a pistol grip, with pins for attaching a narrow disposable blade. The frames may also be adjustable to accommodate blades of different sizes.[1] A screw or other mechanism is used to put the thin blade under tension. Panel hacksaws forgo the frame and instead have a sheet metal body; they can cut into a sheet metal panel further than a frame would allow.

History -While saws for cutting metal had been in used for many years, significant improvements in longevity and efficiency were made in the 1880s by George N. Clemson, a founder of Clemson Bros., Inc of Middletown, New York, USA,. Clemson conducted tests which involved changing the dimensions, shapes of teeth, styles of set, and variable heat treatments of blades. Clemson claimed enormous improvements to the cutting ability of blades and built a major industrial operation manufacturing hacksaw blades sold under the trade name Star Hack Saw.[2] In 1898, Clemson was granted US Patent 601947, which details various improvements in the hacksaw.[3]

This is an era of automation where it is broadly defined as replacement of manual effort by mechanical power in all degrees of automation. The operation remains an essential part of the system although with changing demands on physical input as the degree of mechanization is increased.

Motor operated hacksaw consists of hacksaw frame, transformer, Control Unit, wiper motor, shafts and bench vice. It follows the principle of scotch yoke mechanism.

In present condition many electrically operated power hacksaw machines of different companies with different specificationsare 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 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. We have pleasure in

introducing our new project "AUTOMATIC OPERATED FOUR WAY HACKSAW", which is fully equipped by sensors circuit and wiper motor. It is a genuine project which is fully equipped and designed for Machines. The FOUR WAY HACKSAW system is a fully automation project.

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DIFFERENT TYPE OF HACKSAWS:-

1. POWER HACKSAW
2. Pedal based power hacksaw
3.Hydraulic hack saw.
4.Manual hand hack saw.

II. PROBLEM STATEMENT

In industries to cut different metal/ plastic bar pieces with high rate and accuracy to minimize an idle time. Present method and problems associated, 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 and consumes high power.

Design and develop a prototype model of showing the concept of four way hacksaw machine which will show the working of application of operating the four hacksaw blades at the same time using cam mechanism.

Also fabricate the model of the same which will show the working desired by Automatic four way hacksaw machine

PROJECT IDEATION -Current scenario of industry focuses on the high production rate withless 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.

III. OBJECTIVE

1. To Design and develop a prototype model of showing the concept of automatic four way hacksaw machine which will show the working of application of operating the four hacksaw blades at the same time using cam mechanism.
2. To fabricate the model of the same which will show the working desired by automatic four way hacksaw machine.
3. The main objective of this project is to reduce the human effort for machining various materials.
4. Also to save man power requirement and time in cutting materials in order to achieve high productivity.
5. To test the model under different conditions.

III. METHODOLOGY

The experimental setup of our project consists of a frame on which the hacksaw blades are mounted. The hacksaw blades are mounted on the four sides of the frame. The circular cam plate is mounted in the centre of the frame which is operated by a motor. The power to the motor is given with the help of an AC supply. Connecting rods are used to connect the cam wheel and the hacksaw blades. The cam mechanism is used to convert the rotary motion into the 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 Hack Saw Blades Reciprocate. The Work Pieces Are Mounted On The Machine Vice Firmly And The Entire System Is Switched On. Thus The Four Work pieces Are Cut Simultaneously Using The Motor And The Cam Mechanism.

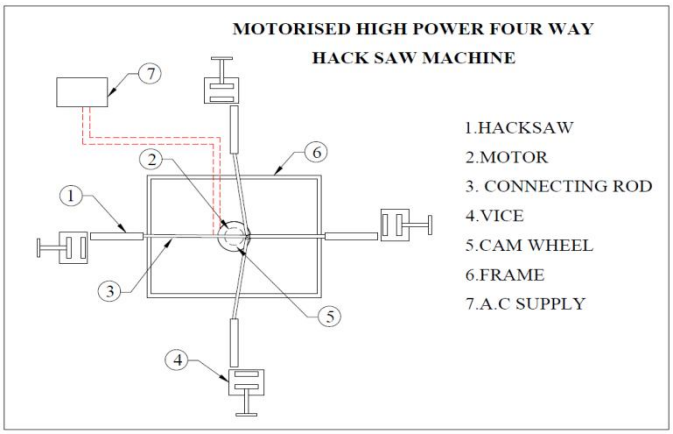


Fig.Motorised high power four Way hacksaw machine

IV. LITERATURE REVIEW

R.S.Khurmi, J.K.Gupta in their book “Theory of machines” (Velocities in mechanisms) helps to find Velocity diagrams of slider crank mechanism.[06]Prof. Nitinchandra R. Patel, Ravi Thakkar, MiteshkumarRathwa in his research paper “Material selection and testing of hacksaw blade based on mechanical properties” stated that the appropiate saw blade must be selected for better operation and fine cutting by selecting number of teeth per inch.[02] There are four types of blades based on material namely High Carbon steel, Alloy Steel, Bi-metallic strip and High speed steel blades.[10] Out of thesefour the best suitable for cutting hard materials like

Mild steel bar and Aluminium is Bi-metallic blade on the basis of Properties of materials, Wear resistance and Cutting performance. D.V.Sabarinanda, V.Siddhartha, T.Mohanraj in their paper "Design and Fabrication of Automated Hacksaw Machine" (April 2014) gives an idea about the various components required for fabrication of the proposed model [01],[07],[08]. These components will help to get smooth working condition and future automation of different mechanical actions as well as linkages. O.Cakir, A. Yardimen, T. Ozben in the paper.

"Selection of cutting fluids in machining processes" gives directions about selection of proper cutting fluids [03]. The suitable cutting fluid is required to select for the purpose of cooling, to avoid friction and making smooth operation and removal of burr.

Theoretical Analysis of Multi-Way Power Hacksaw Machine

Prof. Kshirsagar Prashant R.1, RathodNayan J2, Rahate Prashant P3, Halaye Prashant P4 ,SurveSachin S

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.

Design and Fabrication of Automated Hacksaw Machine

D.V.Sabariananda1, V.Siddhartha1, B.Sushil Krishnana1, T.Mohanraj2

The objective 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 Microcontroller. The automated machine acquires two inputs from the user namely the number of pieces to be cut and the length of each piece that is required to be cut. The inputs are given by the user with the help of a keypad and an LCD display, which will help the user to verify the data given by him. 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 chuck each time after a piece has been cut. After acquiring the two inputs from the user, the machine automatically feeds the given length of work-piece in to a chuck and starts to cut till the given number of work-pieces has been cut. The machine feeds the work-piece with the help of a conveyor, which is driven by a DC motor and an IR sensor ensures that the feeding stops when the specified length has been reached. A pneumatic cylinder is used for holding the work-piece when cutting operation is done. An AC motor is used to bring about the reciprocating motion required for cutting the work-pieces. There is a self-weight attached with the reciprocating mechanism to provide the necessary downward force required for penetration of hacksaw blade in to the work-piece. When a single piece has been cut, a limit switch will get triggered by the self-weight mechanism, which is sensed by the microcontroller to start the cyclic operation again provided if the specified number of work-pieces has not been cut.

Power hacksaws are used to cut large sections of metal or plastic shafts and rods. Cutting of solid shafts or rods of diameters more than fifteen millimeters is a very hard work with a normal hand held hacksaw. Therefore power hacksaw machine was invented during 1920s in the United States to carry out the difficult and time consuming work. This power hacksaw machine shown in figure 1 is considered as an automatic machine because the operator need not be there to provide the reciprocating motion and downward force on the work-piece in order to cut it. Once the operator has fed the work-piece till the required length in to the machine and starts the machine, then the machine will cut until the work-piece has been completely cut in to two pieces. Fig 1.PowerHacksaw Machine The fact that the operator has to feed the work-piece to the required length in to the vice is one aspect that motivated us to automate the feeding of work-piece automatically. Another one aspect is that after a shaft has been cut for one time.

Fabrication of pedal powered hacksaw using dual chain drive

R. Subash 1*, C.M. Meenakshi 2, K. Samuel Jayakaran 1, C. Venkateswaran 1, R.Sasidharan1

In this Paper, Pedal operated hacksaw machine which can be used for industrial applications and Household needs in which no specific input energy or power is needed. This project consists of a sprocket arrangement, the crank and slider mechanism, the chain drive. In the mechanism, chain drive is directly connected to the hacksaw for the processing

of cutting the wooden blocks. The objective of the paper is using the conventional mechanical process which plays a vital role. The main aim is to reduce the human effort for machining various materials such as wooden blocks, steel, PVC etc.

Pedal power is the transfer of energy from a human source through the use of a foot pedal and crank system. This technology is most commonly used for transportation and has been used to propel bicycles for over a hundred years. Less commonly pedal power is used to power agricultural and hand tools and even to generate electricity. Some applications include pedal powered laptops, pedal powered grinders and pedal powered water wells. Some third world development projects currently transform used bicycles into pedal powered tools for sustainable development. This project concentrates on pedal powered hacksaw machining. An individual can generate four times more power (1/4 HP) by pedalling than by hand-cranking. At the rate of ¼ HP, continuous pedalling can be served for only short periods, approximately 10 minutes. However, pedalling at half this power (1/8 HP) can be sustained for close to 60 minutes but power capability can depend upon age [1-2]. As a consequence of the brainstorming exercise, it was apparent that the primary function of pedal power one specific product was particularly useful: the bicycle. Many devices can be run right away with mechanical energy [3].

A saw is a tool that uses a hard blade or wire with an abrasive edge to cut through softer materials. The cutting edge of a saw is either a serrated blade or an abrasive. A saw may be worked by hand, or powered by steam, water, electric or other power. An abrasive saw uses an abrasive disc or band for cutting, rather than a serrated blade.

Components required

- Pedal arrangement
- Stand setup parts
- Supporting frame
- Crank and slider mechanism
- Hack saw assembly
- Dual chain drive assembly
- Sprockets

Experimental Investigation of Pedal Driven Hacksaw
1Sreejith K., 2Aravind K.,3Danie Davis, 4 Farish K.A., 5George Johnson

The objective of this paper was to design, fabricate and experimentally investigate the working of Pedal Driven Hacksaw(PDH). PDH is working on Slider Crank Mechanism. The experiment was done using PDH and plywood work pieces. The main parts of PDH are hack saw, reciprocating rod welded to the pedal of a bicycle, flywheel, sprocket and chain drive. The hack saw is connected with the reciprocating rod. By pedaling the bicycle the reciprocating rod moves to and fro, the hack saw will be moving with the rod. The plywood to be cut is placed under the hack saw. Thus the plywood can be cut without any external energy like fuel or current. Since this uses no electric power and fuel, this is very cheap and best. The performance of the PDH was compared with Hand Hacksaw at different rpm. The results indicate that the PDH had given better, accurate and faster cuts when compared with hand hacksaw at different rpm. PDH reduces the effort of cutting plywood to a great extent. When compared to the Power Saw the PDH requires only manual power thereby reducing the utility bill considerably. Experimental result shows that cutting depth of about 17mm can be obtained in one cycle of strokes for around 100rpm.

A. INTRODUCTION

The Pedal Driven Hacksaw (PDH) is working on Slider Crank Mechanism. The PDH is used to cut ply wood in small scales. PDH helps to obtain a less effort uniform cutting. It can be used in places where electricity is not available. It is designed as a portable one which can be used for cutting in various places. The main parts of PDH are hack saw, reciprocating rod welded to the pedal of a bicycle, flywheel, sprocket and chain drive. The hack saw is connected with the reciprocating rod. By pedaling the bicycle

The reciprocating rod moves to and fro, the hack saw will be moving with the rod. The plywood to be cut is placed under the hack saw on a work piece holder. Thus the plywood can be cut without any external energy like fuel or current. Since this uses no electric power and fuel, this is very cheap and best.

The surveys of the literature regarding the PDH are listed: Dharwa Chaitanya Kirtikumar[1] designed and developed a multipurpose machine which does not require electricity for several operations like cutting, grinding etc. This is a human powered machine runs on chain drives mainly with human efforts. But if you wanted to operate this machine by electric power this machine can also does that. It has some special attachment so use both human power as well as electric power.

The design is ideal for use in the developing world because it doesn't require electricity and can be built using metal base, chain, pulley ,rubber belt, grinding wheel, saw,

bearing, foot pedal(for operated by human),electric motor, chain socket.

S.G.Bahaley, Dr. A.U. Awate, S.V. Saharkar [2] designed and fabricated a pedal powered multipurpose machine. It is a human powered machine which is developed for lifting the water to a height 10 meter and generates 14 Volt, 4 ampere of electricity in most effective way. Power required for pedaling is well below the capacity of an average healthy human being. The system is also useful for the work out purpose because pedaling will act as a health exercise and also doing a useful work.

The pedal powered hacksaw set up, has a simple mechanism operate with chain and sprocket arrangement. The chain is placed on the teeth of the wheel and pinion. Pedal and connecting rod are interconnected to each other with the help of bolts. Bearing is provided between the center of the wheel or pedal and to delivers a smooth running of the hacksaw in to and fro motion during pedaling. The hacksaw is connected to the end of a rod. As by pedaling the wheel, the flywheel connected nearer to the pinion also rotates and to reduce the fluctuation of speed and also provide a uniform cutting. The work piece is placed on the work piece holder, which is to prevent the movement of work piece during cutting. The size and shape of this setup is similar to cycle. Here for reducing the power, loss chain mechanism is used.

V. PROJECT PROFILE ON HACKSAW BLADE MANUFACTURING

Micro, Small & Medium Enterprises Development
A hacksaw is a fine-tooth saw with a blade under tension in a frame, used for cutting materials such as metal. Hand-held hacksaws consist of a metal frame with a handle, and pins for attaching a narrow disposable blade. A screw or other mechanism is used to put the thin blade under tension. A power hacksaw (or electric hacksaw) is a type of hacksaw that is powered by electric motor. Most power hacksaws are stationary machines but some portable models do exist. Stationary models usually have a mechanism to lift up the saw blade on the return stroke and some have a coolant pump to prevent the saw blade from overheating.

VI. DESIGN PROCEDURE OF PARTS

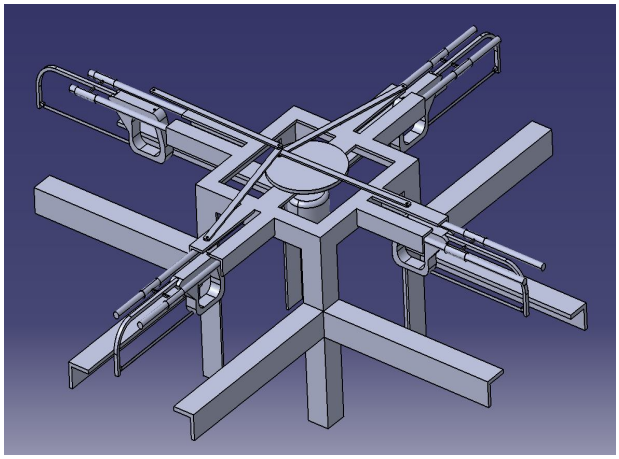


Fig.2.proposed model in CATIA

Major Components

1. L angle channel (mild steel) for frame
2. Electric motor
3. Cam mechanism
4. Hacksaw blades
5. Guide way for hacksaw

Components specification-Frame

WE design a basic frame for a prototype by mild steel channel (L beam), L Channel- MS Angles are L-shaped structural steel represented by dimension of sides & thickness. For e.g. 25x25x3 means, both the sides of angles are 25mm & thickness is of 3mm. There are various sizes of angles which are as follows :-(there are also equal & unequal angles). Equal angles: - They are angles having both the sides of equal dimensions. For e.g. refer below given diagram, in which both the sides are of dimensions “a”.’

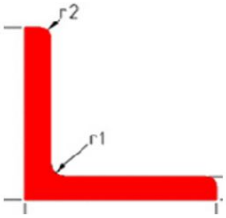


Fig.3.. L-angle bar dimensions

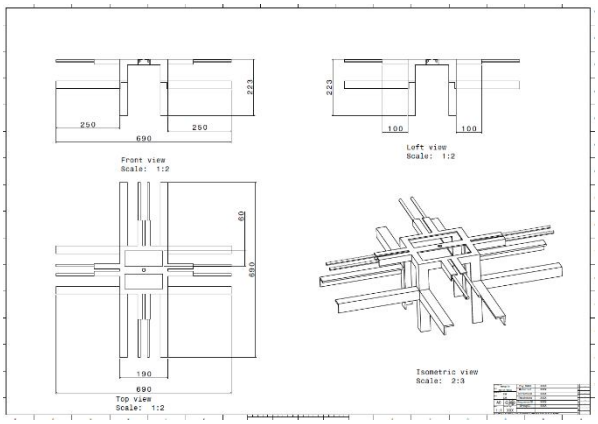


Fig.4.Base Frame With Dimension in MM

VII. DESIGN CALCULATIONS

A. Design of Frame

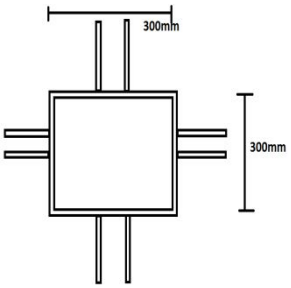


Fig.5.Base Frame

Hence $\frac{M}{I} = \frac{\sigma_b}{y}$ …….(1)

Bending moment(M)= force X perpendicular distance
= 30 X 300 X 9.81
Bending moment(M)=88290Nmm

$$I=\frac{bh^3}{12}=\frac{25\ X\ 25^3}{12}=32552.08mm^4$$

$$Y=\frac{25}{2}=12.5$$

Therefore above value use in equation no(1).

$$\frac{288290}{32552.08}=\frac{\sigma_b}{12.5}$$

Therefore, σ_b=33.90Nmm
33.90<105
Hence design is safe.

B. Design of Plate

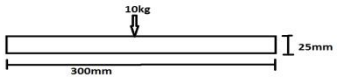


Fig .6.Cam Plate

I. HENCE-

$$\frac{M}{I} = \frac{\sigma_b}{y} \quad \text{…….(1)}$$

Bending moment(M)= force X perpendicular distance
= 10 X 400 X 9.81
Bending moment(M)=29430Nmm

$$I=\frac{bh^3}{12}=\frac{300\ X\ 3^3}{12}=675mm^4$$

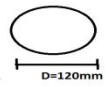
$$Y=\frac{3}{2}=1.5$$

Therefore above value use in equation no(1).

$$\frac{29430}{675}=\frac{\sigma_b}{1.5}$$

Therefore, σ_b=65.4Nmm
65.4<105
Hence design is safe.

C. Design of disc



$$hence\ \frac{M}{I} = \frac{\sigma_b}{y} \quad \text{…….(1)}$$

Bending moment(M) = force X perpendicular distance

= 10 X 300 X 60
Bending moment (M) = 5886 Nmm

$$I=\frac{M\ R^2}{4}=\frac{10\ X\ 9.81\ X\ 60^2}{4}=88290mm^4$$

$$Y=\frac{120}{2}=60$$

Therefore above value use in equation no(1).

$$\frac{5886}{88290}=\frac{\sigma_b}{60}$$

Therefore, σ_b=4 Nmm
4<105
Hence design is safe.

D. Electric motor

Type – Ac Single Phase Motor

An AC motor is an electric motor driven by an alternating current (AC). The AC motor commonly consists of two basic parts, an outside stationary stator having coils supplied with alternating current to produce a rotating magnetic field, and an inside rotor attached to the output shaft producing a second rotating magnetic field. The rotor magnetic field may be produced by permanent magnets, reluctance saliency, or DC or AC electrical windings.

Operating principles - When an AC motor is in steady-state rotation (motion), the magnetic fields of the rotor and stator rotate (move) with little or no slippage (near synchrony). The magnetic forces (repulsive and attractive) between the rotor and stator poles create average torque, capable of driving a load at rated speed. The speed of the stator rotating magnetic field (\omega_s) and the speed of the rotor rotating magnetic field (\omega_r), relative to the speed of the mechanical shaft (\omega_m), must maintain synchronism for average torque production by satisfying the synchronous speed relation (i.e., \pm\omega_s \pm\omega_r = \omega_m). Otherwise, asynchronously rotating magnetic fields would produce pulsating or non-average torque The two main types of AC motors are classified as induction and synchronous. The induction motor (or asynchronous motor) always relies on a small difference in speed between the stator rotating magnetic field and the rotor shaft speed called slip to induce rotor current in the rotor AC winding. As a result, the induction motor cannot produce torque near synchronous speed where induction (or slip) is irrelevant or ceases to exist. In contrast, the synchronous motor does not rely on slip-induction for operation and uses either permanent magnets, salient poles (having projecting magnetic poles), or an independently excited rotor winding. The synchronous motor produces its rated torque at exactly synchronous speed. The brushless wound-rotor doubly fed synchronous motor system has an independently excited rotor winding that does not rely on the principles of slip-induction of current. The brushless wound-rotor doubly fed motor is a synchronous motor that can function exactly at the supply frequency or sub to super multiple of the supply frequency Other types of motors include eddy current motors, and also AC/DC mechanically commutated machines in which speed is dependent on voltage and winding connection.

Less commonly, linear AC motors operate on similar principles as rotating motors but have their stationary and moving parts arranged in a straight line configuration, producing linear motion instead of rotation.

For lightning and general purposes in homes, offices, shops, small factories single phase system is widely used as compared to three phase system as the single phase system is more economical and the power requirement in most of the houses, shops, offices are small, which can be easily met by single phase system. The single phase motors are simple in construction, cheap in cost, reliable and easy to repair and maintain. Due to all these advantages the single phase motor finds its application in vacuum cleaner, fans, washing machine, centrifugal pump, blowers, washing machine, small toys etc.

VII. SPECIFICATIONS

Single phase ac motor
Voltage = 220 volts
Current = 0.36 ampere
Speed = 100 rpm
Torque = 30 kg-cm
Power = 30 watt
Operating frequency = 50 Hz

VIII. WORKING PRINCIPLE

Most known hacksaw apparatuses include only a single hacksaw, operable therefore only to cut a work piece from one side only. Such devices are relatively slow in operation because they can only cut from one side. Known hacksaw apparatuses having two hacksaws are very bulky and heavy. The mechanical complexities of single hacksaw machines are compounded by having two opposed hacksaws. The invention therefore provides two essentially parallel spaced apart hacksaw blades, mounted on reciprocating support means in opposition to one another, which can be operated simultaneously so as to cut a bar from both sides at once.

More specifically, the invention provides a saw apparatus having the foregoing advantages in which the slid able guide means for guiding the blade frames are slid able towards and away from one another, by power operated means, such power operated means being mounted on said slid able guide means, and being reciprocal in association there with. Consequently, it would be advantageous to provide a four hacksaw apparatus, the blades of which are operable to apply a relatively constant force to a work piece during a cutting stroke. Furthermore, such blades ought preferably to have a more constant velocity during the cutting stroke in order to increase the overall speed of the cutting operation and in order to improve the efficiency of the cutting stroke. Such

advantages should be obtained, if possible, without adding to the bulk, weight or expense of the hacksaw apparatus.

A wiper motor is placed at the centre of the frame and links are attached to each of the hacksaw frame for their operations for its operation scotch yoke mechanism is used. Four of the blades operates one after another to cut the metal pieces mounted on each vice. The blades slides on the shaft support and cuts the work piece as the wiper motor requires 12volt dc supply so transformer is used to convert ac current into 12volt dc current and capacitor is used to supply the required energy to motor to operate.

X. ADVANTAGE

1. Simple in construction.
2. Easy to fabricate.
3. Repairing and replacing is not a difficult task as The components used for the fabrication of they are easily available.
4. Multiple work pieces can be cut simultaneously.
5. The time taken for cutting operation is less.
6. Increased productivity.
7. The non-productive time is reduced to a greater extent.
8. The involvement of manual work is very negligible.
9. No need of skilled operators to operate this machine.
10. The cost of the system is less.

XI. APPLICATIONS

1. In small scale industries of manufacturing and fabrication.
2. In colleges and professional workshops etc.
3. Also widely used in agriculture purpose

XII. FUTURE SCOPE

The hacksaw is a metal/platic cutting machine tool designed to cut multiple metals simultaneously by applying cam mechanism. The machine is exclusively intended for mass production and they represent the faster and more efficient way to cut a metal. Hacksaws are used to cut thin and soft metals. The operation of the unit is simplified to a few simple operations involving a motor and a cam mechanism.

There are numerous types of cutting machines in Engineering field, which are used to fulfil the requirements. We are interested to introduce multiple hacksaw cutting operation in Hacksaw machine. The main function of this hacksaw machine is to cut thin and soft metals by motor power.

This is an era of automation where it is broadly defined as replacement of manual effort by mechanical power in all degrees of automation. The operation remains an essential part of the system although with changing demands on physical input as the degree of mechanization is increased. Degrees of automation are of two types, viz.

- Full automation.
- Semi automation.

In semi automation a combination of manual effort and mechanical power is required whereas in full automation human participation is very negligible.

XIII.CONCLUSION

As per the above discussion we concluded that to overcome problems in conventional hacksaw Machines, due to high efficiency, easy to operate and affordable price the proposed model of multi-way power hacksaw machine is helpful and completes all the expectations needed in the mini industries. Future scope of proposed research work to increase the production rate, cuts the metal/plastic bars easily. It can withstand the vibrations, no hazards from jerk, no special training required to operate it.

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.

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REFERENCES

[1] D.V. Sabarinanda, V.Siddhartha, B. Sushil Krishnana, T.Mohanraj , "Design and Fabrication of Automated Hacksaw Machine", International Journal of Innovative Research in Science, Engineering and Technology, ISSN (Online): 2319-8753, volume 3, April 2014.

[2] Prof. Nitinchandra R. Patel, Mohammad A. Vasanwala, Balkrushna B. Jani, Ravi Thakkar, Miteshkumar D. Rathwa, "Material selection and testing of hacksaw blade based on mechanical properties", International Journal of Innovative Research in Science, Engineering and Technology, ISSN: 2319-8753, volume 2, Issue 6, June 2013.

[3] O.Cakir, A. Yardimen, T. Ozben, "Selection of cutting fluids in machining processes", Journal of Achievements in Materials and Manufacturing Engineering, volume 25, Issue 2, December 2007.

[4] R. Subhash, C.M. Meenakshi, K. Samuel Jayakaran, C. Venkateswaran, R. Sasidharan, "Fabrication pedal powered hacksaw using dual chain drive", International Journal of Engineering and Technology, ISSN: 220-223, volume 3, Issue 2,2014.

[5] Dr. V.P. Singh, (2007)"Mechanical Vibration", Page no. 145-162

[6] R.S.Khurmi, J.K.Guptal, (2012)"Theory of machines", Page no. 143-168

[7] PSG College of Technology, (2007) "Design Data Book", Page no. 1.4-1.37

[8] V.B.Bhandari, Design of machine elements, Year 2007, Page no. 5-7 & 20-39