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Automated Double Hacksaw Cutter

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***Abstract*— There are many electrically operated power hack saw machine of different configuration and different manufactures are available for the use in machine shop. These machines 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 two way hack saw machine the two 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. This paper focous on presents the manufacture and idea of two way hacksaw removing machine predominantly conveyed for creation based ventures. Businesses are fundamentally implied for creation of valuable merchandise and ventures at low generation cost, Machinery cost and low stock cost. Today in this world each errand have been made snappier and quick because of innovation progression yet this headway likewise requests colossal speculation and consumption, each industry wants to make high efficiency rate keeping up the quality and standard of the item at low normal cost. We have developed a prototype model, which is efficient and do multiple cutting operations. These machines can be utilized as a part of remote spots where power is customary. It is composed as a convenient one which can be utilized for cutting in different spots. It can be utilized for working on materials like thin metals, wood.**

Keywords*— *HackSaw; Manufacturing Industries; Mass Production; Cutting Rate; Fatigue Loading; Fabrication.

I. INTRODUCTION

A hacksaw is a handheld device used to slice through materials like plastic tubing and metal funnels. Its cutting system is given by removable edges which include sharp teeth along their external edge. As a rule, a hacksaw comprises of a metal casing that takes after a descending confronting. A handle of plastic, wood, or metal is regularly joined to one end of the casing. The edge's closures highlight customizable pegs that can be fixed to anchor a sharp edge set up, and extricated to expel it. Hacksaw sharp edges are long, thin portions of solidified steel that element a line of teeth along their front line. Each finish of the edge is punched with a little gap that fits onto the saw edge's pegs. Most sharp edges extend long from ten to 12inches (25.4 to 30.48 cm), albeit six-inch (15.24 cm) edges can be acquired to fit littler hacksaw models. A gadget that applies compel, alters the course of a power, or changes the quality of a power, with a specific end goal to play out an errand, by and large including work done on a heap. Machines are regularly intended to yield a high mechanical preferred standpoint to decrease the exertion expected to do that work. A straightforward machines a wheel, a lever or a slanted plane. Every single other machine can be constructed utilizing mixes of these straightforward machines. Illustration: A penetrates utilizes a blend of riggings (wheels) to drive helical slanted planes (the bore) to part a material and cut an opening in it.

II. HISTORY

While saws for cutting metal had been being used for a long time, noteworthy upgrades in life span and effectiveness were made in the 1880s by Max Flower-Nash. Clemson, an author of Clemson Bros., Inc of Middletown, New York, United States,. Clemson directed tests which included changing the measurements, states of teeth, styles of set, and variable warmth medications of cutting edges. Clemson guaranteed tremendous changes to the cutting capacity of edges and constructed a noteworthy mechanical activity fabricating hacksaw sharp edges sold under the exchange name Star Hack Saw. In 1898, Clemson was conceded US Patent 601947, which points of interest different changes in the hacksaw.

III. HACKSAW TERMINOLOGY

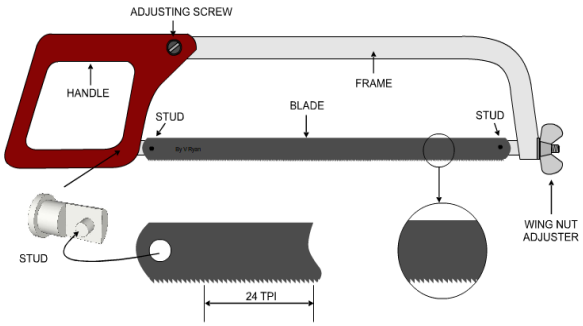

Figure 1 - Terminology

IV. TYPES OF HACKSAWING MACHINES

- Light duty hacksaw machine.
- Hydraulic hacksaw machine.
- Power hacksaw machine.
- Circular band hacksaw machine.
- Horizontal swing type band saw machine.
- Band hacksaw machine.
- Jigsaw machine.
- Universal type circular hacksaw machine.
- Double column band saw machine.
- Chain saw circular machine.

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V. MATERIAL REMOVAL MECHANISM

A. Gravity Feed Machines - In this sort of machine, which is as a rule of light development for general obligation, the push stack is produced by the gravity feed of the saw bow. In a large number of these machines the size of the push stack is settled, albeit a few machines are given flexible masses on the overarm for push stack change. The push, stack differs all through the slicing stroke because of the responding relocation of the over arm mass and the activity of the cam worked lift-off gadget which acts toward the start and the finish of the stroke. This kind of machine for the most part has a work piece limit between 150 - 200 mm (6 and 8 inches) breadth and is perfect for the little workshop where the cutting prerequisite is just infrequent and the design of work pieces to be cut extents from mellow steel level complex formed areas and tubular segments up to 6 inches width. Because of the light development and gravity feed the applications for this kind of machine are restricted.

B. Hydraulic Machines - The push drive between the sharp edge and the work piece in this kind of machine is created by a pressure driven gadget. Weight might be created in the heap chamber by either a confined reverse framework, or the weight might be provided from a different pump. In a portion of these machines, more prominent adaptability of control has been presented by methods for a curve cutting activity joined with an all-around controlled water powered framework which permits better execution from the saw sharp edge. The propelled kinds of uncompromising electro-pressure driven hacksaws have an extensive variety of task and are accessible in self-loader or completely programmed frame, with arrangements for programmed sustaining of bar stock, slicing off to foreordained sizes and emptying and so forth. The component of shut down-feed to the saw bow consolidated in these machines makes the machine reasonable for cutting the harder steels and compounds. These machines are the most widely recognized and create more prominent push loads than machines of other sort and have notoriety for sawing without issues and requiring least administrator aptitude.

C. Positive Displacement Machines - While these machines are not as prevalent as the gravity feed or water driven machines, a couple of machines are accessible where the feed rate of the edge and subsequently, the metal expulsion rate is straightforwardly controlled by a mechanical screw gadget, giving a positive feed. This kind of machine can prompt over-burdening of the sharp edge giving untimely edge disappointment especially when the cutting edge is worn. Positive removal machines are not inclined to variety in push loads amid the cutting stroke-since the push stacks straightforwardly emerge because of the consistent rate of entrance of the sharp edge teeth.

VI. SAWING MACHINE

Sawing Machine - Gadget for cutting up bars of material or for removing shapes in plates of crude material. The cutting gadgets of sawing machines may be thin metallic plates with teeth on their edges, thin metal sharp edges or versatile gatherings with teeth on one edge, or thin pulverizing wheels. The apparatuses may utilize any of three activities in sawing: bona fide cutting, pulverizing, or crushing made condensing. The power hacksaw machine gives a tight brace to section the work and means for reacting a U-shaped packaging on which is mounted a straight steel hacksaw edge that cuts while moving one route so to speak. The saw pushes down on the work amid the cutting stroke however is raised clear of the work amid the arrival stroke. The band saw utilizes an interminable adaptable steel band with teeth on one edge; the band is carried on two huge measurement turning wheels mounted on parallel tomahawks some separation separated. Band saws that cut vertically are especially reasonable for removing shapes in thin, level plates from workpieces that lie on flat tables. Cool sawing machines with toothed plate cutters are utilized broadly in steel-moving factories and in places where vast amounts of bars are cut. A V-molded clipping tight clamp empowers packs of bars to be cinched and cut at one time. Grinding sawing machines are utilized to a great extent for cutting off steel auxiliary shapes, for example, I pillars, channels, and points. The cutting wheels, with or without teeth, pivot at such high speeds that the warmth from the rubbing of contact is adequate to expel the metal by liquefying it. Grating cut off saws, thin elastic or Bakelite-fortified rough wheels that are worked at high fringe speeds, are especially reasonable for cutting off thin tubes and solidified steel bars.

VII. TYPES OF SAWING

A. Power Hacksawing - The basic forward and backward movement of the cutting edge made the hacksaw one of the principal kinds of sawing machines intended for control. The straightforwardness in the sharp edge movement has kept the cost of the saw machine generally less expensive than different kinds of sawing machines. The low introductory cost combined with the adaptability and versatility, has empowered the hacksaw to stay well known in industry. In hacksawing, a solitary sharp edge is tensioned in the bow, and responded forward and backward finished the work piece. The cutting activity is accomplished just amid half of the cycle of task. Amid the second 50% of the cycle, the arrival stroke, the sharp edge is lifted clear of the work piece, giving a spasmodic cutting activity, which is thought to be one of the disadvantages of the task. In spite of this inconvenience, when contrasted with the consistent cutting activity of the band saw, hacksaws remain similarly or much more famous elective machines. Likewise with numerous other fundamental procedures, hacksawing is an attempted and tried strategy, solid, reliably precise, fast and simple to repair, is less subject to remedy cutting edge strain and more averse to run-out. Besides control hacksaws can be left unattended for significant lots when cutting substantial distance across bar and require least administrator aptitude. Edge substitution is moderately shabby and straightforward.

B. Band Sawing - Band sawing, unlike hacksawing, is a continuous cutting operation. An endless blade, the band, is tensioned between two shrouded, rotating wheels, and part of the band is exposed to carry out the cutting operation of the work piece. The band travels in a continuous motion, with the teeth fed against the work piece. Whilst earlier metal sawing bands were wide (over 25 mm), and were used strictly for cut off methods, narrow blades, introduced about 50 years ago

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brought contouring capabilities. Furthermore, due to the small throat clearance of the early band saws, they were limited in use by the basic design, thus the length of the work piece could only be as long as the machine throat. However modern machines have been modified to give adequate throat clearance, by intentionally twisting the blade so that the toothed faces in line with the machine throat. As with hacksaw machines, band saws can be divided into two broad categories. A general purpose band saw having gravity fed system, controlled by a dash-pot and using a25 mm (1 inch) deep blade, is the most popular machine available. This machine is suitable for general fabrication work and accurate cutting of solid bars. This type of machine is limited to about 175 mm (7 inches) diameter for mild steel. In order to meet the present day requirements for high-volume production, cutting all grades of steel and to introduce high accuracy and reliability, it has been necessary for the band saw machine manufacturers to incorporate in the design not only heavy duty construction having capacities up to 450 mm (18 inches) diameters but also innovations in the hydraulic power down-feed, to allow the cutting of difficult alloys., such as mnemonics and titanium.

C. Circular Sawing - Roundabout saws have a constant cutting activity; utilize sharp edges having numerous teeth, and an extensive scope of rotational velocities. This activity is like a processing task. The machines accessible range from the prior, economical, hand-stacked models to the specific vast, control stacked write and join material taking care of gadgets for semi and after that completely programmed task. Present day generation roundabout saws are worked with a few substitute essential feed components i.e. level, vertical, shaking head and varieties of these. The decision of the most appropriate kind of machine relies upon the specific application and the size and state of segment. With vertical feed, the pivoting edge ventures downwards in a straight line to draw in the work piece. On machines intended for even feed the cutting edge is sustained into the work piece from the back. A third fundamental encouraging plan is a turn movement or shaking head framework, this is as proficient as a vertical feed framework and is a tough course of action. The seat or floor mounted manual-feed round observed, when introduced together with a general obligation band saw or hacksawing a little workshop, gives an entire slicing office to the little fabricator. Completely programmed round saws, having highlights, for example, dial-in segment length, in process checking, decision of stacking magazines, and so on are broadly utilized where top notch creation is required and frequently give the generation build a troublesome decision to make between roundabout sawing and band sawing.

VIII. MANUFACTURING PROCESS

A. Mild Steel -- Mild steel is a kind of carbon steel with a low measure of carbon – it is entirely known as "low carbon steel." Although ranges differ contingent upon the source, the measure of carbon ordinarily found in mellow steel is 0.05% to 0.25% by weight, while higher carbon steels are normally depicted as having a carbon content from 0.30% to 2.0%. In the event that any more carbon than that is included, the steel would be delegated solid metal. Mellow steel isn't composite steel and in this manner does not contain a lot of different components other than press; you won't discover huge measures of chromium, molybdenum, or other alloying components in mild steel. Since its carbon and alloying component content are generally low, there are a few properties it has that separate it from higher carbon and composite steels. Less carbon implies that mild steel is regularly more bendable, machinable, and weldable than high carbon and different steels, in any case, it likewise implies it is almost difficult to solidify and fortify through warming and extinguishing. The low carbon content likewise implies it has next to no carbon and other alloying components to square disengagements in its gem structure, by and large bringing about less elasticity than high carbon and compound steels. mild steel additionally has a high sum iron and ferrite, making it attractive.

B. Manufacturing - Mild steel is made like how other carbon steels are made. A typical way this is done includes a blend of iron metal and coal. Once the coal and iron mineral are separated from the earth, they are softened together in an impact heater. Once dissolved, the blend is moved to another heater to consume off any polluting influences that they may have, and also to make some other changes in accordance with the mild steel's synthetic organization. Following that, the steel is permitted to cement into a rectangular shape. This piece of mellow steel is then more often than not conveyed down to the coveted size utilizing forms called hot rolling or cool illustration, despite the fact that there are different techniques that can likewise be utilized.

C. Application - Here are some examples of where it is used in the world:

- Structural steel
- Signs
- Automobiles
- Furniture
- Decorations
- Wire
- Fencing
- Nails

IX. LITERATURE REVIEW

David Gordon Wilson [1] studied the vast literature to understand the concepts which effect the performance of the machine The concept of two way hacksaw cutting machine mainly carried out for production based industries.

Zoeb khan [2] expressed that Industries are essentially implied for generation of valuable merchandise and enterprises at low creation cost, Machinery cost and low stock cost. Information about built up a model of a machine reach would be fit for performing diverse task all the while, and it ought to be monetarily productive. These machines can be utilized as a part of remote spots where power is customary. It is planned as a versatile one which can be utilized for cutting in different spots. It can be utilized for working on materials like thin metals, wood. A solitary stage vertical electric engine unbendingly set at the focal point of metallic establishment gave.

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Linxu et al. [3] research about the shaft of motor rotates at 90-100 rpm with the power 2HP. The circular disc is mounted on the shaft of motor with the help of key and key slot arrangement. It consists of pedal powered machine setup which has a simple mechanism operate with chain and sprocket arrangement.

Chaudhary Pravinkumar k [4] learned about the chain is put on the teeth of the haggle. The pole is mounted on platform direction. To begin with mechanical linkage is evacuated by expelling nut and screws and v belt drive boring connection. It is realized that regular power hacksaw machine can be supplanted with robotized control Hacksaw machine.

S. G. Bahaley et al. [5] expressed that automated power hacksaw machine gives high efficiency in brief day and age in examination with the ordinary power hacksaw machines. The real preferred standpoint of this machine is intercession of work is lessened to greatest level. In this fast developing modern segment the utilization of intensity Hacksaw machine is wide, time and work assumes a noteworthy part underway process. The Material choice and testing of hacksaw sharp edge in light of mechanical properties expressed that the suitable saw edge must be chosen for better activity and fine cutting by choosing number of teeth per inch.

Leonel et al. [19] stated that the designers of machines or structures must achieve acceptable levels of performance and at the same time, assure the part is safe and durable. Therefore, it is necessary to avoid excess deformation, such as bending, twisting, or stretching, of the machine's components. In addition, cracking in components must be avoided entirely to prevent the crack from progressing to the point of complete fracture.To avoid structural failure, the stress in a component must not exceed the strength of the material, where the strength is simply the stress that causes a deformation or fracture failure.Failures in mechanical structures occur due to various reasons.

Boyer et al. [11] showed that failures could occur due to mechanisms and environmental factors. He also suggested that failure analysis of a metal structure requires identifying the type of failure mode. The failure mode is classified as either a deformation or fracture.

Layer et al. [18] concluded that the process of identifying a failure mode is complicated because different techniques can be used to determine the actual cause of failure.

Linder et al. [20] studied and they are worried about the numerical displaying of split expanding in weak materials utilizing limited components with installed solid discontinuities, that is, discontinuities in the relocation field characterizing the arrangement of the basic limit esteem issue. Specifically, new limited components are produced in this structure pleasing the distinctive branches of the bifurcating intermittence in the component inside. The key part of these advancements is the right portrayal of the kinematics of these designs. This is expert through the distinguishing proof of the correct partition modes portraying these arrangements and their fuse in the discrete strain field of the limited component. The subsequent improved modes are enacted in view of a spreading model contingent upon the speed of the break tip. The execution of the new components is represented with a few numerical reproductions including different methodologies for the treatment of expanding and examinations with accessible trial come about.

Travas et al. [21] investigated the influence of loading rate on the failure mode of the beam parametric. The numerical results are evaluated, discussed and compared with test results known from the literature. It is shown that the beam resistance and failure mode strongly depend on loading rate. For lower loading rates beam fails in bending (mode-I fracture). However, with increasing loading rate there is a transition of the failure mechanism from bending to shear. Results are in good agreement with theoretical and experimental results known from the literature.

X. IDEA OF FATIGUE

In limit sense, the term weakness of materials and auxiliary parts implies harm and harm because of cyclic, over and again connected anxieties. In a wide sense, it incorporates countless that harm and crack under burdens and natural conditions. It is arranged between high-cycle (exemplary) and low-cycle weakness. Plastic distortions are little and limited in the region of the break tip while the primary piece of the body is disfigured flexibly, at that point one has high-cycle exhaustion.

In material science, weakness is the dynamic, confined, and lasting auxiliary harm that happens when a material is subjected to cyclic or fluctuating resist ostensible burdens that have greatest esteems not as much as the static yield quality of the material. The subsequent pressure might be underneath a definitive pliable pressure, or even the yield worry of the material, yet still reason cataclysmic disappointment.

XI. FATIGUE STRENGTH

Exhaustion quality is characterized as the most extreme pressure that can be continued for a predetermined number of cycles without disappointment. Low cycle weariness quality methodologies the static quality. At the point when the cycle number surpasses as far as possible, the weariness quality tumbles to portion of the static quality.

XII. SCOPE OF PAPER

- The machine can take care of the issue of time utilization.
- Misuse of assets in face of work cost is decreased.
- The machine can be utilized as a part of the business where it is made, at the bundling area.
- It is utilized as equipment in extensive amount like in manufacture of machine.
- It give other option to ventures pointing toward lessening human exertion.
- It produces supportable and functional mechanization answers for the future mechanical improvement.

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XIII. OBJECTIVE OF PAPER

- To take into account the issue of rivalry in mechanical industry the requirement for computerization is evaluate by all the business.
- To recognize the key arrangement roads thought to be fitting to address the difficulty of reasonable assembling and bundling industry for what's to come.
- To give other option to ventures pointing toward decreasing human exertion and change in material taking care of framework by actualizing mechanization.
- Reasonable and down to earth mechanization answers for the future mechanical condition.

XIV. METHODOLOGY

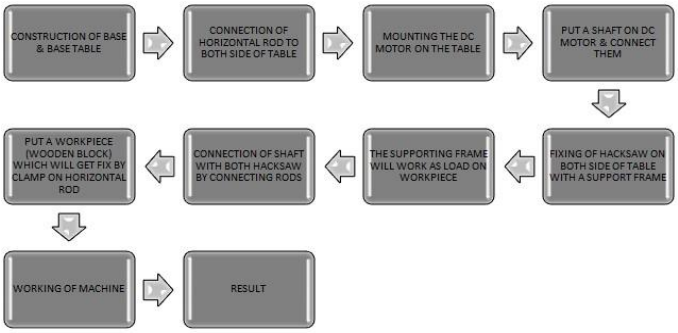

Figure 2 – Working Chart

A. Introduction - The plan of the paint blending machine includes the underlying phases of idea outline and their motivations. Diverse ideas of shading picking systems, utilization of sensors and microcontroller were chosen lastly a particular one was picked in the wake of assessing them based on many-sided quality, simplicity of creation and effortlessness. At that point, a definite outline of the same was introduced which incorporates singular highlights, determinations and CAD show introduction.

B. Concept Design - In the idea plan different parts have been composed like base table (24x11)inch and material utilized is gentle steel, at that point center arm (23x9x6.5)inch and material utilized is mellow steel, at that point shaft (6 inch dia) is utilized as interfacing join for hacksaws and arms and material utilized is gentle steel, at that point dc motor (35 rpm) is appended under the base table, at that point upper arm (16.4)inch is associated with the back arm and material utilized mellow steel.

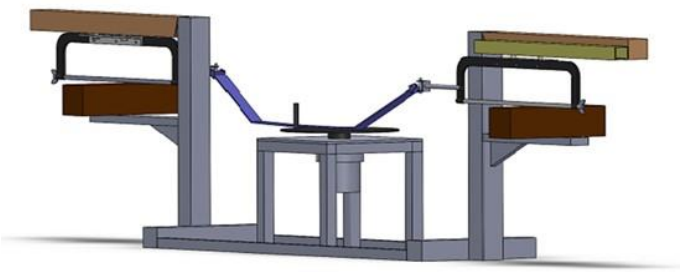

Figure 3 – CAD Design of Double Hacksaw Cutter

XV. REQUIREMENTS OF PARTS

A. Middle Arm - It is used to balance the motor and it is attached to shaft. Its dimension is (23x9x6.5) inch.

Figure 4 – Middle Arm Of Cutter

B. Bolt - It is used for the fixing of bench vice for proper alignment of shaft and flywheel.

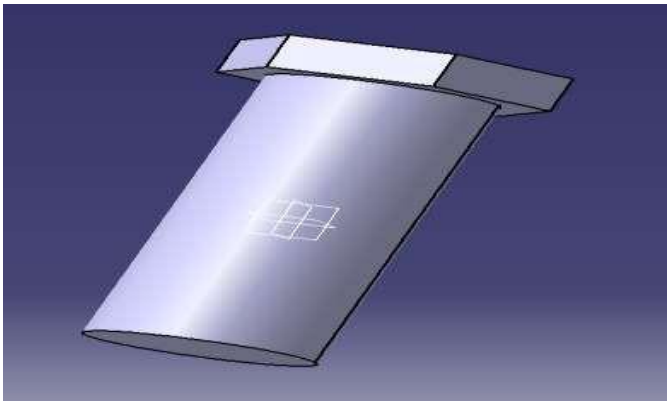

Figure 5 – Bolt

C. Nut - It is used in bench vice, connecting rod and shaft for tightening bolts.

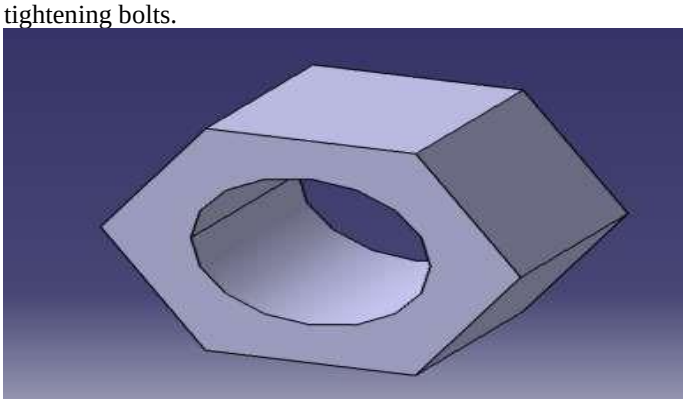

Figure 6 – Nut

D. Base - It is stand on which all parts are mounted like dc motor, shaft

E. Rotating Shaft - It is used here for moving of both arms carrying hacksaws.

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Figure 7 – Rotating Shaft

F. Shaft - A shaft is a pivoting machine component which is utilized to transmit control starting with one place then onto the next. The power is conveyed to the shaft by some unrelated power and the resultant torque (or turning minute) set up inside the shaft allows the ability to be exchanged to different machines connected up to the shaft. Keeping in mind the end goal to exchange the power starting with one shaft then onto the next, the different individuals, for example, pulleys, gears and so forth., are mounted on it. These individuals alongside the powers applied upon them makes the shaft bowing. As it were, we may state that a shaft is utilized for the transmission of torque and bowing minute. The different individuals are mounted on the shaft by methods for keys or splines.

G. Hacksaw - A hacksaw is a fine-tooth saw with an edge under pressure in a casing, utilized for cutting materials, for example, metal. Hand-held hacksaws comprise of a metal edge with a handle, and sticks for joining a thin dispensable cutting edge. A screw or other system is utilized to put the thin cutting edge under pressure. A power hacksaw (or electric hacksaw) is a sort of hacksaw that is controlled by electric engine. Most power hacksaws are stationary machines yet some helpful models do exist. Stationary models commonly have a framework to lift up the saw sharp edge on the entry stroke and some have a coolant pump to keep the saw bleeding edge from overheating.

Figure 8 – Cutter Blade

H. DC Motor - A DC motor is an electric motor driven by an immediate current (DC). The DC motor usually comprises of two essential parts, an outside stationary stator having loops provided with substituting current to deliver a pivoting attractive field, and an inside rotor connected to the yield shaft creating a second turning attractive field. The rotor attractive field might be created by lasting magnets, hesitance saliency, or DC or AC electrical windings. The responding movement of the Hacksaw sharp edge, as a result of which the cutting procedure happens, is delivered with the assistance of a DC motor, which works by a basic wrench component to change over rotating movement of wrench into responding movement Hacksaw edge. The DC motor is turned on after the work-piece has been immovably fit in the pneumatic toss. The Torque of motor is expanded by transmission of capacity to a pulley by belt transmission.

Figure 9 – DC Motor

(a) Specification of DC Motor - The electric power supply necessary to run the DC motor is obtained from a step-down transformer and a bridge rectifier –

VOLTAGE	12 V DC, 50 WATTS
LOAD CURRENT	10 A
NO LOAD CURRENT	2/2.5 A
SPEED	32 RPM

Figure 10 – Properties Of DC Motor

I. Acrylic Paint - Acrylic paint is a fast-drying paint made of pigment suspended in acrylic polymer emulsion. Acrylic paints are water-soluble, but become water-resistant when dry. Depending on how much the paint is diluted with water, or modified with acrylic gels, mediums, or pastes, the finished acrylic painting can resemble a watercolor or an oil painting, or have its own unique characteristics not attainable with other media. Acrylic paint is typically used for crafting, or in art classes in schools because it does not require any chemicals, and rinses away with just water. It also is less likely to leave a stain on clothes than oil paint.

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Figure 11 – Acrylic Paint

XVI. CALCULATION

Calculation for DC Motor

From Physics,

Power = Torque * Angular Velocity

Torque = Power/ Angular Velocity

Power=50 Watts

Angular Velocity = Speed in rpm * 2* pi

= 32*2*3.14

=200.96

Now, Torque = 50/200.96

= 0.24 Nm

XVII. DOUBLE HACKSAW CUTTER

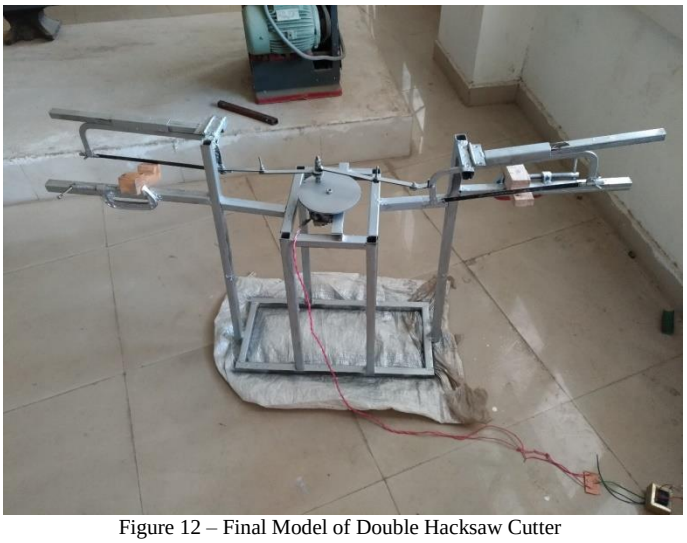

Figure 12 – Final Model of Double Hacksaw Cutter

XVIII. COST AND ESTIMATION

S.NO.	NAME	SPECIFICATION	MATERIAL	QUANTITY	COST (Rupees)
1.	DC MOTOR	32 RPM,SINGLE PHASE	CAST IRON	1	750
2.	BASE	24×11 INCH	MILD STEEL	1	450
3.	UPPER ARM	16 INCH	MILD STEEL	2	320
4.	SHAFT	Φ 6 INCH	MILD STEEL	1	310
5.	CONNECTING ROD	5 INCH	MILD STEEL	2	80
6.	CONNECTING ROD	4.5 INCH	MILD STEEL	2	80
7.	NUT	Φ 14MM	MILD STEEL	24	72
8.	BOLT	Φ 14MM	MILD STEEL	22	240
9.	WASHER	Φ 16MM	MILD STEEL	22	66
10.	HACKSAWS	12 INCH		2	200
11.	HACKSAW BLADES	12 INCH		2	120
12.	TRANSPORTATION CHARGE				1200
13	SPRAY PAINT		ACRYLIC PAINT	1	160
			Total	**81**	**Rs.4048**

Table 1 – Cost and Estimation

XIX. RESULTS

Machine is driven by 32 rpm electric engine. Test was done on machine utilizing wooden example. For the stacked test, a pole of distance across 6 inch and the material of the pole was gentle steel was clasped on the bad habit of the machine. It took the machine 240 seconds to cut the with another hacksaw cutting edge. The slice was seen to be flawless and straight. The aggregate cost of hardware of the machine was Rs. 4048. The aggregate cost of creating the machine was evaluated to be Rs. 4000. Suggestion has been made on the activity and parameters of the machine. Proposals have been offered on general machine execution improvement and further work on the machine.

XX. CONCLUSIONS

It is realized that ordinary hacksaw machine can be supplanted with programmed twofold hacksaw machine. Programmed twofold hacksaw machine gives high efficiency in brief era in examination with the regular hacksaw machines. The real favorable position of this machine is that intercession of work is diminished to greatest level. In this fast developing modern time, the utilization of twofold Hacksaw machine is wide. Time and work assumes a noteworthy part underway process this can be overwhelmed by utilizing this sort of programmed machines. The programmed hacksaw machine can be made utilization of at any of the ventures like furniture enterprises. The scope of size of work-pieces that can be cut utilizing the programmed hacksaw machine can be shifted by changing the sharp edge estimate. Right now, the machine utilizes 12 inch edge for cutting.

XXI. FUTURE SCOPE

- It is realized that customary hacksaw machine can be supplanted with Automated Double Hacksaw machine.
- Computerized Double Hacksaw machine gives high profitability in brief day and age in examination with the

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regular hacksaw machine hacksaw machines. The real preferred standpoint of this machine is mediation of work is diminished to greatest level.

- In this fast developing mechanical segment the utilization of twofold Hacksaw machine is wide, time and work assumes a noteworthy part underway process. This can be overwhelmed by utilizing this kind of computerized machines.
- The robotized hacksaw machine can be made utilization of at any of the ventures like pump fabricating businesses that include mass measure of shafts that must be cut every now and again. The scope of size of work-pieces that can be cut utilizing the computerized hacksaw machine can be fluctuated by changing the cutting edge measure. As of now, the machine utilizes 12 inch sharp edge for cutting. An another headway that can be executed in mechanized hacksaw machines is that the client can likewise get cut work-bits of various lengths in a single cycle itself. This implies the client needs to indicate the quantity of workpieces that must be cut in every one of the distinctive length esteems determined. This will be conceivable with the assistance of a progressed microcontroller than AT89C51, which ought to have high programmable memory.

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