Pedal Operated Hacksaw Machine

Shaikh Asif Dulekha[1], Tamke Pavan Annasaheb[2], Date Varad Bhushan[3], Deshpande Atharv Vijaykumar[4] , Prof. Sabde Abhijit Manoharrao[5]

[1, 2, 3, 4] Dept of Mechanical Engineering

[5]Guide Lecturer, Dept of Mechanical Engineering

[1, 2, 3, 4, 5] Vishweshwarayya Abhiyantriki Padvika Mahavidhyalaya, Almala, Maharashtra, India.

Abstract- *In this 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 crank and slider mechanism. In the mechanism pedal is directly connected to the hacksaw through crank and slider mechanism for the processing of cutting the wooden blocks, metal bars, pvc materials. The objective of the modal 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. The power hacksaw machine, which runs on human power, works on the principle of the conversion of rotational motion to oscillatory motion.*

Keywords- Bicycle Pedal, chain, Sprocket , Connecting rod etc.

I. LITERATURE REVIEW

R. Subash, K. Samuel Jayakaran, (2014), In this paper author has designed 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.

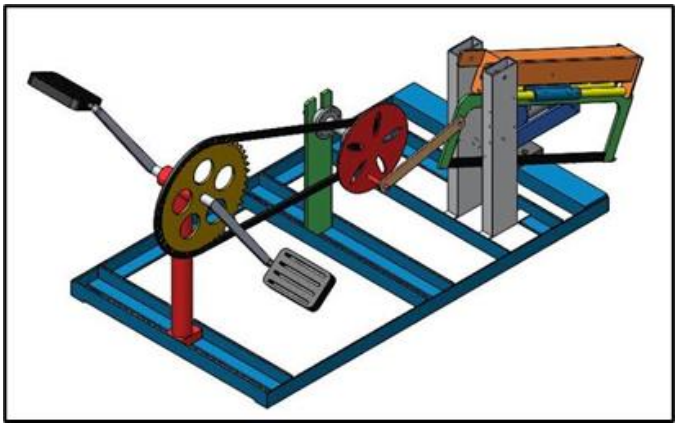
Girish T. , Parameswaramurthy D., (2014), In this paper author has designed to development of conceptual model of water pumping and battery charging cross trainer which is user friendly, easy to do exercise, save & stores the energy of the users muscle efforts. When the human operates the lever and the pedal, the Centrifugal Pump is actuated and the water is pumped from ground sump to the tank. At the same time the attached dynamo (i.e., is mounted near the V-belt) operates and the mechanical energy is converted in to electrical energy, the generated electrical energy is stored in battery with the help of wires. The stored electrical energy is used when we are needed.

Umesh Bokade, Zakiuddin Syed Kazi and Girish D Mehta, (2013), The author proposed the designed model which will convert the dirty/saline water into pure/ potable water using the renewable source of energy (i.e., Human power). The machine consists of a human-powered flywheel motor using a bicycle-drive mechanism with speed-increasing gearing and a flywheel, which drive the process unit though a spiral jaw clutch and torque increasing gearing. The operator puts energy into the flywheel at a convenient power level for about one minute. After enough energy is stored, pedaling is stopped and the energy in the flywheel is made available to the process unit.

David Gordon Wilson, (1986), According to the author, a person can generate four timer more power (1/4 horsepower (hp)) by pedaling than by hand-cranking. At the rate of1/4hp, continuous pedaling is for can done only short periods, about 10 minutes. However, pedaling at half this power (1/8 hp) can be sustained for around 60 minutes. Pedal power enables a person to drive devices at the same rate as that achieved by hand-cranking, but with far less effort and fatigue. Pedal power also lets one drive devices at a faster rate than before (e.g. winnower), or operate devices that require too much power for hand-cranking (e.g. thresher). The main use of pedal power today is still for bicycling, least in the high-power at range (75 watts and above of mechanical power). In the lower-power range there are a number of uses of pedal power-for agriculture, construction, water pumping, and electrical generation-that seem to be potentially advantageous, at least when electrical or internal-combustion engine power is unavailable or very expensive.

CONSTRUCTION

The pictorial view of the constructed main body of the pedal power hacksaw machine is shown in Fig.1.1 For the construction of the proposed system, several parts of the system like frame, cutter, roller, shaft, and handle are tobe constructed. The brief description of the several parts of the system is delineated below**.**



1.1 Bicycle Pedal

A bicycle pedal is the part of a bicycle that the rider pushes with their foot to propel the bicycle. It provides the connection between the cyclist's foot or shoe and the crank allowing the leg to turn the bottom bracket spindle and propel the bicycle's wheels.

Pedals were initially attached to cranks connecting directly to the driven (usually front) wheel. The safety bicycle, as it is known today, came into being when the pedals were attached to a crank driving a sprocket that transmitted power to the driven wheel by means of a roller chain. Pedals usually consist of a spindle that

Figure 1.1: Bicycle pedal

threads into the end of the crank and a body, on which the foot rests or is attached, that is free to rotate on bearings with respect to the spindle.Pedal will be used to transfer our muscular energy to the large sprocket.

1.2 SPROCKET

A sprocket or sprocket-wheel is a profiled wheel with teeth, cogs, or even sprockets that mesh with a chain, track or other perforated or indented material. The name 'sprocket' applies generally to any wheel upon which radial projections engage a chain passing over it. It is distinguished from a gear in that sprockets are never meshed together directly, and differs from a pulley in that sprockets have teeth and pulleys are smooth.

Sprockets are used in bicycles, motorcycles, cars, tracked vehicles, and other machinery either to transmit rotary motion between two shafts where gears are unsuitable or to impart linear motion to a track, tape etc. Perhaps the most common form of sprocket may be found in the bicycle, in which the pedal shaft carries a large sprocket-wheel, which drives a chain, which, in turn, drives a small sprocket on the axle of the rear wheel. Early automobiles were also largely driven by sprocket and chain mechanism, a practice largely copied from bicycles.

1.3 Chain

There are actually two types of links alternating in the bush roller chain. The first type is inner links, having two inner plates held together by two sleeves or bushings upon which rotate two rollers. Inner links alternate with the second type, the outer links, consisting of two outer plates held together by pins passing through the bushings of the inner links. The "bushingless" roller chain is similar in operation though not in construction; instead of separate bushings or sleeves holding the inner plates together, the plate has a tube stamped into it protruding from the hole which serves the same purpose. This has the advantage of removing one step in assembly of the chain.

1.4 CONNEECTING ROD

A connecting rod, also called a 'con rod', is the part of a piston engine which connects the piston to the crankshaft. Together with the crank, the connecting rod converts the reciprocating motion of the piston into the rotation of the crankshaft. The connecting rod is required to transmit the compressive and tensile forces from the piston. In its most common form, in an internal combustion engine, it allows pivoting on the piston end and rotation on the shaft end.

The predecessor to the connecting rod is a mechanic linkage used by water mills to convert rotating motion of the water wheel into reciprocating motion.[5]

The most common usage of connecting rods is in internal combustion engines or on steam engines.

1.5 HACKSAW

A hacksaw is a fine-toothed saw, originally and mainly made for cutting metal. The equivalent saw for cutting wood is usually called a bow saw.

Most hacksaws are hand saws with a C-shaped walking 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. A screw or other mechanism is used to put the thin blade under tension.On hacksaws, as with 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 vise, hacksaw blades are set to be facing forwards.

Fig 1.2 Hacksaw

1.6 BASE FRAME:

Plan view of frame in support position.

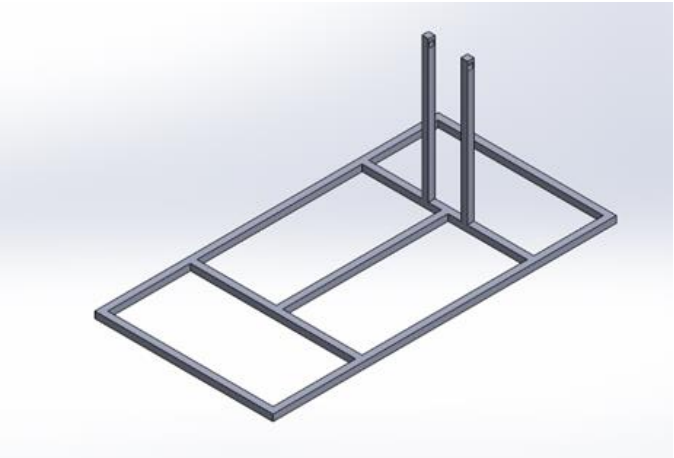


Fig 1.3 Base Frame

1.7 BENCH VICE:

A vise or vice is a mechanical apparatus used to secure an object to allow work to be performed on it. Vises have two parallel jaws, one fixed and the other movable, threaded in and out by a screw and lever.

II. RESULT, CONCLUSION AND FUTURE SCOPE

1.Result

[1] PDH can be used in distant places where electricity is not accessible. It is designed as a transportable one which can be used for cutting in various places.
[2] The ply wood can be cut devoid of any peripheral energy like fuel or current. Since PDH uses no electric power and fuel, this is very economical and best.
[3] PDH can be used for light duty cutting process of plywood. It is also effective for the human health
[4] Pedal driven hack saw helps to obtain less effort uniform cutting. The results specify that the PDH had given better, accurate and faster cuts when evaluate with hand hacksaw at different rpm.
[5] This machine reduces the human endeavor and hence we don't need two persons to cut the wooden logs.

2 Conclusion

Thus a low cost can enhance day today household needs and daily day to day purposes and it can be also and simple design pedal operated hacksaw machine is fabricated. This machine reduces the human effort and hence we don't need two persons to cut the wooden logs. This simple design of conventional design which used in for industrial applications during power shut down scenarios. By using this method we can do any operation as per our requirement without the use of electricity. so we can save the electrical power.

3 Future Scope

1. In a furniture making industry at production it is widely used
2. It can perform cutting operation in various kinds of industries.
3. This machine can be applied in carpentry and plumbing works also.

REFERENCES

[1] https://www.ijert.org/design-and-fabrication-of-pedal-operated-hack-saw
[2] https://learnmech.com/pedal-operated-direct-simple-hacksaw/
[3] https://www.indiamart.com/proddetail/pedal-operated-hacksaw-19289121397.html
[4] Chaudhary Pravin, Solanki Chirag ,Vaghela Jaydeep, Rabari Mehul and Detroja Pratik, Design and Fabrication

of Power Hacksaw, International Journal of Engineering and Technology, Vol 2, june 2015, pp 45-53.

[5] Adarsh Ranjan and Kushagra Sharan, Pedal Powered Washing Machine (PPWM), International Journal of Engineering Research and Technology, Vol 3, 2012, pp 113-118.

[6] Vishal Gehlot, Abhinay Nigam and Kunal Marmat, Design and Fabrication of Pedal Operated Air Compressor, International Organization of Science and Research, Vol 8, 2014, pp 225-325.Montesa, I.E.P,. Beniteza, A.M., Chaveza, O.M. and