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“FABRICATION OF HYBRID MULTIPURPOSE MACHINE TOOL”

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ABSTRACT

Developing a hybrid multipurpose machine tool, which consists of 3 different features in one cycle. I am developing Grinding, Drilling and Hacksaw Cutting machine in one cycle mechanism. In which hacksaw machine can be disabled and enabled as per the need. Our invention is that, a low cost, pedal-powered machine that is designed around readily available parts. Its innovation is its simple design and its use of inexpensive and cycle components. It is reliable, easy to operate and uses no electricity. The parts are available locally, so it can be manufactured and repaired in the community.

Keyword: Fabrication, hybrid, multipurpose, machine tool.

I. INTRODUCTION

Throughout history, human has applied energy through the use of arms, hands and back. With the invention of bicycle and pedaling, legs also began to be considered as a means to develop power from human muscles. A person can generate four times more power by pedaling than by hand cranking. At the rate of 1/4hp, continuous pedaling can be done for only short periods, about 10 minutes. However, pedaling at half this power 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, or operates devices that require too much power for hand cranking. Over the centuries, the treadle has been the most common method of using the legs to produce power. Treadles are still common in the low-power range, especially for sewing machines.

The maximum power output from treadles is very small; perhaps only 0-15 percent of what an individual using pedal operated cranks can produce under optimum conditions. It is a compact, portable unit capable of doing many operations that normally require expensive single purpose machines. With different attachments that are available with the unit, cutting, drilling and grinding can be performed quickly and inexpensively.

II. OBJECTIVES

Objective of this paper is to reduce time and many operations performed at one time like drilling, cutting, grinding. In the multi-purpose mechanical machine, parts or components produced should have its minimum possible production cost.

III. LITERATURE SURVEY

Sahu Samirkumar, Satishkumar and Ashishkumaron Fabrication of Tow Way Pedal Power Hacksaw Machine In this Pedal operated two-way hacksaw machine which can be used for industrial applications for cutting of wooden block, metal bar and pipe too. The machine works on the principle of slider crank mechanism. In this machine peddle in connected to the crank which is connected directly to the hacksaw frame from both the side and the power is supplied to the hacksaw frame by means of chain. The main objective behind this machine to reduce both cutting time and energy in which no external power is required for cutting operation, it also available in affordable cost. The peddle power two-way hacksaw machine, which runs on human power, works on the principle of the conversion of rotational motion to oscillatory motion. This is a green project which saves our electricity need and can be easily applicable in day today's life.

Sanjay N.Havaladar, AltafSomani, AnushaPikle, YashSiriahand, SamikshaPatil Studied on Pedal Operated Water Filtration System (Mobifilt) and paper analyzes the design of a pedal operated water filtration system to be used by local dwellers. It works on the principle of compression and sudden release of a tubeby creating negative pressure in the tube and this vacuum created draws water from the sump into the pump while rollers push the water through to the filter where adsorption takes place to purify the water. The design comprises of a peristaltic pump powered by pedaling, a filter and hose or flexible tube.As the operator sits on the seat and pedals, the pedal crank transfers the motion to the rotor thus the rollers and the tube is squeezed by the set of rollers to move the fluid. Thisdesign will reduce the labor, cost and weariness causedby transporting and sanitizing drinkable water for use.Improving access to safe drinking-water can result in tangible benefit to health. Nearly, one billion people suffer needlessly without access to safe drinking water and over five thousand children die each day because of water related diseases.

Anyanwu S. Ikechukwu, Ashinze E. Anthony Studiedon Design and Fabrication of a pedal operated power Generator Energy conservation is a topical issue and this design proffered an efficient method of doing so. The design was originally conceived to meet the energy needs of those living in rural areas, due to poor access to electricity and also as a model for gym centers and cycle workout studios. Most persons living in these rural areas possess at least a cell phone but lack the means to charge them. This study focused on the design and fabrication of a pedal operated power generator, for the intents of burning fats while yet generating electricity. It was fabricated using locally sourced materials and is intended to encourage local ingenuity and empower aspiring entrepreneurs especially in developing countries. Its purpose is to efficiently transfer human foot motion less than 60 rpm via a treadle and sprocket-chain step-up to drive a 24V DC permanent magnet generator. The inverter converts the direct current (DC) into alternating current (AC) which is needed to charge low voltage devices like mobile phones, laptops etc. The overall efficiency of the system was about 66.6%.

Mr. Vivek V. Jawnekar , Mr. Dhiraj C. Jagtap and Mr.ShubhaH.Gulhanestudied On Pedal operated bicycle drain cleaner pedal operated bicycle drain cleaner is used to remove the garbage from drainage system. Drain cleaner works on electricity but we are replacing electricity by pedal power. Pedal power generates the rotary motion by using bicycle and rotary motion is converted into mechanical energy which runs the drain cleaner. The drain cleaner are couple with sprocket of bicycle with the help shaft and that shaft rotated the drain cleaner. In Drain cleaner the reversing mechanism is fitted inside the drain cleaner that easily run the drain cleaner according to the sprocket speed. The Pedal Power drains cleaner works only on mechanical energy without electricity. The pedal operated drain cleaner are work without electricity that helps the irrigation in remote areas where electricity is still a major problem along with providing eco-friendly environment. It also helps to regulate a good health while pedaling Pedal Powered drain cleaner is not only free from pollution but also provide healthy exercise.

IV. COMPONENTS

4.1 Hacksaw frame and hacksaw blade

A hacksaw is a fine-toothed saw, originally and mainly made for cutting metal. The equivalent saw for cutting wood. 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. A screw or other mechanism is used to put the thin blade under tension.

4.2 Drill chuck and drill bit



Figure-1 Drill chuck

Drill bits are cutting tools used to remove material to create holes, almost always of circular cross-section. Drill bits come in many sizes and shapes and can create different kinds of holes in many different materials. In order to create holes drill bits are usually attached to a drill, which powers them to cut through the work piece, typically by rotation. The drill will grasp the upper end of a bit called the shank in the chuck.

4.3 Fly wheel

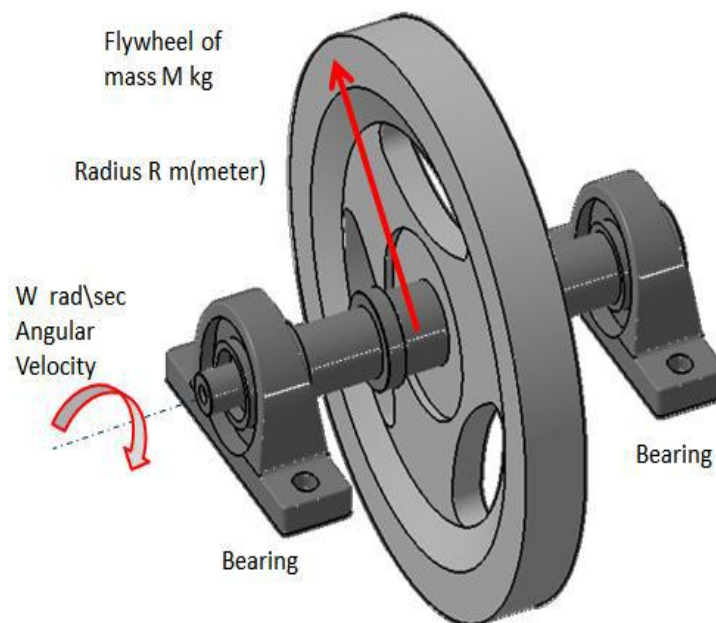


Figure 2 flywheel

A flywheel is a mechanical device specifically designed to efficiently store rotational energy. Flywheels resist changes in rotational speed by their moment of inertia. The amount of energy stored in a flywheel is proportional to the square of its rotational speed.

4.4 vise and clamp

Rigid & Robust Vices designed for smooth operation & Reliability. Manufactured from high quality grey iron castings very strong material with excellent shock absorbing capacity and immense strength under compression. Steel jaw is hardened 45 ± 5 HRC for increased resistance to wear. Knurling on the jaw ensures a firm grip of the work piece.

4.5 Grinding Wheel

The grinder, also known as a side grinder or disc grinder, is a handheld power tool used for grinding (abrasive cutting) and polishing. Although developed originally as tools for rigid abrasive discs, the availability of an interchangeable power source has encouraged their use with a wide variety of cutters and attachments. Grinder was used for providing surface finish to various portion of frame like surface plate edges, square pipe etc.

4.6 Chain

Chain is used to rotate the sprocket & flywheel for specified operations. Chain drive is a way of transmitting mechanical power from one place to another. It is often used to convey power to the wheels of a vehicle, particularly bicycles and motorcycles. It is also used in a wide variety of machines besides vehicles.

4.7 Pedestal bearing



Figure 3 Pedestal bearing

A cylindrical hole formed in a cast iron machine member to receive the shaft which makes a running fit is the simplest type of solid journal bearing. Its rectangular base plate has two holes drilled in it for bolting down the bearing in its position as shown in the figure. An oil hole is provided at the top to lubricate the bearing. There is no means of adjustment for wear and the shaft must be introduced into the bearing endwise. It is therefore used for shafts, which carry light loads and rotate at moderate speeds.

V. WORKING MODEL OF HYBRID MULTIPURPOSE MACHINE TOOL



Figure 4 Working model of hybrid multipurpose machine tool

VI. CONCLUSION

Thus a low cost and simple design pedal and motor operated sheet cutter 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 can enhance day today household needs and daily day to day purposes and it can be also 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. After some literature surveys it is found that the traditional method in sheet cutter, it consumes lot of time and energy. So these problems present in this method could be overcome by proposed mechanism. After some modifications and focusing on disadvantages will put the project in main league of use. This project saves time and lead to efficient of working. The operating procedure of this system is very simple so any person can operate this mechanism. At the start of our project we have been able to increase in easiness in operating of machine. Further, problems occurred at the time of unloading the trolley in critical areas are eliminated and thereby reducing overall time required of the trailer.

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