



SOLAR WOOD AND METAL CUTTING HACKSAW ODR CUTTER

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ABSTRACT

The project aims at designing a system which makes the Wood cutter (hacksaw) based motor running through solar energy. Power plays a great role wherever man lives and works. The living standard and prosperity of a nation vary directly with the increase in the use of power. The electricity requirement of the world is increasing at an alarming rate due to industrial growth, increased and extensive use of electrical gadgets. According to world energy report, we get around 80% of our energy from conventional fossil fuels like oil (36%), natural gas (21%) and coal (23%). It is well known that the time is not so far when all these sources will be completely exhausted. So, alternative sources should be used to avoid energy crisis in the nearby future. The best alternative source is solar energy. A solar panel are sometimes called photovoltaic cells because they use sunlight ("photo" comes from the Greek word for light) to make electricity (the word "voltaic" is a reference to electricity pioneer Alessandro Volta). The system depending on the charging circuit the motor can be controlled. The solar power stores the energy to a battery and then runs the motor.

KEYWORDS : Solar panel, Charging circuit, Wood/Metal cutter (hacksaw), Motor

I. INTRODUCTION

A. Introduction to Non-Conventional Energy Sources:

While fossil fuels will be the main fuels for thermal power, there is a fear that they will get exhausted eventually in the next century. Therefore other system based on non-conventional and renewable sources are being tried by many countries. These are solar, wind, geo-thermal, sea and bio-mass.

1). Solar Energy:

Solar energy can be major source of power. Its potential is 178 billion MW which is about 20000 times the world's demand but so far it could not developed on large scale. Sun's energy can be utilized as thermal and photovoltaic. The former is currently being used for steam and hot water production.

2) Wind energy:

Wind energy which is indirect source of solar energy conversion can be utilized to run wind mill which in turn drives a generator to produce electricity. Wind can also be used to provide mechanical power such as for water pumping. The energy available in winds over the earth's surface is estimated to be 1.6×10^{17} which is of same order of magnitude as present energy consumption on the earth.

3) Geothermal energy

Geothermal energy drives the heat in the Centre of the earth. According to various theories the earth has a molten core. The facts that volcanic action takes place in many places on the surface of the earth, supports these theories. The steam and hot water comes naturally to the surface of the earth in some location of the earth. India does not appear to have any major exploitable sources.

4). Ocean Energy:

Energy from seas can be utilized as wave tidal or ocean thermal energy. About 13 kW per meter height of wave can be generated. A plant to make 445000 kWh/yr of energy is being set up in Kerala State. Ocean thermal energy conversion utilizes the temperature difference between warm surface water at about 28°C and the cold deep sea water at 5-7°C at depth of 800-1000 meter in tropical areas. In India the Gulf of Kutch, Gulf of Cambay and Sunder bans are potential sites.

5). Biomass Energy:

Biomass is another renewable source of energy in the form of wood, agriculture residues, etc. The potential for application of biomass as an alternate source of energy in India is very great. We have plenty of agriculture and forest for production of biomass. Biomass is produced in nature through photosynthesis achieved by solar energy conversion. Biomass can be burnt directly to generate steam for use in steam turbine for power generation or they can be gasified and the gas used in an IC Engine.

B). Introduction to Solar Energy:

Sun is primary source of energy, and all form of energy on the earth is derived from it. Solar energy has the greatest potential of all the sources of renewable energy and if only a small amount of this form of energy could be use, it will be one of the most important supplies of energy especially when other source in country have depleted. Energy comes to the earth from the sun. This energy keeps the temperature of the earth above that in colder spaces, causes current in the atmosphere and in ocean, causes the water cycle and generates photosynthesis in plants. The solar power where sun hits atmosphere is 1017 watts, whereas the solar power on earth's surface is 1016. The total worldwide power demand of all needs of civilization is 1013 watts. Therefore, the sun gives us 1000 times more power than we need. If we can use 5% of this energy, it will be 50 times what the world requires. The energy radiated by the sun in bright sunny day is approximately 1 kW/m². Utilization of solar energy is of great importance to India since it lies in a temperature climate of the region of the world's where sun light is abundant for major parts of the year. India has the total land area of 3.28×10^{11} m². On an average 5 kW/m² per day solar energy is falling on this land over 300 days per annum.

C). The Application of Solar Energy:

- Heating and cooling of residential building.
- Solar water heating.
- Solar drying of agricultural and animal products.
- Solar distillation on a small community scale.
- Salt production by evaporation of sea water or inland brines.
- Solar cookers.
- Solar engines for water pumping.

- Food refrigeration.
- Bio conversion and wind energy, which are indirect source of solar energy.
- Solar furnaces.

II. LITERATURE REVIEW

A). Provide alternative for industries aiming toward reducing human effort:

BY: -Dr.SyedAzam Pasha Quadri, M.Tech, Ph.D (Thermal Engg)

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This project is on the design and construction of a solar power hacksaw machine for cutting of metal to different size and length with the help of solar hacksaw. The objective of this project is to save manpower and time, energy in cutting metals. It is a cutting machine with teeth on its blade used specially for cutting material. The power to the hacksaw is provided by the Solar Energy. A solar connected to the hacksaw converts the solar energy into electrical energy which is stored in a 12 v battery. A DC motor is connected to the hacksaw which is used to give the rotary motion to the flywheel connected to the shaft of the dc motor. The energy stored in battery is supplied to the dc motor which rotates the flywheel connected to the shaft of motor. A solar power hacksaw is a cheap and environmental friendly device that is operated without the consumption of any energy other than the solar energy. Solar energy is cheap and easily available on the earth. No heavy machines or devices are required for energy conservation. SOLAR OPERATED WOODCUTTER can be used in work shop, industries, and many fields where there is a requirement of hacksaw.

Ref 1

B). Keywords: Arduino Microcontroller, Cutter, Pulse Width Modulation (PWM), Solar Design & Development of Metal/Wood Cutting Tool by using Solar Energy: An Approach Towards Building Green City

BY:-Archan B. Patel Sagar R. Amrelia Keyur S. Denpiya

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Requirement of electricity of the world is increasing at very high rate because of industrial growth, increased and extensive use of electrical gadgets. Today world receives 80% of the energy from conventional non-renewable energy sources. So within short timespan, all the sources will be completely exhausted. The best alternative source is solar energy. Solar energy can be used in many electrical appliances. Industries like automobile, packaging and medical etc. have increased the use of aluminum, as aluminum made things are quiet easier to manufacture, handle and reliable to use. Solar charge controller is simulated using MATLAB and hardware is prepared using arduino microcontroller. solar energy based metal/wood cutting machine is proposed. In many countries, in the interior parts till today electricity is not available, or it is available for short period of time. In this area used of solar energy plays very important role. The proposed system shows how solar energy can be used in day to day life without polluting the environment and keep our city green. Further many industries today use aluminum because of the advantages offered by it. Hence, for cutting the metal lot of electricity is consumed. This proposed system shows how solar energy can be used for metal cutting.

C). Design and Development of Pedal Powered Hacksaw

By R. Subash, K. Samuel Jayakaran

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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.

D) DipakPatil, SwapnilRaut, ShrikantJadhav

The main objective of this work is to perform cutting operations with the help of motor. For a developing industry the operation performed and the parts (or) components produced should have its minimum possible production cost, and then only industry runs profitability

E) Kondakkagari Dharma Reddy, Pathi Venkataramaiah

The usage of phase change materials (PCM) to store the heat in the form of latent heat is increased, because large quantity of thermal energy is stored in smaller volumes. In the present experimental investigation, sodium this sulphate pentahydrate is employed as phase change material and it is stored in stainless steel capsules. These capsules are kept in fabricated tank and hot water is supplied into it. The experimental design is prepared by considering the parameters: flow rate, heat transfer fluid inlet temperature and PCM capsule shape.

F) Essam Ali Al Bahkali, Adel Taha Abbas

The aim of study is the Failure analysis in mechanical components has been investigated in many studies in the last few years. Failure analysis and prevention are important functions in all engineering disciplines. Materials engineers are often the lead role in the analysis of failures, where a component or product fails in service or if a failure occurs during manufacturing or production processing

III. CONCLUSION

- It is the need of time to replace conventional power hacksaw OR cutter machine by solar powered hacksaw.
- SOLAR OPERATED WOOD-CUTTER is energy efficient as well as eco-friendly in comparison to convention hacksaw being used. The major advantage of this machine is that it requires no exhaustible source of energy for its operation.
- This machine is light in weight and thus easily portable.
- An advancement that can be implemented in SOLAR OPERATED WOOD-CUTTER (Hacksaw) is that the user can also make it automated using required mechanism and sensors. This is possible with the help of an advanced microcontroller, which should have programmable memory.

Main points that I have considered:

1. Sensor (I) – with the help of the sensor the machine or cutter will cut the material automatically as specified length (given by user initially)
2. Sensor (II) – this type of sensor will be used for determining the condition of cutter or hacksaw.
3. This machine has a wider application in areas where supply of electricity is less or even no electricity. Cutting operation is performed by each and every manufacturing industry.
4. Small work place or industry can be setup in no electricity region for cutting woods, tree etc.
5. So for future if there would be development of micro-batteries which would supply the required power then this machine could be made even more compact

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