

DESIGN AND FABRICATION OF SOLAR POWERED GRINDING AND WOOD CUTTING MACHINE FOR SMALL SCALE INDUSTRY

v.Gokulnath¹, D.lakshminarayanan¹, K.Mohamed halid¹, G.saravanamanickam¹, S.K.senthilkumar¹,

T.T.M. kannan²

1 UG scholar, 2 Associate professor

PRIST University

ABSTRACT

The point of the present work is to outline and create solar power fueled auto charging grinding machine is utilized for granulating any state of objects like Circular, Rectangular, and Polygon. Grinding machine is accustomed to grinding the distinctive sorts of material. The grinding machine is turned by the single stage acceptance engine. Thus our task to be specific solar fueled auto charging grinding machine is a Special kind of Machine. As indicated by the sort of material to be a grind, the granulating instrument can be changed. This task gives subtle elements of granulating different shapes and sizes of segments. This machine can be broadly connected in all sorts of ventures. By differing the pulley sizes we can get a top of the line speed of more than 10,000 rpm if necessary. The main change we have to make is to have a completely encased engine to keep out the coarseness. In the present work, D.C powered grinding machine which control is drawn by the 12-volt D.C battery. This battery is charged by the solar power based board and the alternator which is coupled to the grinding machine shaft with the assistance of spur gear drive.

Keywords: Solar panel, grinding machine, dc battery alternator, induction motor

I. INTRODUCTION

Aim of the research work is to design and fabricate the auto charging grinding machine. It is used to grind the machining surfaces to super Finish and accuracy. The principal parts of this attachment are the main body, the motor with pulley, bearings, rope pulley and alternator, etc. So this project solar powered auto charging grinding machine is very much use since it is provided with good quality of power sources and simple operating mechanism. Hence each and every drop of fuel save our economy and meet the needs is the saturation point that is to be attained as soon as possible.

In order to achieve this saturation point, we have to save and seek some other source of power. This power, the **alternate power must be much more convenient in availability and usage. The next important reason for the search of** effective, unadulterated power is to save the surrounding environments including men, machine and material of both the existing and the next fourth generation from pollution, the cause for many harmful happenings and to reach the saturation point. The most talented power against the natural resource is supposed to be the electric and solar energies that best suit the automobiles. The unadulterated zero emission electrical and solar power is the only easily attainable alternate source.

Hence we decided to incorporate the solar power in the field of automobile, the concept of many Multi-National Companies (MNC) and to get relieved from the incorrigible air pollution. Need for non-conventional energy sources. Energy is the primary and most universal measure of all kinds of work by human beings and nature. Everything that happens in the world is the expression of the flow of energy for input to their bodies or to the machines and thinks about crude and electric power.

A. PRIMARY ENERGY SOURCES:

Primary energy sources can be defined as sources, which provide net energy. Coal, Oil, uranium, etc, are examples of this type. The energy required to obtain these fuels is much less than what they can produce by combustion or nuclear reaction. Their energy yield ratio is defined as the energy feedback by the material to the energy received from the environment becomes very essential to use these fuels sparingly. Primary fuels contribute concededly to the energy supply.

B. SECONDARY FUELS:

It produces no net energy though it may net energy yield ratio and those highest investments in terms of energy. Insulation is an example of this source. Coal, Natural gas, Oil and Nuclear energy using Breeder reactor are net energy yielder and are primary sources of energy. Secondary sources like solar energy, Wind energy, Water energy, etc. Solar energy can be used through plants, solar cells, and solar heaters. The solar tower is another emerging technology. Solar drying and solar heating are economical applications when passive methods are used. Because of the dilute nature of solar energy, it is difficult to classify the sources as the primary one. Better sources are wind. Tidal, wave and hydroelectric application, Geothermal and ocean thermal are other sources, which may well prove worthwhile. It may be necessary for the future to develop secondary sources like solar, wind, etc. Energy is an important input in all sectors of any country economy. The standard of a given country can be directly related to per capita energy consumption. The energy crisis is due to two reasons first the increase of population and the second is the standard of living of human being has increased. The supply of oil will fail to meet the increasing demand before the year 2020 even if the energy crisis rises 50% above current levels in real terms. Additional constraints on oil production will hasten this shortage, thereby reducing the time available for action on alternatives. Electricity from nuclear power is capable of making an important contribution to the global energy supply although worldwide acceptance of it, on a sufficiently large scales yet to be established. Fusion power will not be sufficient before the end of 2020.

C. WORLD ENERGY FUTURE:

If the present trend continues, the world in the year 2020 A.D. will be more crowded than that of today. The world population may reach 10 billion by 2020 A.D. the conventional energy sources are depleting and may be exhausted by the beginning of the next century. Nuclear energy requires a skilled technician and poses safety as regards to radioactive waste disposal. Solar energy and other non-conventional energy sources are to be utilized in the future. Coal has the potential to contribute substantially to future energy supplies. Coal reserves are abundant but taking advantages of them requires an active program of development by both producers and consumers. Natural gas reserves are large enough to meet projected demand provided the incentives are sufficient to encourage the development of extensive and costly inter-continental gas transportation system. Other than hydroelectric power, renewable resources of energy example solar, wind, wave are unlikely to contribute significant quantities of additional energy during the century at global level although they could be of importance in particular areas they are likely to become increasingly important in the mind of the 21st century.

II. NEED FOR NON-CONVENTIONAL ENERGY:

Fuel deposit in the world will soon deplete by the end of 2020 Fuel security will be maximum. A country using petroleum will not have the chance to use petroleum products. Keeping this dangerous situation in mind, we tried to make use of the non-pollutant natural resource of solar energy. The creation of a new source of perennial is environmentally acceptable. Low-cost electrical energy as a replacement for energy from rapidly depleting resources of fossil fuels is the fundamental need for the survival of mankind. We have oil resources for about 25 Yr. And coal reserves for about 75-100 Yr. Resort to measure the beginning of coal in thermal electric. Power station to service the population would result in a global elementary change in leading to worldwide draught and desertification. The hazards of the nuclear electric power station are more & huge.[7]

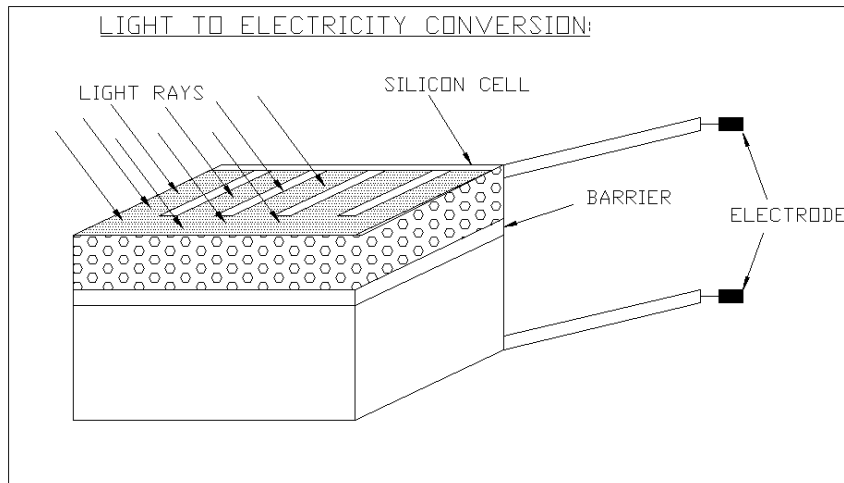
Now electric power beamed directly by microwave for orbiting statuette. Solar power stations (s.p.s) provide a cost-effective solution every through many certain has extensively proceeded work on Solar photovoltaic and solar thermal electric energy resources. Earth-based solar power station suffers certain basic limitation. It is not possible to consider such a system and meeting continuous uninterrupted concentrated baseload electric power requirement.

A. CONCEPT:

Dr. Peter Glaser in the U.S. published an idea centered on the fact that in orbit close to earth, 1.35 KW of solar energy illuminates one square meter which is considerably greater and one more continuous than anyone square meter on the earth which, even when perpendicular to the sun can receive only a maximum of 1 KW. His idea was converting sunlight to electricity to convert into a frequency signal and beam down to the earth caring significant levels of energy. This electricity is by establishing a very large array of a solar cell in geostationary orbit. A receiving antenna station on the earth would convert this radio frequency back into an alternate current which would a fed into a local grit.

B. SOLAR ENERGY:

Solar energy has the greatest potential of the sources of renewable energy and if only a small amount of this form of energy could be used. Solar radiation is the diffusion radiation. The solar power where the sun hits atmosphere is 10^{17} watts whereas the solar power on earth's surface is 10^{16} watts. The total worldwide power demand for all needs of civilization is 10^{13} watts. Therefore the sun gives as 1000 times more power than we need. The sun radiates energy as electromagnetic waves of which 99 percent have wavelengths in the range of 0.2 to 4.0 meters. Solar energy reaching the top of the earth's atmosphere consists of about 8 percent ultraviolet radiation, 46 percent visible lights, and 46 % infrared Radiation.



where sunlight is abundant for a major part of the year. Solar energy is a time-dependent and intermitted energy Resource.

Fig 1: the light of Electricity Conversion

In general energy needs or demands for a very wide variety of applications are also time-dependent, but in an entirely different manner from the solar energy supply. Here is thus a marked need for the storage of energy or another product of the solar process, is the solar energy is to meet the energy needs.

This problem is especially severe for solar energy when it is used for heating in winter, because of its low availability during this period. So, we need optimally designed solar electric system will collect and convert the solar energy into electrical energy when the isolation is available during the day period and also optimally designed solar energy storage systems are needed for storing the converted electrical energy.

III. DIRECT METHOD OF UTILIZATION OF SOLAR ENERGY:

The most useful way of harnessing solar energy is by directly converting it into electricity by means of solar photovoltaic cells. Sunshine is incident on Solar cells, in this system of energy Conversion that is a direct conversion of solar radiation into electricity. In the stage of conversion into thermodynamic form is absent. The photovoltaic effect is defined as the generation of an electromotive force as a result of the absorption of ionizing radiation. Energy conversion devices, which are used to convert sunlight to electricity by use of the photovoltaic effect, are called solar cells.

In recent years photo-voltaic power generation has been receiving considerable attention as one of the more promising energy alternatives. The reason for this rising interest lies in PV's direct conversion of sunlight to electricity, the non-polluting nature of the PV widespread are of PV generation has been hampered by economic factors. Here to force, the low cost of conventional energy sunlight has obviated the development of a broad-based PV technology.

At the present time, PV generation can be justified only for special situations mostly for remote sites where utility lines on other conventional means of furnishing energy may be prohibitively expensive and are one of the most attractive non-conventional energy sources of proven reliability from the micro to the Mega-watt level.

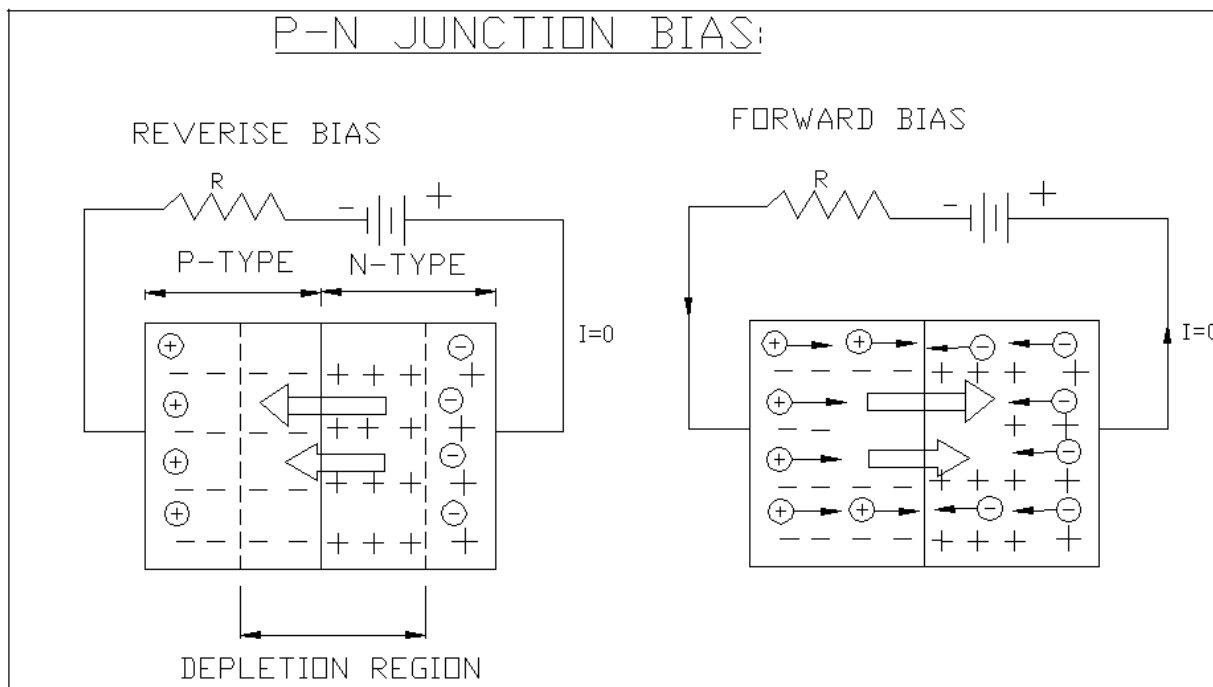
Like another energy system, this system also has some disadvantages

- (1) Distributed nature of solar energy,
- (2) Absence of energy storage,
- (3) Relatively high capital cost.

IV . PHOTOVOLTAIC PRINCIPLE:

The photovoltaic effect can be observed in nature in a variety of materials that have shown that the best performance in sunlight is the semiconductors as stated above. When photons from the sun are absorbed in a semiconductor, that creates free electrons with higher energies than the created there must be an electric field to induce these higher energy electrons to flow out of the semiconductor to do useful work. A junction of materials, which have different electrical properties, provides the electric field in most solar cells.

During the day time, the battery gets charged and when the intensity of light decreases, the LDR makes the light gets ON and the light glows by using the stored charge in the battery. Thus the given project is completed and commissioned.



Fir 2: P-N Junction BIAS

If electrical contacts are made with the two semiconductor materials and the contacts the connected through an external electrical conductor, the free electrons will flow from the n-type material through the conductor to the p-type material (figure). Here the free electrons will enter the holes and holes and become bound electrons thus both free electrons and hole will be removed. The flow of electrons through the external conductor constitutes an electric current, which will continue as long as move free electrons and holes are being formed by the solar radiation. This is the basis of photo-voltaic conversion that is the conversion of solar energy into electrical energy. The combination of n-type and p-type semiconductors thus constitutes a photo-voltaic cell or solar cell. All such cells some rate direct current that can be converted into alternating current it desired.

The photovoltaic effect can be observed in almost any junction of material that has different electrical characteristics, but the best performance to date has been from cells using semiconductor materials especially all of the solar cells used for both space and terrestrial applications have been made of the semiconductor silicon. Future cells may use such materials as the Semiconductors like Gallium arsenate, copper sulfate cad, etc. The device used to utilize the photovoltaic effect is solar cell.

V. CONSTRUCTION:

The construction of the photovoltaic cell is also known as the barrier layer or rectified cell as shown in the figure. It consists of a base plate made of either steel or aluminum and carries a layer of metallic selenium, which is light sensitive. An electrically conducting layer of cadmium oxide is applied by sputtering over the selenium layer. The layer is sufficiently thin to allow light to reach the selenium and is electrically continuous as it acts as the negative pole. The negative contact is formed of a strip of woods metal sprayed on to the edge of the top surface. The base plate forms the positive contact. A transparent varnish protects the front surface of the cell. When light falls on the upper surface of the selenium, electrons are released from the surface, which maintained a flow of current through the external circuit connected between the positive and negative contacts.

In the current output of a photocell should be proportional to the illumination, which is achieved by keeping the external resistance at a low value. Also if greater accuracy is required then illumination should not be allowed to exceed 25 lumens/feet². The smaller the size of the cell, of course, compatible with obtaining sufficient current to be properly measured the better a linear relation is obtained between current and illumination. This is because, for such a cell, the resistance of the electrically conducting film is at a minimum. Also, since the current is small, the voltage drop due to the circuit resistance will be kept low. Limitation of the photocell is that if the light is incident at the angels of 60° or above, the lacquer tends to reflect a significant an amount of light which, therefore, does not reach the selenium layer.

Thus the current is less than what it should be according to cosine law of illumination. Using a Matt lacquer can make some compensation for this. A better method is to omit the lacquer and cover the cell with a hemispherical dome of transparent plastic. The equivalent circuit of a photovoltaic cell is shown in the figure. Here E is a perfect photo-voltaic generator, which produces a current proportional to the illumination.

s = Series resistance, C = The effective capacitance, R = The equivalent of the barrier layer resistance and

RL = The resistance of the external circuit.

VII. WORKING PRINCIPLE

This machine is fixed on the work table, where the compound rest. When the motor is on, the abrasive grinding stone and the roller wheel will be rotated. The solar panel is used to store the electrical energy to the battery. The battery gives the supply to the D.C motor which is coupled to the generator and grinding machine with the help of belt drive as shown in the

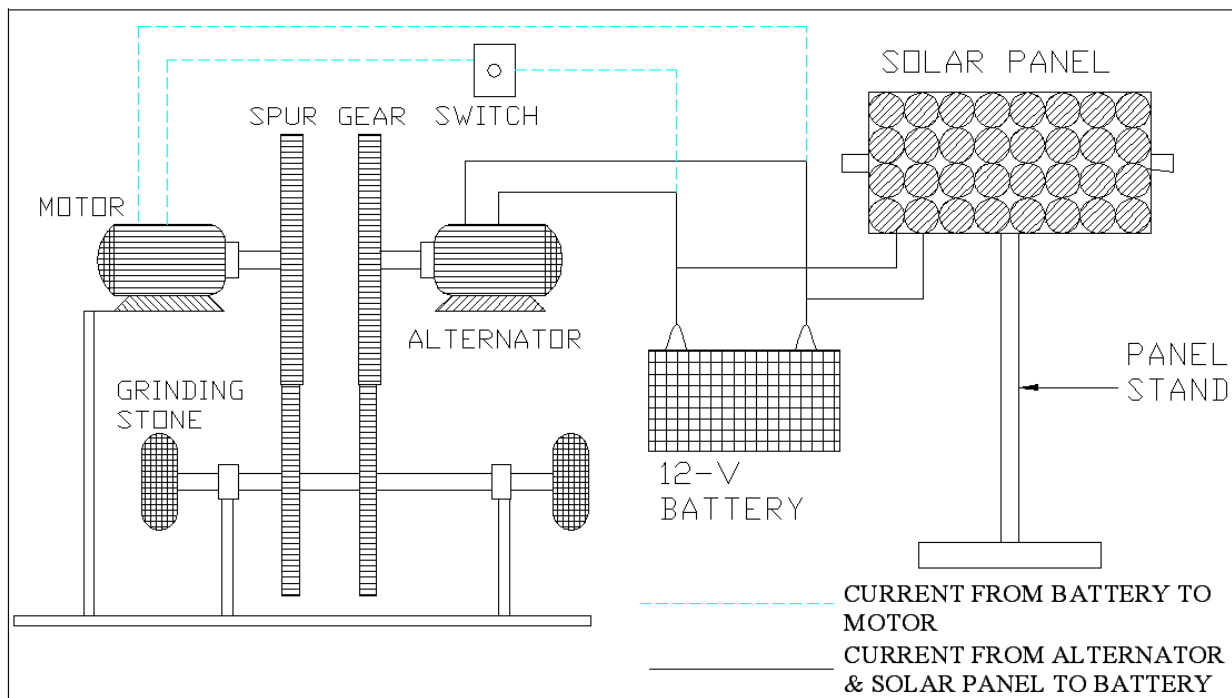


diagram.

Fig 3: Proposed Diagram

Solar energy means all the energy that reaches the earth from the sun. It provides daylight makes the earth hot and is the source of energy for plants to grow. Solar energy is also put into two types of users to help our lives directly solar heating and solar electricity. Solar electricity is the technology of converting sunlight directly into electricity. It is based on photo-voltaic or solar modules, which are very reliable and do not require any fuel or servicing. Solar electric systems are suitable for plenty of suns and are ideal when there is no mains electricity.

VIII. CONCLUSION

This report details with design and “solar powered auto charging grinding machine for small scale industries”.The project carried out by us made an impressive task in the shaping works of all types of the workpiece. It is very useful for the small scale industries in order to minimize the manufacturing cost by implementing the solar-powered automatic grinding machines to make the shape of small elements after the machining process. This project has been designed to perform the entire requirement task, which has also been provided. This type of fixture is mainly used in the production field for grinding all types of small scale elements firmly and securely to perform operations and is mainly used in manufacturing-oriented industries.

IX. REFERENCES

- [1] Machine tools and tool design by P.C. Charma published by S.Chand and company.
- [2] [http://www.ssiproject.com/mechanical_projects/solar powered auto charging grinding machine](http://www.ssiproject.com/mechanical_projects/solar_powered_auto_charging_grinding_machine)
- [3] Design of jigs, fixtures, and press tools by C.Elanchezhian, T.Sunder Selwyn, B.vijaya Ramnath Published by Eswar press.
- [4] Design of jigs, fixtures and press tools by Venkataraman published by Tata McGraw Hill.
- [5] A Review on Agricultural robots, International Journal 7, July 2015. (International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 4 Issue 7, July 2015.)
- [6] Sensor Based Multipurpose Agricultural Cutter. (International Research Journal of Engineering and Technology May-2016.)
- [7] Solar Based Wireless Grass Cutter, IJSTE, May 2016. (IJS - International Journal of Science Technology & Engineering, May 2016)
- [8] Pollution Free SolarPoweredBrush Cutter. (International Journal of Emerging Technology and Advanced Engineering, MAY 2015)