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An Ultra Small Water Power Generator for Electricity Generation

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ABSTRACT: We are living in the world which is full of pollution and what has caused this pollution maximum uses of non-renewable energy. many people nowadays are turning to renewable energy for their power. they know that renewable are necessary alternatives to fossil fuel and other non-renewable, which will eventually run out. most are also aware that renewable energy is kindle to the planet and society. that's why have to turn to renewable energy source we have to start using it. there are three main type of renewable energy source solar, wind and hydro. our project is related to the hydro power. all flowing water as a energy that's why we decide to utilise that unused energy from nature it is small and easy to used any one can used this generator easily. by using this generator we can power street light also used to electrifying fences to protect farmers crops. it can also be used village where there is a lot of problem of load shedding.

KEYWORDS: Hydropower, turbine, Dam, DC generator, power plant.

I. INTRODUCTION

Hydropower is a renewable energy source currently used in most parts of the world to supplement with electricity needs. It was recorded that waterpower was used to power the clock. Since this time, hydropower has evolved from running a small clock to generating enough power to supply a large city (Energy saving trust, 2003). Small-scale hydropower was first commonly used style of electricity generation in early 20th century. Hydropower is a very clean source of energy, which does not consume but only used the water and again make it available for other uses. It involves the conversion of the potential energy of water into mechanical energy, which is a technology with higher efficiency, in most cases double that of other conventional electric power plants (Energy saving trust, 2003). Hydroelectric power plants already supplies over 6% of the world energy needs and over the next decades much of the growth in renewable energy source will result from large-scale hydroelectric power project particularly in the developing world. The basic principle of hydropower follows that; if water can be piped from a certain level to a lower level, then the resulting water pressure can be used to do work. This means that hydropower involves the use of potential energy released by the weight of the falling water through a vertical distance to generate energy. If the water pressure is allowed to move a mechanical component, then that movement involves the conversion of the potential energy of water to mechanical energy which can be used to drive an electric generator, a grinding or some other useful devices. Hydroelectric power depends on the dynamic head, the amount of water flow and the efficiency of the generator/turbine. To know the power potential of a river, it is necessary to know the flow in the river and the available head. The flow Q of the river is the amount of time (in m or liters) that passes in a certain amount of time across a section of the river. Flows are normally given in cubic meters/seconds. The head H is the vertical difference in level (in meters) through which water falls down. The theoretical power P available from a given head of the water is exactly equal to the head H and flow Q . This available power will be converted by the hydro turbine into mechanical power. As a turbine has efficiency lower than one, the generated power will be a fraction of the available gross power. Our project is related to the hydro power. all flowing water as a energy that's why we decide to utilise that unused energy from nature it is small and easy to used any one can used this generator easily. The main objective of this research is to

see the possibility of powering a generator using water from a storage tank in other to generate electricity without polluting the environment.

II. RELATED WORK

Pico hydro is a term used for hydroelectric power generation of under 5 kW. These generators have proven to be useful in small, remote communities that require only a small amount of electricity – for example, to power one or two fluorescent light bulbs and a TV or radio in 50 or so homes.[2] Even smaller turbines of 200–300 W may power a single home in a developing country with a drop of only one meter. Pico-hydro setups typically are run-of-stream, meaning that a reservoir of water is not created, only a small weir is common, pipes divert some of the flow, drop this down a gradient, and through the turbine before being exhausted back to the stream. Like other hydroelectric and renewable source power generation, pollution and consumption of fossil fuels is reduced, though there is still typically an environmental cost to the manufacture of the generator and distribution methods.

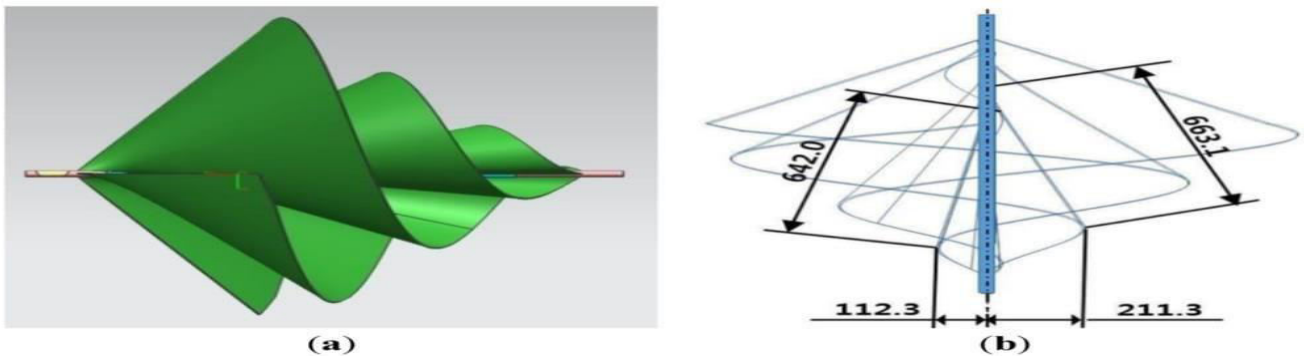


Fig 1.1 Spiral Picopica Hydraulic Power Unit

Spiral PicoPica Hydraulic Power Unit is a promising pico-hydro power generation equipment which has potential for dissemination in non-electrified areas, with its characteristics including low-head generation and dust-resistance. There are two types of units, “PicoPica10” and “PicoPica500”

“PicoPica10” is a unit that enables around 10W generation by securing a flow of 10ℓ/sec and a head of 0.1m. This product can be manually assembled and utilized as security lighting, drawing power from a nearby waterway. “PicoPica10” has already been sold over 500 sets within Japan as an environmental education material.

On the other hand, “PicoPica500” enables around 500W generation by securing a higher flowrate of 100ℓ/sec and a head of 0.7m. The generated energy can be equivalent to an average Japanese household’s electricity consumption.

If this product is implemented in developing countries where electrification is an issue, people’s lifestyle can be modernized, resulting in providing enormous social and cultural impact

I. Low Head Generation

This project can generate electricity with lower head compared to other hydraulic power generation units. II.

Dust Resistance

Besides having an open-type and simple structure for easy installation, the spiral shape of the watermill prevents the unit to be clogged with floating substances or dusts.

This project allows you to generate with lower head compared to other hydraulic power generation units. As the whole structure of this watermill is open-type and simple, works such as assembly, installation, cleaning, and maintenance can be completed with ease. Besides, the spiral shape watermill prevents the unit to be clogged with floating substances or dusts.



Because this doesn't require large waterways or pressure tubes for installation and there are not many component parts, this is cost-effective compared to another hydraulic generation units. When installed, the frame and the main body create a head by damming the waterway. So this project can be installed and operated smoothly as long as the waterway ensures required flow for generation. Regarding main consumables (such as bearing, generator, and watermill turbine) that require maintenance, no special skill will be needed to exchange them. Consequently, troubles can be repaired promptly. PicoPica10 enables around 10W generation by securing a flow of 10ℓ/sec and a head of 0.1m.

III. METHODOLOGY

- DC GENERATOR :

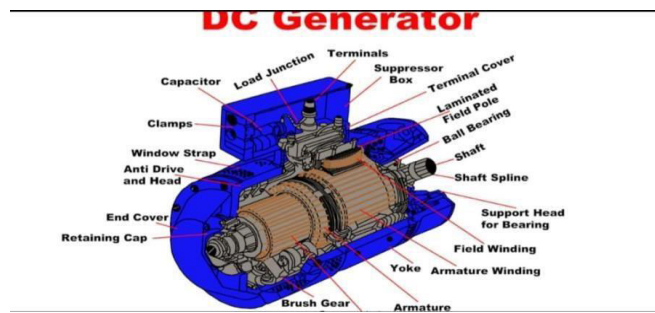


Fig 1.2 D C Generator

A dynamo is an electrical generator that creates direct current using a commutator. Dynamos were the first electrical generators capable of delivering power for industry, and the foundation upon which many other later electric-power conversion devices were based, including the electric motor, the alternating-current alternator, and the rotary converter. The electric dynamo uses rotating coils of wire and magnetic fields to convert mechanical rotation into a pulsing direct electric current through Faraday's law of induction and Lenz's law. A dynamo machine consists of a stationary structure, called the stator, which provides a constant magnetic field, and a set of rotating windings called the armature which turn within that field. Due to Faraday's law of induction the motion of the wire within the magnetic field creates an electromotive force which pushes on the electrons in the metal, creating an electric current in the wire. On small machines the constant magnetic field may be provided by one or more permanent magnets; larger machines have the constant magnetic field provided by one or more electromagnets, which are usually called field coils.

Working: When we place this device in flowing water. Then because the spiral blades are angled so they rise slightly towards the upstream side. A high metal plate blocks the stream this makes the water run over the top of the plate and flow down through the spiral blades. The force of the water on the blades turn the generator connected to the turbine to generate electricity. According to Faraday's law of electromagnetic induction, we know that when a current-carrying conductor is placed in a varying magnetic field, an emf is induced in the conductor. According to Fleming's right-hand rule, the direction of the induced current changes whenever the direction of motion of the conductor changes. Let us consider an armature rotating clockwise and a conductor at the left moving upwards. When the armature completes a half rotation, the direction of the motion of the conductor will be reversed downward. Hence, the direction of the current in every armature will be alternating. But with a split ring commutator, connections of the armature conductors get reversed when a current reversal occurs. Therefore, we get unidirectional current at the terminals. This concept work anywhere flowing water even if it's very sharp it could provide environment-friendly electricity for any place on earth where there is even a slight flow of water.

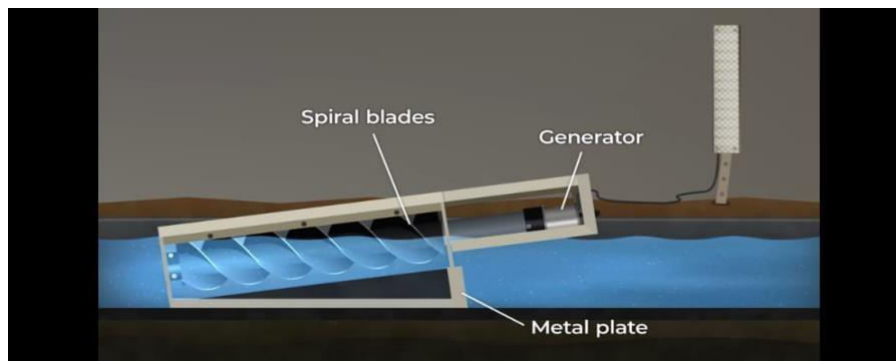


Fig 1.3 Turbine Working

ADVANTAGES :

1. It only takes a small amount of flow (as little as few litres per minute)
2. If planned carefully and well adapted to the environmental conditions, Small hydropower schemes produce a continuous and predictable supply Of electrical energy in comparison to other small-scale renewable Technologies.
3. Very easy to use even a ordinary man can use this generator
4. Very low cost and less weight Commutator

Disadvantages :

1. Small water power generator require certain site conditions and are thus not Suitable for any location. In order to take full advantage of the electrical Potential of small streams, a suitable site is needed.

IV.CONCLUSION

Small water power generator provides environment-friendly electricity .The main purpose of this project is to increase the awareness about Renewable energy sources among the people also to help the villages Where there is a lack of power

REFERENCES

1. Energy Saving Trust,(2003).[Http://Www.Saveenergy.Co.Uk/Download Hydroelectric.Pdf](http://www.saveenergy.co.uk/download/hydroelectric.pdf) Retrieved On 3/12/2003
2. Wisconsin Focus On Energy,(2002).
[Http://Focus On Energy.Com/Data/Common/Pagebuildersfiles/1802977667 Low Head %20 Hydro.Ne.Pdf](http://focusonenergy.com/data/common/pagebuildersfiles/1802977667_low_head_hydro.ne.pdf).Retrieved On 5/9/2003



- 3.Trout Unlimited,(2003). [Http//Tu.Org/Conservation/Threats-Hydro.Asp](http://Tu.Org/Conservation/Threats-Hydro.Asp) Retrieved On 4/7/2004
- 4.U.Sdepartment Of Energy,(2004).Energy Efficiency And Renewable Energy
- 5.[Http//Www.Eere.Energy.Gov/Wind%20and %20hydrol](http://Www.Eere.Energy.Gov/Wind%20and%20hydrol).Retrieved On23/7/2005
6. Wikipedia. [Http//En.Wikipedia.Org/Wiki/Hydroelectricity](http://En.Wikipedia.Org/Wiki/Hydroelectricity) Retrieved On 23/7/2005
- 7.Mcgraw H(1982)Mcgraw Hill Encyclopedia Of Science And Technology. 5th Edition.Mcgraw Hill Inc.Pp.278-282.
- 8.Encarta Concise Encyclopedia.(2005)
- 9.Korthari Dp,Nagrath Ij(1989).Theory And Problems Of Basic Electrical Engineering



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