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MIRROR BASED POWER GENERATION

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ABSTRACT

The solar power plant technology using solar concentrators like parabolic trough, enclosed trough, Fresnel reflector, dish stirling, solar power tower are generating adequate power but efficiency of this plants is quietly less, Due to this the utilization of sun energy is minimum and less energy is generated. In the mirror based power generation system the focus is on the technology of parabolic dish power plants, a proven technology for solar power generation. The large scale in parabolic dish power plant through parabolic shape mirror concentrates the solar radiation onto pipe in the focal line of the receiver. Thus the thermal energy generated is used for electricity generation using prime mover as green steam engine. Due to use of this power plant there is vast savings of fuel. Approximately in year the plant can continuous on up-to 288 days. It does not create any sort of pollution. There is no use of any fossil fuel which is the best features of this power plant. This plant should be installed as per local areas like village at the higher position of the village. As we know very well that from last two centuries we use 60% of non-conventional energy. Hence, mirror based power generation plant can be much preferable and useful to us. Solar thermal power plants are ideal for covering peak and medium load in power off grid policy in hybrid operation they also work as base load. When we use mirror based power generation system then we can also prove the Moto of 24 hours of electricity.

Keywords: Scheffler reflector, axis tracking mechanism. Green technology.

I.INTRODUCTION

In the solar power plant technology the opportunity it present and the development in the market are the outlined. The focus is on the technology of parabolic dish in power plants a proven technology for solar power generation. The large scale in parabolic through power plant through shape mirror concentrated the solar irradiation onto pipe in the focal line of the receiver. The thermal energy thus generates it use for electricity generation in a steam engine parabolic through we can combined with wind energy system when sun is not shining. Due to use of this power plant there is vast savings of fuel. Approximately in year plant can continuous on up-to 288 days. It does not create any pollution. There is no use of any fuel as the best features of this power plant. This plant should be installed as per local areas like village at the higher position of the village. As we know that very well from last two centuries we use 60% of non-conventional energy. Hence, solar power plantcan be much preferable and useful to us. Solar thermal power plant is ideal for covering peak and medium load in power grid in hybrid operation they also work as base load.

II.NEED OF MIRROR BASED POWER PLANT

A.Short fall of conventional sources:

Nowadays, we are running all the power plants on conventional sources like Coal, oil, diesel, which are available in limited stocks so we will face short fall of this sources. But, our mirror based power generation plant totally works on solar system so there are no chances of short fall of source

B.Future demand of electricity:-

Increase with the globalization demand of electricity is also increasing rapidly so Conventional power plants could not able to fulfill increasing demand of electricity

C.Move towards green environment:-

Due to conventional power plant pollution problem is growing up day by day but our mirror based power plant is totally pollution free.

III.CONSTRUCTION

A. Scheffler dish:

i) The size of the Scheffler dish is of two type i.e

A) 10 sq.m

B) 16 sq.m

ii) The shape of this Scheffler dish is parabolic. One parabolic dish consist of 380 mirrors

iii) The main working of this dish is to concentrate the run rays towards the receiver.

iv) The basic model description Scheffler is concentrating heat on reflector

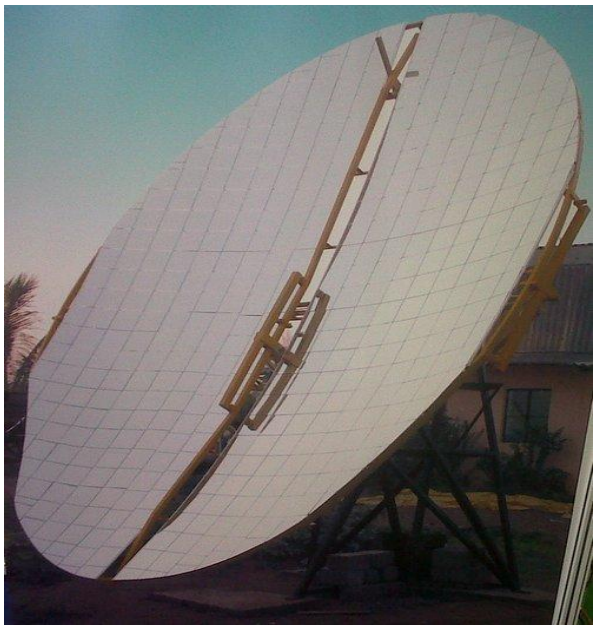


Fig 1.Scheffler dish

MODULE DESCRIPTION	RATING
surface area of collector	16 sq.m.
Dimensions and shape	parabolic
Reflectivity	92%

Table 1: Scheffler specification

B. Green steam engine:

It's a machine that burns fuel to make heat energy from water. A steam engine is a heat engine that performs mechanical works using steam. Steam works as working fluid. Steam engine is external combustion engine where the working fluid is separates from the combustion products. To rotate steam engine solar power is used. The ideal thermodynamic cycle used to analyze this is called Rankine cycle. In simple steam engine the steam works only once in a cylinder and then it get exhaust directly into the atmosphere. Hence green steam engine is the improved design as that of old steam engine. Benefits of green steam engine are as follows

1) Noiseless operation
2) Simple conversion from rotary to reciprocal movement and vice-versa.
3) Multiple outputs from a single rotary source.
4) Multiple outputs with separate timing, amplitude and duration.
5) Input and output in same linear direction.
6) Extremely simple structure.
7) Few and easily constructed parts
8) Little or no lubrication requirements
9) Applications include generators, distillers, boat propulsion, pumps, toy models, to suggest only a few.
10) Engine may be operated on any fuel including solar, bio-mass, dung, corn and barley, wood, waste heat and unrefined fuels.

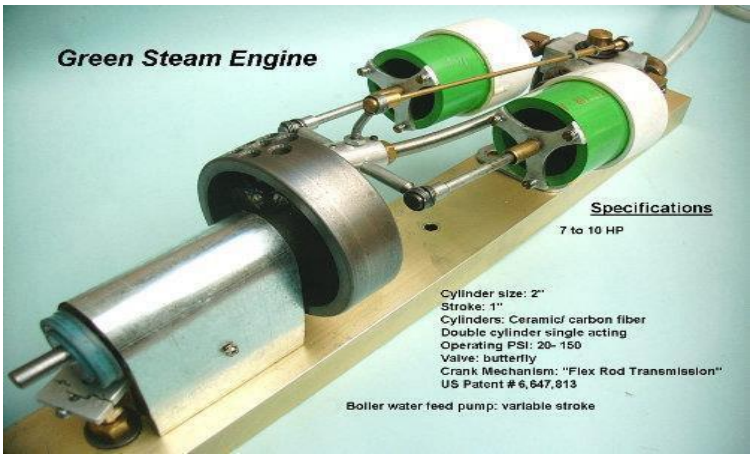


Fig 2.Green Steam Engine.

C.Alternator:

An alternator is an electrical generator that converts mechanical energy to electrical energy in the form of alternating current

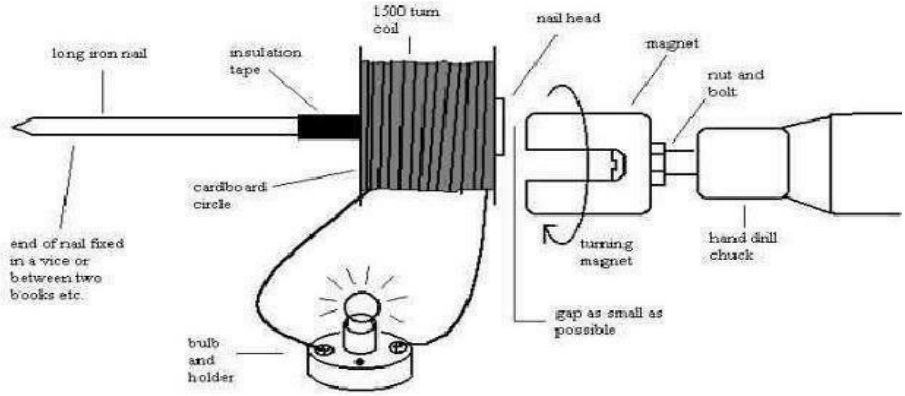
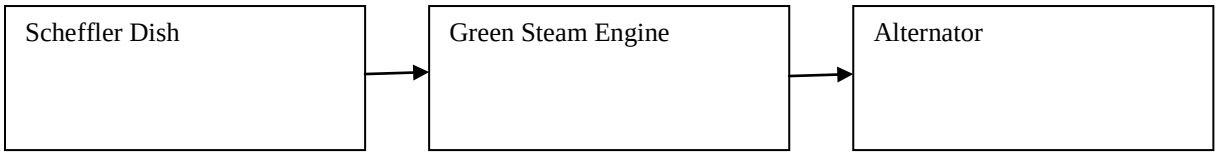


fig.3 Construction of Alternator

IV.WORKING OF MIRROR BASED POWER GENERATION

Sun rays concentrated on Scheffler dish are reflected to receiver. Receiver contains header pipe which stores water in half portion of pipe. Remaining Half portion is used for store steam. When sun rays are reflected on Scheffler dish and concentrated on receiver on basic principal which state that when sun rays are concentrated on magnifying glass it burns piece of paper. Steam which is produced is store in upper side of header pipe due low density of steam. And cool water goes downward for heating and it gets converts into steam. This cycle is continuously goes on and steam is produce. Steam is produce at temperature 180°c to 350°c pressure 10 bars. This steam goes into input of green steam engine. Green steam engine has property of crank mechanism which has a unique feature of FRT flex rod transmission which produces an intermittent

movement whereby the valve movement is stopped and it is opened and closed during the power and exhaust strokes. These give prolonged, fully opened valve timing. In compliment, the pistons are held stationery while the valve moves between phases. The output shaft continues rotation while the pistons stand still. As the result efficiency of engine increases as well as power produce at shaft. Due to pump in front of flywheel it recycle condensed exhaust steam. Due to this efficiency is increased. At shaft of engine generator is coupled. Basic principal of generator is that, alternating voltage may be generated by rotating coil in magnetic field within a stationery coil. The value of the voltage generated depends on the number of turns in the coil, strength of the field and the speed at which the coil or magnetic field rotates Shaft of steam engine rotate and generator generate electricity due to coupling of shaft.



Block diagram 1:-MBPG

V.BENEFITS

1 It does not require kerosene, coal gas or any fire wood because it works with the heat energy received directly from the sun as a result there is no lighter and no fuel bills as well.

2 It does not creates pollution of any kind hence at keeps the atmosphere clean and soot free

3 It does not emit the any smoke and fumes and so it is not health hazard either.

4. Zero emission at any gaseous and free solar energy makes plant beautiful places to live and stay cooler.

5. Compact for small scale production.

6. Less preventers‟ maintenance.

7. The Scheffler dish is sufficiently high sunshine hours (288 days) that are looks promising for clean energy in the Indian content. Steam can be generated using this Scheffler dish concentrator for the POWER GENERATION. This system can help to reduce the consumption of Non-renewable energy source i.e. coal and makes pollution free from smoke and fumes.

8. The Scheffler concentrator focuses the incident radiation on a receiver with smaller area. To keep focus throughout day. The most important feature of these system the dish has to track the sun is such way that the focus line on the axis of rotation. To keep the focus fired through the year, change in the shapes up in strong tank. In case of zero consumption of steam, pressure keeps increasing with radiation and reaches peak in the afternoon and then comes down.

9. The steam is generated from the Scheffler dish is start typically places around 10:30 am and continues up to approximately 4:30pm

10. Man power required less.

11. There is no any type of fumes are produce.

12. The MBPG (mirror based power generation) helps to meet demand of electricity at local areas like villages, school etc. that called off grid placed that when the MBPG is under the off grid policy as the Scheffler dish is use at various places like cooking thermal applications that when we choose the Scheffler dish. the green steam is works on „RRT" that is flex rod transmission system due to this the engine become noiseless and efficient. The steam engine have maintenances once that is change the „0" ring in year and it takes 10 minutes. The assembly and disassembly of engine is very easy. And no lubricants are required. The alternator is coupled with shaft of green steam engine. As the result of case study the alternator always gives above 95% efficiency the losses occurs in alternator are loose contact of brushes winding loss, etc. till alternator works efficiently as the Scheffler dish and green steam engine are now in working condition hence, there is no more issues and problems related to it. The MBPG project supports the green environment and cleanliness & no any chance of explosion or any other big accident.

VI.CONCLUSION

Though we are generating sufficient power but the demand is increasing day by day. Due to this the load shedding problem is very vast. Hence by using mirror based power generation plant we can overcome the load shedding problem.

Anyone can install this own generation plant as space required for mirror based power generation is quite less than other.

This is completely Eco-friendly as the mirror based power generation does not take any type of conventional fuel like coal, oil, etc. hence, it does not emit smoke and fume and hence is totally pollution free.

Need of smart city is currently the demand of developing country and hence mirror based power generation will play an important role in achieving smart city goal.

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