

On Finding an Alternative Method of Harnessing Solar Energy Directly Into AC

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Abstract – This paper presents an alternative mechanism to the conventional method of harnessing solar energy via solar cells and panels. The proposed mechanism directly produces alternate current in contrast to the solar cells, which first convert solar energy into DC. This DC has to be subsequently converted into AC for transmission purposes, a process marked by the loss of energy and production of noise. The proposed mechanism can solve the energy loss problem by directly converting solar energy into alternate current.

Keywords: Solar Energy, Alternate Current, Energy Transmission, Photo electrodes, Optical Fibers, Electromagnetic Induction.



Introduction

The rising oil prices and concerns regarding global warming have forced humanity to shift to cleaner alternative to energy, like solar energy and wind energy. The solar energy is practically an unlimited source of energy, which, if harnessed properly can reduce, or even completely eliminate, mankind's dependence over fossil fuels that are bound to deplete in the near future. However, the current methods of harnessing solar energy, which employ the use of photovoltaic cells, come with significant problems concerned with large scale production and transmission.



The photovoltaic cells convert the solar energy in direct current (DC). However, the electrical distribution system transmits energy via alternate current (AC). This means that the DC produced from photovoltaic cells must be inverted to AC. This additional step of inverting DC to AC is marred with energy loss, and it also creates noise and power pollution on the fundamental waveform.

Hence, it would be desirable to have a mechanism that directly converts solar energy into alternate current. This was the motivation my proposing this new mechanism, which directly converts solar energy into alternative current, in this paper.

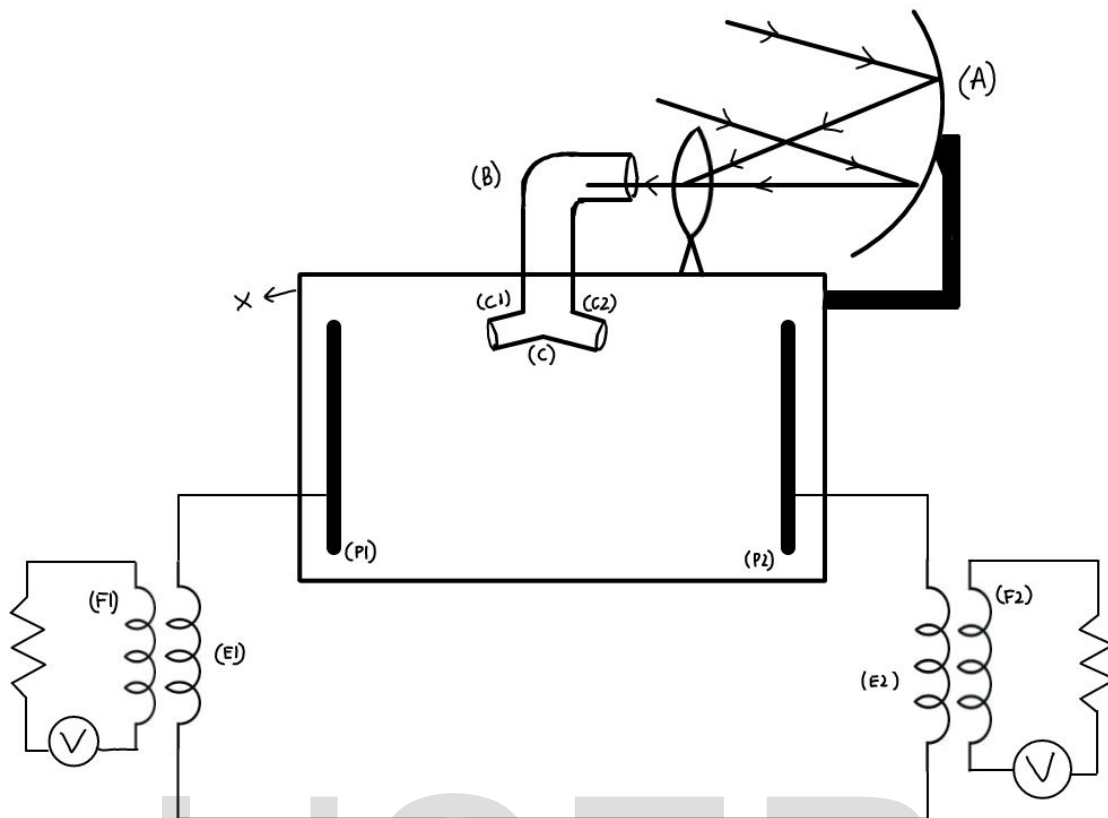
Materials, Design and Principle of Working

The basic materials required for building a prototype of this mechanism to be employed are:

1. Optical Fibers
2. Photo electrodes
3. Vacuum Box
4. Inductors
5. Electrical Cables

Basic Principles behind the Working

1. Photoelectric Effect
2. Electromagnetic Induction



The Basic Setup

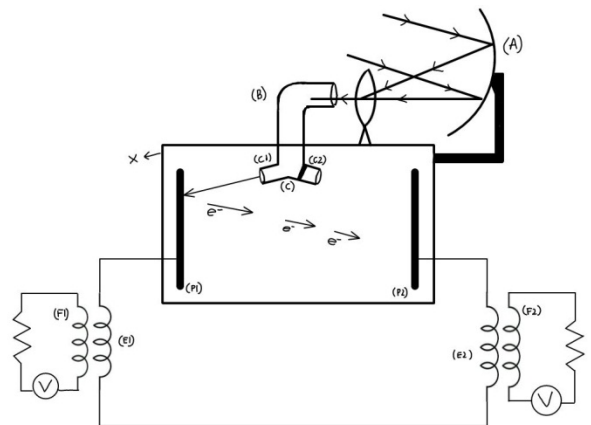
A system of concave mirrors and convex lens, (A), is attached over a vacuum box, X. Inside the vacuum box are 2 photo electrodes, (P1) and (P2), which are connected in series with each other via a connection wire which passes through the two inductors, (E1) and (E2). The other two inductors, (F1) and (F2), are placed alongside (E1) and (E2), and are connected in two other circuits, which they will be powering.

Mechanism

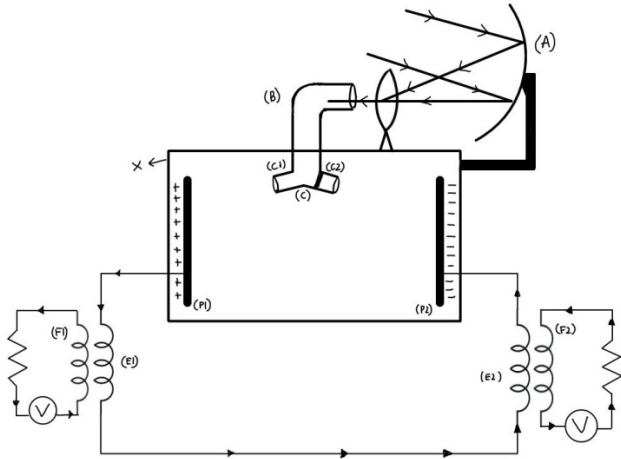
Step 1: Through a system of concave mirrors, (A), a large amount of light is concentrated on an optical fiber (B). The optical fiber helps direct the light inside the vacuum box.

Step 2: The optical fiber (B) is bifurcated at point (C) into the optical fibers, (C1) and (C2), which help us direct the light at photo electrodes, (P1) and (P2), respectively. The incoming light, at (C), is modulated in such a way that when light passes from (C1), it is blocked at (C2), and when light passes through (C2), it is blocked at (C1). These two instances are alternated. When (C1) allows the light, the light reaches (P1) where the

electrons get excited, due to photoelectric effect. We design our system in such a manner that the instance of blockage of light keeps alternating between (C1) and (C2). The crudest way of doing that would be to fit, in (C1) and (C2), 2 rotators which allow and block light, alternatingly, as they keep rotating. There can be more efficient methods but this paper is concerned with elucidating the mechanism rather than improvements.

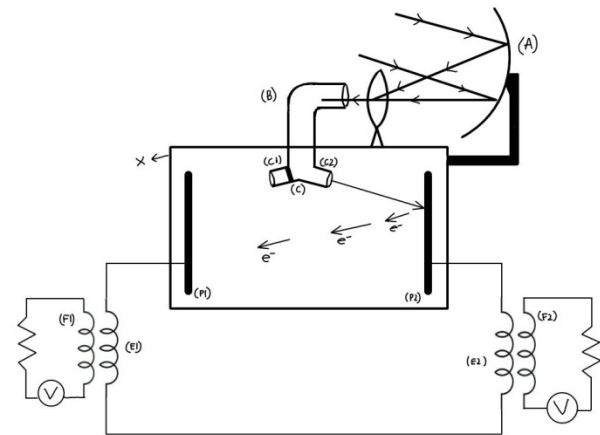


Step 3: We suppose that, initially, (C1) allows the light and (C2) blocks it. When the light reaches (P1) [since (C1) is allowing the light, the electrons are ejected due to the photoelectric effect rendering (P1) positively charged. The ejected electrons, which possess a certain kinetic energy, will be directed towards (P2). On reaching (P2), they will render it negatively charged.

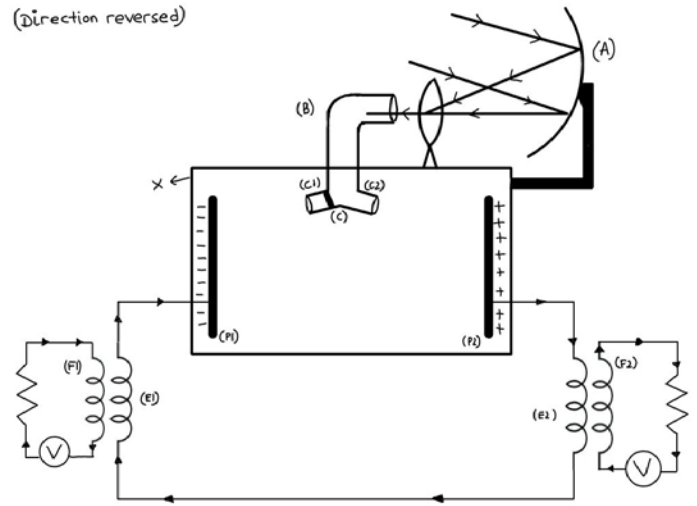


Step 4: But we have (P1), (E1), (E2), and (D2) connected in series, and since (P1) is positively charged and (P2) is negatively charged, a current starts flowing from (P1) to (P2).

Step 5: With the influx of current, a magnetic field is produced inside (E1) and (E2). Further, due to Lenz's Law, emf will be induced in the inductors (F1) and (F2). This emf will lead to the flow of current in the two circuits.



Step 6: Just as the current starts flowing to a maximum, we interchanged the roles of (C1) and (C2) with the help of the rotators. Now (C2) will allow the light and (C1) will block the light. Hence the polarity of (D1) and (D2) will get interchanged. Hence the direction of current will get interchanged.



Step 7: The whole is repeated perpetually. Each cycle will correspond to a single cycle of alternate current.

Here the vacuum box is serving as a capacitor, with two photo electrode plates (C1) and (C2) as the plates of a capacitor. The two Inductors (E1) and (E2) are working as the primary coils of transformers. The number of turns of the coils in (E1), (E2), (F1), (F2), can be set so that a desired AC voltage is obtained.

Advantages of the Proposed Mechanism

1. The proposed mechanism enables us to directly convert solar energy into alternate current.
2. It can be readily set up of extremely large scale production of energy. For instance, light can be concentrated from a large piece of parched land area, into a vacuum box which converts it into AC. The power can then be effectively transmitted with the help of transmission lines.
3. Lesser amount of photoelectric material is used in the conversion of solar energy into electricity.

Conclusion

Contrary to the present knowledge, solar energy can be directly converted into alternating current without the use of any inverters, with the help of this proposed mechanism.

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