

A low-cost solution to tap into gravitational potential energy of earth

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Abstract--This paper discusses a low-cost solution to tap into the gravitational potential energy of the earth using a plus-shaped plastic fan. It was shown in [1] that gravity can be converted to electricity without using running resources. However, the solution presented in [1] is not a commercially viable solution as the cost per watt generated using a piezo transducer is very high. The trick to finding a low-cost solution lies in arranging non-rigid bodies in an appropriate asymmetric way so that gravity can create continuous movement.

Index Terms--Piezo transducer, GRAEN generator

I. INTRODUCTION

Global warming (climate change) is a serious problem humans are currently facing. Renewable energy is a promising solution that can help bring global warming to permissible levels.

The gravitational potential energy of Earth is a recently discovered renewable energy source [1]. According to classical mechanics, it is not possible (using rigid bodies) to convert gravity into electricity directly. However, this result is not applicable when we are dealing with systems containing non-rigid bodies. It was shown in [1] that it is possible to convert gravity into electricity (using piezo transducers) without consuming running resources.

A generator made up of piezo transducers is not a commercially viable solution as the cost per watt generated is very high. The trick for creating a commercially viable solution lies in arranging non-rigid bodies in an appropriate

asymmetric way so that gravity can create continuous movement.

II. THEORETICAL MODEL

Let us see one such example of an appropriate asymmetric arrangement below. Consider a plus-shaped fan as shown in Fig. 1.

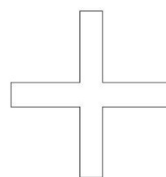


Fig. 1. Plus-shaped fan

All the blades are of equal length. The torque due to gravity on any one blade is canceled by torque due to gravity on the opposite side blade. Hence, there is no fan rotation due to gravity.

Next, consider a fan which is like a Jesus Christ's cross held in a horizontal orientation, as shown in Fig. 2.

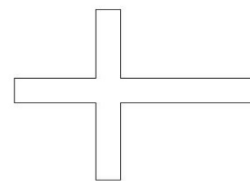


Fig. 2. Asymmetric Plus-shaped fan

Consider a vertical axis passing through the center (junction) of the fan. To the left side of this axis, the edge of the fan blade moves in a circular path. To the right side of the vertical axis, the edge of the fan blade moves in an elliptical path. Since length of the fan blade is longer on the right side of the axis, the torque due to gravity is also higher. Hence, the fan will rotate in the clockwise direction, due to gravity. Next, let us look at how such a fan can be constructed.

III. PRACTICAL MODEL

Consider a plus-shaped fan made of plastic pipes as shown in Fig. 3. Here, all blade lengths are equal.

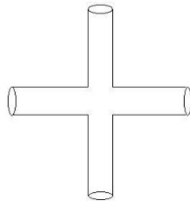


Fig. 3. Plus-shaped fan made using plastic pipes.

Next, attach another plastic pipe of a slightly larger diameter than the inner pipe (as shown in Fig. 4.) so that it can slide along the length of the inner pipe.

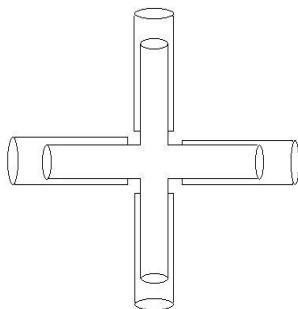


Fig. 4. Outer-pipe sliding over inner pipe.

Attach a rolling ball to the outer pipe as shown in Fig.5

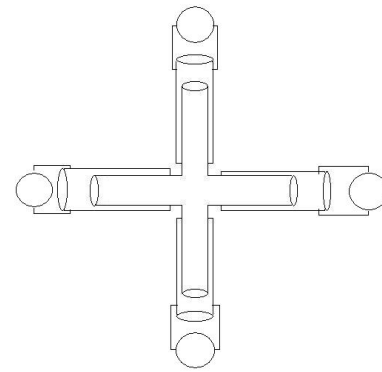


Fig. 5. Outer-pipe attached to a rolling ball.

Finally, place an aligner as shown in Fig. 6.

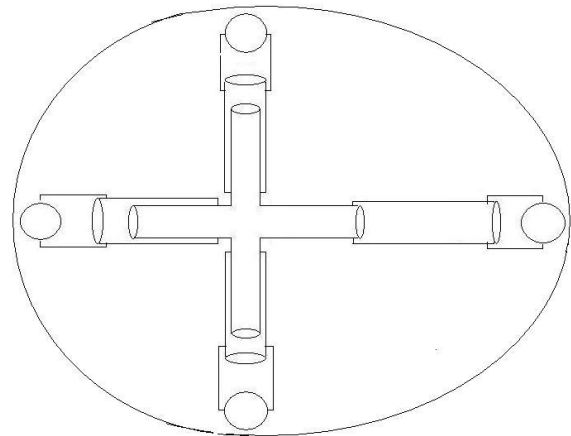


Fig. 6. Balls roll along the aligner.

Aligner and moving the outer pipe will ensure that the ball follows a circular path to the left of the vertical axis (2nd and 3rd quadrants). To the right side of the vertical axis, in the 4th quadrant, the ball will roll along the aligner in an elliptical path. Such a fan converts GRAvitational ENERGY of the earth into rotational kinetic energy and it is called GRAEN generator. A fan may stop rotating after some time due to friction. We can use a battery-motor combination to give some initial momentum. We can use a part of the energy generated to recharge the battery and the cycle can be repeated.

IV. CONCLUSION

A low-cost solution to tap into the gravitational potential energy of the earth is presented. The methodology used to come up with this idea is

inspired by an engineering technique called Gandhian Engineering. Gandhian Engineering proposes the idea of extracting more services using fewer resources for more and more people. The GRAEN generator is an example of Gandhian Engineering. It produces electricity without using running water resources. It is open-source so anyone can build it. It does not cause air pollution.

V. REFERENCES

- [1] B R V, S. K. (2021). A novel method to convert gravitational potential energy into electricity using piezo transducers. *Journal of Innovative Ideas in Engineering and Technology* (ISSN: 2563-3678), 1(1), 1-2.

VI. BIO

B R V Sumith Kumar did his Bachelor's degree in Electrical Engineering and Master's degree in Communication Systems from Department of Electrical Engineering at IIT Madras from 2004 to 2009. Currently, he is the CEO of Magworks, Hyderabad (India) and can be reached at sumithiitm@gmail.com