International Journal of Advance Research in Science and Engineering
Volume No. 14, Issue No. 03, March 2025
www.ijarse.com
IJARSE
ISSN 2319 - 8354

Water Pumping and Power Generation by Swing Action

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ABSTRACT

This project explains raising water levels for irrigation and producing electricity. Children utilize the swing cradle far more frequently in their daily lives since it generates energy through swing movement, which may be used to raise water in gardens and the village. A double-acting reciprocating pump is the system utilized to raise the water level. The installation of centrifugal pumps is less expensive when swing cradles are used. This work proposes the implementation of water lifting and power generation in swing cradle mechanism. The swing set's holding bars create some torque in the shaft when the sitting goes forward and backward. The larger sprocket that is pivoting over the shaft's axis is displaced by this torque, resulting in an angular displacement. By attaching a chain, this angular movement is transformed into rotating motion and connected to a smaller sprocket. The sprocket rotates the spur gear arrangement which runs the dynamo to generate the electricity this set up is done at one side of shaft in swing cradle. Lifting water is done in other side of the shaft is connected to connecting rod and this connecting rod is further connected with reciprocating pump through which water is pumped. This project work is eco-friendly, pollution free, the maintenance cost is less and requires less human efforts.

Keywords— *Generating power, lifting water, swing cradle.*

I. INTRODUCTION

Energy is the capacity for action. Energy is a vital component of contemporary civilizations, and its production and use are critical to socioeconomic growth. Energy levels consumed per person are frequently regarded as a reliable indicator of economic development. A number of limitations must be taken into account for human power conversion systems to be effective in developing nations, including low cost, low resource and skill needs, low maintenance, human safety and comfort, and environmental friendliness. It is simple to convert human power from children's play while they are stationary in relation to the playground's moving mechanisms, like the swing, merry-go-round, and seesaw. Using cost-effective human power conversion techniques when the children are in a dynamic condition rather than a static device (like a swing) will be difficult due to safety and simplicity issues. Human power is converted into useful electrical or mechanical energy via a variety of devices, including flywheels, electric generators, piezoelectric, compressed air systems, hydraulic components, springs, and so on. In case of individual human power conversion, increasing the conversion system's efficiency is frequently crucial; nevertheless, doing so would typically raise the system's overall cost. Power is created as a byproduct when multiple kids are using playground equipment. Because so many kids are playing, it is possible to build and deploy a low-cost system without significantly compromising efficiency.

II. LITERATURE SURVEY

Atul [1] found that the water is pumped by the pedal operated. Pedalling is the most efficient way of utilizing power from human muscles. To lift the water continuous pedalling it is very much painful to the human muscles that also a human cannot pedal for an hour. Kali charan [2] found that using the pendulum, water is pumped through oscillating motion. But this oscillation motion is not continuous motion a person should lift and drop or either by keeping magnet for lifting and drop it requires human efforts.

III. WORKING PRINCIPLE

Both forward and backward strokes of the swing cause some torque to be produced in the shaft. There are two bearings that secure the shaft. The shaft is shifted by pivoting a large, securely fastened sprocket at one end over the shaft axis. A chain is used to join two sprockets of different sizes. The smaller sprocket is put on the shaft to which the spur gear arrangement is attached. In these circumstances, the battery stores the power generated in the dynamo. The swing model is shown in the Fig. 1.

Fig. 1. Swing model.

The swing set's holding bars create some torque in the shaft when the sitting goes forward and backward. The larger sprocket, which is rotated across the shaft's axis, is displaced by this torque, resulting in an angular displacement. Chain attachment transforms this angular action into a smaller sprocket's rotating motion. The spur gear system, which powers the dynamo and generates electricity, is rotated by the sprocket. Electric circuits are used to store the resulting electricity in a battery, as illustrated in fig. 2.

Fig. 2. Power generation.

Other side of shaft is attached with connecting rod and that is joint with reciprocating pump through which water is pumped using to & fro motion as shown in Fig. 3.

Fig. 3. Water lifting.

IV. ADVANTAGES AND APPLICATIONS

The merits of developed model are: Pollution free electricity generation.

- This electricity can be stored in a battery array for later use, and it can be placed in locations where children are seen moving in large numbers, such playgrounds, hotels, gardens, and schools.

- Simple upkeep and installation.
- It can also be utilized in isolated locations without access to electricity.
- Since it operates manually, there are no operational expenses.
- Unlike solar, wind, and other plants, it can be swiftly erected anywhere.
- It is portable and has the ability to function as a portable power generator.

  Like other standard parts, it is simple to make, and installation only takes up a minimal amount of space.

V. CONCLUSION

In upcoming days, the demand of energy resources will be increasing every day's the aim of this project is to develop the world by enriching by utilizing its resources more. Now time has come for using such innovative ideas and it should be brought into practice. In this project the mechanism is used to lift the water from one place to another with reciprocating pump. This project is completely based on "simple pendulum". There are many sources to convert from mechanical energy to various forms. In this system no fuel or electrical energy is used. This project gives the overview for the challenges and opportunities for energy lasting in coming decades, this work can make best use of existing technology to ensure reliability and efficiency under changing condition. It outlines the need for cost effective technology in rural region.

ACKNOWLEDGEMENT

We are very much thankful to Dr. S. N. Topannavar, Professor and Head, Mechanical Engineering Department, Dr. S. C. Kamate, Principal, HIT, Nidasoshi, all teaching and non-teaching staff of Mechanical Engineering Department, HIT for their well guidance and support while carrying out this work.

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