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Pendulum Driven Water Pump

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ABSTRACT: The traditional hand water pump we are using may take more efforts, the man who operates traditional hand water pump has to apply his force continuously on the lever of pump, due to which man who are using this pump get tired immediately .One important thing of a pump with a pendulum is that the work is alleviated or in simple terms it makes work rather easier when is compared with a traditional hand water pump. By the use of pendulum based water pumping system we can increase the efficiency of the plant and reduce the effort, cost of production, production time, and manpower requirement. The research done fill today is concentrated on the working and effectiveness of the mechanism only. Considering all of the advantages of the mechanism it was decided to use it for lifting water with the help of reciprocating pump such that the input to the mechanism is given by humans which is comparatively less than the effort applied by humans to lift water using hand pumps directly.

KEYWORDS: lever mechanism, efficiency, cost of production, production time, water pump.

I. INTRODUCTION

This Pendulum Driven water Pump helps to Reduce time and effort. The main importance of a pendulum pump is that the initiation energy for starting the process of pumping, swinging of the pendulum, is considerably less when compared with the work required to operate hand pumps. Typical hand pumps require sufficiently large effort and an average person can use the pump continuously only for a short time, but the pendulum pump requires only minimum of the effort, because it is only required to oscillate the pendulum and can maintain these oscillation for several hours, without any fatigue. The advantage of this invention compared to present hand pump solutions are: less force to start the pump, less water consumption, and both arms can be used to fetch the water. New and technically original idea - hand water pump with a pendulum - provides alleviation of work, because it is enough to move the pendulum occasionally with a little finger to pump the water, instead of large swings. Using the minimum of human strength in comparison to present classic hand water pumps enables efficient application in irrigation of smaller lots, for water - wells and extinguishing fires even by old people and children, which was proved by a large number of interested future consumers during the presentations.

II. RELATED WORK

The aim & main objective of pendulum driven water pump is to reduce the effort made by the farmer forwell as the dual-medium and Communication Indian Institute of Technology, Roorkee, India presented an approach for the swing up and stabilization of a rotary inverted pendulum (RIP). RIP system is an unstable, multivariable, under actuated and highly nonlinear in nature. RIP consists of a pivot arm; the pivot arm rotates in a horizontal plane by means of a servo motor. The opposite end of the arm is attached to the pendulum rod whose axis is along the radial direction of the motor. The task is to design a controller that swings up the pendulum, and keeps it in upright position. Swing up action is based on the energy principle whereas stabilization pressurize. An onshore pendulum WEC test rig is built to validate the above proposals. A hydraulic cylinder is substituted for the wave that exerts force on the pendulum. Although the force and the output power in the simulation are somewhat different from those in the test results, the overall tendency is the same, and the dual power stroke in one period is clearly shown.

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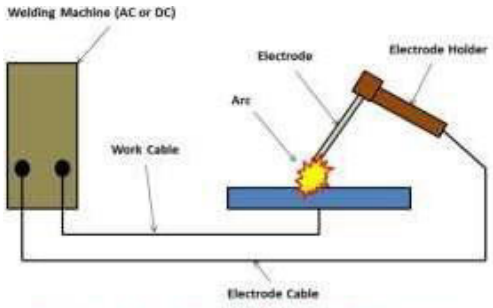
III. METHODOLOGY

1. **Frame:** It is the main part of the pump system and it is made up of steel. The cycle frame consists of seven rigid links which convert the pendulum movement to the pistonmovement.
2. **Reciprocating Pump:** This is a positive displacement pump. This is closely fitted with cylinder by the principle of actual displacement or a plunger.
3. **Springs:** The Spring is an elastic object which store mechanical energy. Here, in this system both tension and compression springs are used. The function of tension and compression springs to stretch and compress according toload applied.
4. **Levers:** The motion of pendulum is transferred to lever then lever move like see –saw .the spring &piston rod is connected to the remaining side of lever due to this the oscillating motion convert in to reciprocating motion of piston in cylinder.
5. **Bearings:** The rod is supported by two Pedestals bearing one on either side of lever forming the fulcrum of lever. The assembly of lever mounted on bearing Lever rotate with the help of beating. Another Pedestal bearing used atthe pendulum bracket for motion of a pendulum.
6. **Pendulum:** A pendulum is a weight suspended from a pivot so that it can swing freely. When a pendulum is displaced sideways from its resting, equilibrium position, it is subject to a restoring force due to gravity that will accelerate it back toward the equilibrium position. When released, the restoring force acting on the pendulum's mass causes it to oscillate about the equilibrium position, swinging back and forth. The time for one complete cycle, a left swing and a right swing, is called the period. The period depends on the

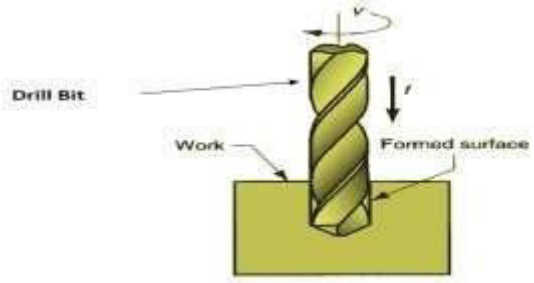
to join metal to metal by using electricity to create enough heat to melt metal, and the melted metals when cool



Basic Arc Welding Circuit Diagram

result in a binding of the metalsIt is a type of welding that uses a welding power supply to create an electric arc between a metal stick ("electrode") and the base material to melt the metals at the point-of-contact. Arc welders can use either direct (DC) or alternating (AC) current, and consumable or non-consumable electrodes.

8. **Drilling :**Drilling is a cutting process that uses a drill bit to cut a hole of circular cross-section in solid materials. The drillbit is usually a rotary cutting tool, often multi-point. The bit ispressed against the work-piece and rotated at rates from hundreds to thousands of revolutions per minute. This forces the cutting edge against the work-piece, cutting off chips fromthe hole as it is drilled.



9. **Metal Cutting :**Cutting is the separation or opening of aphysical object, into two or more portions, through the application of an acutely directed force.

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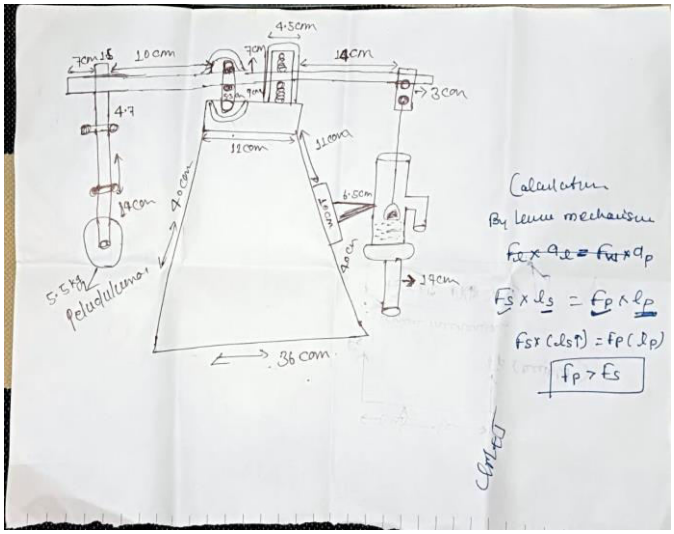
IV. EXPERIMENTAL RESULTS



By lever mechanism

Fs*ls(up)=fp(low)*lp(low)

V. CONCLUSION

In this study it was concluded that The pendulum pump can replace hand pump works on with the help of oscillating motion of pendulum which converted into reciprocating motion of piston for pumping action it is easy to operate & less effort is required for pumping Due to pumps portability and lesser weight even handicapped person and children can operate it. It can be used as a replacement for conventional hand pump.we have reduced the human effort by providing the pendulum bob which is attached in the hand lever. While pumping the pendulum oscillates to and fro and provides continuous energy to the hand lever which pressurizes the water and lifts the water from lower head to higher head and provides the continuous flow of liquid.

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