

DESIGN OF A POWERLESS PUMP FOR RAINFED REGION BASED ON INVERSION OF A DOUBLE SLIDER CRANK MECHANISM

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ABSTRACT

The development for this working model is prompted due to the need for pumping systems that does not use electricity or any fossil fuel as its power source and no geographical limitations, especially in underdeveloped remote areas.

In this paper, the oscillatory motion of a weighted pendulum which conserves momentum, obtained with the application of human effort, is converted into rotational motion of two shafts of 2.5 cm diameter and three rear sprockets via a 4.5 mm module bevel gear mechanism and gear ratio 6 which rotate the crank disc working on an inversion of double slider crank chain, known as Scotch Yoke Mechanism. The scotch yoke mechanism converts its rotary motion obtained from the sprockets into reciprocating motion of the two plungers used to suck water in one stroke into the cylinder and to deliver the same out from it in the next stroke. Efficiency of the system is found up to 48% - and 2.7-liters discharge per minute. The virtual model is created with software.

KEYWORDS: Bevel gear, Freewheel Sprockets, Pendulum & Scotch Yoke Mechanism.