Fabrication of Bicycle Parts for Water Lifting System

Vaibhav Bankar[1], Sheetal Prakash Manwatkar[2]

[1]H.O.D, Mechanical Engineering, Vidarbha Institute Of Technology, Nagpur (M.S), India
[2]Master Student, Mechanical Engineering, Vidarbha Institute Of Technology, Nagpur (M.S), India

Abstract— *In this paper we are going to develop and fabricate the parts which are to be used in water lifting system using bicycle. As we all are very well know various types of system for water lifting. We are also known about their advantages and disadvantages. In all this paper is used for the remote areas where electricity is not available and lifting of water is very difficult. It also used for the person who does not get time for exercise. It is very simple method to lift the water from ground level to the various heights. It is very simple in design and required less space. Electricity is not required here. Also maintenance cost is very low. When the cycle not is use, we can use as a normal cycle as all the parts which are to be used in lifting water is bolted in bicycle. Fabrication is done with the help of design calculations. And fabricate only those parts which are to be used in lifting water. As parts fabrication is not very critical and less expensive.*

Keywords— Belt, Pulley, Gears, Bicycle, Pump.

I. INTRODUCTION

The bicycle we get common in every home and it is very cheap rather in any other vehicle because it does not require petrol or diesel. Bicycle concept is very simple. It consists of front and rear wheel which are connected by the chain so that when pedalling the cycle front wheel rotates the rear wheel also rotates. The pump is mounted on the carrier and it is joined by the bolts so that when cycle not in use, it can be reuse for daily purpose. The big pulley is joined other side of the rear wheel of cycle and small pulley is joined to pump. It is connected by means of the belt. So that when rotation of big pulley completes its one rotation, the small pulley completes its three rotations. And when sprocket completes its one rotation, the rear wheel gear rotates its two rotations. So when pedalling the bicycle the water is to be lift to various heights depending on human efficiency. To lift water, 1200rpm and above is needed. So here we design as that we can lift the water 10meter and rpm we get here is 1500rpm.We are used here the centrifugal pump.

II. FABRICATION AND WORKING

Fabrication and working principle is simple in this project. The small parts which are used in lifting water is modified and fabricated. Fabrication is done with the help of design calculation. The cost is low for fabrication. The some parts such as bearing are used is ISO standard. Rests of the parts are mild steel and cast iron. With the help of software design and calculation we get the required output in this project. The below is the fabricated parts with their description and images.

2.1 Center Shaft

The center shaft never rotates in the bicycle. But for this arrangement it should be rotate. Hence all bushes are removed from it. So that when rider pedal the bicycle the front gear rotates, resulting the rear wheel gear rotates. The modified center shaft total length is 200mm. The diameter of the shaft is 15mm. The shaft length divided into equal parts. It is inserted into hollow shaft so that one end is attached to the small gear and other end is attached to the big pulley. The hollow shaft inner diameter and center shaft diameter is equal i.e. 15mm. The center is the main part for rotating the entire component in bicycle.

2.2 Sprocket

Sprocket is used in bicycle, motorcycle to transmit rotary motion between two shafts. The most common form of sprocket in bicycle, in which pedal shaft carries a large sprocket wheel, which drives a chain, which, in turn, drives a small sprocket on the axle of the rear wheel. The normal sprocket teeth in regular bicycle are 60 and rpm is 300rpm. The required rpm to lift water is 1500rpm. For this the number of teeth is increased into 80. Hence when sprocket completes its single rotation, the rear wheel gears its two rotations.

2.3 Pulley

The bicycle consists of one small pulley and one big pulley. The big pulley is connected on other side of the rear wheel which is inserted into center shaft. The small pulley is attached to pump which is placed in carrier of cycle and both pulley is connected by means of belt. The Big pulley and small pulley ratio is 1:3. When big pulley completes its one rotation, the small pulley completes its three rotation. And water is lifted its required height.

2.4 Bearing

The main function of the bearing is to prevent sliding friction between two parts. Here ball bearing is used with ISO standard 6001. The inner diameter where the bearing casing is fix is 15mm and outer diameter is 30mm.It is also called as pedestal or bearing housing. The second fabricated part in which bearing housing is attached is fixed on both side of rear wheel of the cycle.

2.5 Bolts

The main function of the bolt is to connect two parts together and give enough strength to the parts. It is four in number. It is used to bolt the bearing housing and the plate for adjustment from both side of the rear wheel gear.

III. FINAL ARRANGEMENT

The final arrangement is given above

IV. CONCLUSION

The main purpose of this paper is to provide and show the fabrication of basic bicycle parts which are to be used in water lifting. All the fabricated parts are less in cost and maintenance also.

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