

Design of Chainless Bicycle

Prithvi Ramani, Sagar Kushwah

^{1,2}Prithvi Ramani, The New Tulip International School, Ahmedabad, Gujarat.

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ABSTRACT: Nowadays, the majority of the vehicles are dependent on non-renewable fuels such as petroleum or diesel. Such problems result in an increase in toxicity in the atmosphere, traffic issues, global warming and other environmental hazards. In this era of mass-fuel consumption, a bicycle can be a relief to the environment and can reduce the load and burden on petroleum and diesel reserves. In order to overcome the drawbacks of the bicycle being used nowadays, we, a group of Mechanical Engineers have come up with an ideology of a chain-less bicycle. Modification in the design of the conventionally used bicycle is possible. The basic idea is to design a bicycle with a chain-less rear wheel, using a “chain less bicycle”
KEYWORDS: Shaft, Seat, Handle, Belt Drive, Paddle, Disc, Bearing, Wheel.

I. INTRODUCTION

This cycle creates almost 49% less friction when compared to the market leading chain and derailleur drive train. A traditional chain and derailleur drive train contain eight points of sliding friction, which is generated from the articulation of the chain at these points. This cycle for new Driven concept impressively eliminates all eight points of sliding friction.

[1] To achieve the ultimate performance, we use Speed Bearings in a disc style drive shaft system. In total 21 Speed Bearings play a crucial role in the functionality and efficiency of driven. They have extremely low rolling friction and longevity, the bearings transfer torque from the front ring through the drive shaft, then onto the 13-speed rear cog.

[2]. Aim of our Project is to make new kind of transmission system for bicycle for getting high reliability system, and more safe system. A drive shaft, driveshaft, driving shaft, propeller shaft, or bearing shaft is a mechanical component for transmitting torque and rotation, usually used to connect other components of a drive train that cannot be connected directly because of distance or the need to allow for relative movement between them.

[3].The shaft is the primary connection between the front and the rear end, which performs both the

jobs of transmitting the motion and propelling the front end. Thus the terms Drive Shaft and Propeller Shafts are used interchangeably. In other words, a drive shaft is a longitudinal power transmitting, used in vehicle where the pedal is situated at the human feet. A drive shaft is an assembly of one or more tubular shafts connected by universal, constant velocity or flexible joints. The number of tubular pieces and joints depends on the distance between the two wheels. The job involved is the design for suitable propeller shaft and replacement of chain drive smoothly to transmit power from the pedal to the wheel without slip. It needs only a less maintenance. It is cost effective. Propeller shaft strength is more and also propeller shaft diameter is less. It absorbs the shock. Because the propeller shaft center is fitted with the universal joint is a flexible joint. It turns into any angular position.

[4].The both end of the shaft are fitted with the bearing pinion, the bearing pinion engaged with the crown and power is transmitted to the rear wheel through the propeller shaft and disc . . With our shaft drive bikes; there is no more grease on your hands or your clothes; and no more chain and derailleur maintenance.

[5].Drive system is less likely to become jammed, a common problem with chain-driven bicycles The rider cannot become dirtied from chain grease or injured by the chain from "Chain bite".

Power transmission through chain drive is the oldest and widest used method in case of bicycle. In this paper we implemented the chainless transmission to the bicycle to overcome the various disadvantages of chain drive. The detail procedure for the design and analysis for strength consideration is discussed in this paper. A shaft-driven bicycle is a bicycle that uses a driven shaft instead of a chain to transmit power from the pedals to the wheel. Shaft drives were introduced over a century ago, but were mostly supplanted by chain-driven bicycles due to the gear ranges possible with sprockets and derailleur. Recently, due to advancements in internal gear technology, a small number of modern shaft-driven bicycles have been introduced. The shaft drive only needs

periodic lubrication using a grease gun to keep the gears running quiet and smooth. This “chainless” drive system provides smooth, quite and efficient

transfer of energy from the pedals to the rear wheel. It is attractive in look compare with chain driven bicycle. It replaces the traditional method.

II. CHAINLESS BICYCLE PROTOTYPE



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Bicycle is one of the most commonly used form of transportation in the world. It is two wheeled vehicle, powered by a rider and steered using a handle. It is considered as eco-friendlier and an economical mode of transport in the world. Existing form of bicycle is evolved from the developments in its past history. Research is carried on making the bicycle economical and more comfortable. In this review paper, various designs developed in the history of bicycle are described. This review paper summarizes an up-to-date progress in different methods for transmission of human power on the pedal to the rotation of the wheels and the major advantages and disadvantages of these transmission methods.



Disc 1



Shaft Drive

PARTS OF CHAINLESS BICYCLE



Wheel



Final Assembly

III. OVERVIEW

A shaft is a rotating machine element which is used to transmit power from one place to another. The various members such as pulleys, bearing, etc are mounted on the shaft to transfer the power from one shaft to another. These members along with forces exerted upon them causes the shaft to bending. It is made up of mild steel. It is a straight rod, having a step. It is supported by the bearing. A shaft is a rotating machine element which is used to transmit power.

Ball Bearing:

A bearing is machine element which supports another moving machine element. The moving machine element is known as journal. Bearing permits a relative motion between the contact surfaces of the members, while carrying the load. A certain amount of power is wasted in overcoming frictional resistance. In order to reduce frictional resistance and wear and to carry away the heat generated, lubricant may be provided. The lubricant used is usually a mineral oil refined from petroleum. The bearing block is used to hold the bearings. It is made up of cast iron. All the bearings are fitted on the machine frame. A bearing is machine element which supports another moving machine element.

Wheels:

A bicycle wheel is a wheel, most commonly a wire wheel, designed for a bicycle. A pair is often called a wheel set, especially in the context of ready built “off the shelf” performance-oriented wheels. It contain Hub, Axle, Bearings, Hub shell and flanges , Hub brakes, Rim, Spokes ,

Lacing, Adjustment (“truing”), Nipples, Disc wheels etc For or road bicycle racing performance there are several factors which are generally considered the most important.

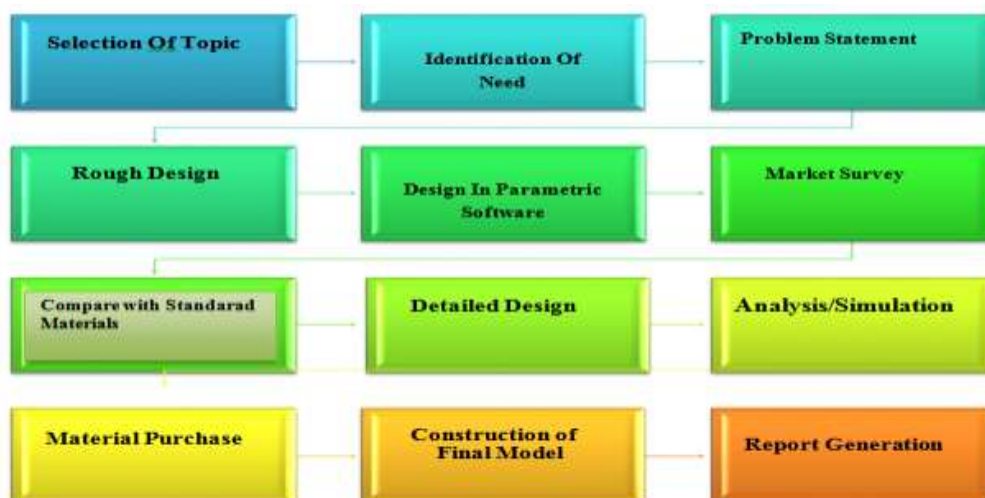
Pedals:

Bicycle pedals have evolved, and now can be found in all manner of shapes and sizes. This is good news for you. it is quite easy to find the perfect pedals for you. The pedals found on most bikes are made from hard rubber or plastic. these pedals are light and durable enough for casual riding. More avid cyclists may want to consider a more durable pedal made of aluminum alloys For those interested in maximum strength combined with minimum weight, you can always pay more for higher end bicycle pedals made of carbon or titanium.

Brake Arm:

A bicycle brake is used to slow down or stop a bicycle. There have been various types of brake used throughout history, and several are still in use today. The three main types are: rim brakes, disc brakes, and drum brakes. Caliper (or rim) bicycle brakes include side or center pull caliper brakes, and brakes. Although these different braking styles are slightly different, they all operate by applying braking force to the rim of the wheel via rubber brake pads. In most cases, this is accomplished by squeezing brake levers mounted on the bicycle handlebars thus contracting brake cables and forcing the brake pads to press against the rim. Rim brakes offer more modulation than pedal brakes, but have the tendency to lose their power in overly wet or muddy condition.

IV. WORK PLAN



V. COST ESTIMATION

Bill Of Material

SR.NO	PARTNAME	COST	QUANTITY	TOTALCOST
1	Shaft	300	-	300
2	BallBearing	300	15	4500
3	Disc	4000	2	4000
4	Cycle	7000	1	7000
5	Teethwheel	700	1	700
6	FabricationCost	1000	-	1000
TotalCost				Rs17500/-

VI. CONCLUSION

After lots of research is being done to reduce the efforts required to drive the bicycle. The history of bicycle and its development is discussed in this paper. Different methods of transmission of human power on the pedal to the rotation of the wheels are discussed and the major advantages of these transmission methods are listed out.

Our main purpose is to remove the chain of cycle and use bearing shaft mechanism and make it effective and efficient. Generally, new mechanisms should be developed such that the design should be eco- friendly and more energy efficient..

SOME OF THE ADVANAGES FROM THE ABOVE RESULTS

- Drive system is less likely to become jammed, a common problem with chain-driven bicycles
- The rider cannot become dirtied from chain grease or injured by the chain from "Chain bite", which occurs when clothing or even a body part catches between the chain and a sprocket
- Lower maintenance than a chain system when the bearing shaft is enclosed in a tube.
- More consistent performance. Dynamic Bicycles claims that a bearing shaft bicycle can deliver 94% efficiency, whereas a chain driven bike can deliver anywhere from 75-97% efficiency based on condition
- Greater clearance: with the absence of a derailleur or other low-hand

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