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Design and Development of Hub-less Wheel

Navin D. Panmiya[1], Prof. C. V. Patel[2]
[1]*Student,* [2]*Assistant Professor, Department of M. Tech mechanical Engineering, Sankalchand Patel University, Visnagar,Gujarat, India*

Abstract: ***The present invention is related to a cycle or an engine-driven vehicle that moves on a bearing surface and more particularly on a road. In the case of a motorcycle, the front steering wheel is fitted with a first crown-shaped roller bearing being comprised of an outer annular element that supports the rim and an interior annular element that is connected to an arm. The carries at its front end a second crown-shaped roller bearing of which the interior elements are made integral by way of a lug of the interior annual element of the roller bearing and of which the interior annular elements of bearing is made integral with the arms device allow transmitting the steering force at a point located as close as possible to the contact area between the rim and the road. In addition to that, the vehicle device becomes more compact. due to hub mass, it is difficult in comparison to without hub, which can be easily steered in manual, The power is transmitted with the aid of gear Drive mechanism which is more efficient that the chain mechanism.***

Keywords: Hub-lees Wheel, Rim, Tire, Try Wheel, Roller

I. INTRODUCTION

In today`s era, there are many problems of using normal Wheel are their heavyweight, comparable more cost, a complex assembly which all makes for more force to accelerate the wheel or vehicle themselves. Across that, I come to know that hub-less wheels are a helpful alternative to regular wheels. So, I searched and analyzed the whole system and I came across with new idea that "Hub-lees Wheel" means the design of hub-lees wheel. The hub-less wheel is the modified form of wheel for Light Motive Vehicles in which there is the elimination of hub from the traditional wheel. The eliminated hub gives it an excellent appearance with a lot many advantages over the hub wheel. It reduced the overall weight of the wheel in the vehicle along with an advanced innovative design. It proves itself to the great innovation in the field of automobiles, Further on also reduced the material consumption thus resulting in overall cost reduction. Hub-less wheel. Now a-day every of vehicle is having either stainless steel spokes wheel or alloy wheel. This report consists a very new types wheel which do not have any spokesor support from to rim. In every of the vehicle the hub id fitted with shaft which restricts the axial motion of the wheels and further on this hub relates to rim of required tire diameter .this combination of hub and rim together known as wheel.

II. LITERATURE REVIEW

1) In 2013, Andrew J.Horst, (1)the Hubless wheel of the present invention utilizes a combination of the external sliding structure, the internal sliding structure and the bridging component to replace the conventional hub portion, so as to effectively decrease the material weight, number of part , and the product cost, and further to increase structural strength of the rim by the sliding structure. According to the first embodiment, the external sliding structure rotates relative to the immobile internal sliding structure to revolve the bridging structure for the connection of the hubless wheel and the frame. According to the second embodiment, the hubless wheel rotates to drive the bearing assembly to revolve along the gap between the sliding structure, which means the shagt of the bearing assembly can revolve and make the sliding structures move. Comparing to the prior art, the hublees wheel of the present invention does not use the central hub portion, and the sliding structure and the bridging components are applied to rotatably install the hublees wheel on the frame of the stroller. The sliding structure that house the contoured rollers are disposed around the inner surface of the rim to for the mounting junction between the hubless wheel frame. Advantage of material economy for low cost and low weight,movable mounting junction for ground clearance and additional power generation, automatic drive illumination.

2) In 2014, Sheldon S.N.Pinto, Joshua M.Amarnath, Jishnu S.Nair, E.Rajkumar, the life cycle of product is absolutely important especially for a commercial product.as per our design, the damage percentage is about 5%.this is a minimal amount considering the fact that the chasis of the skale-cycle is going to experience both bending moment as well as well as shear forces. The factory of safety as per our calculation is 42.8. since this value of FOS is within feasibility range in terms of manufacturing capability, the design proposed is apt. with respect to life of the product , our design hosts a prolonged life of up to 1,000,000 cycle during its operation. This value indicates that the proposed design is not only able to handle the fatigue stress level, but also able to provide a nominal life time of the product. The material to selected will ensure light-weight characteristics as well as the property to support alternating load to give to an optimal life.

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3) In 1993, US patent Franco Sbarro (No.5248019) claims to have invented an engine driven Vehicle with hub-less wheel. Chain drive is being used to transmit the power from the engine to the rear wheel. Sbarro claims that hub-less wheel is more advantageous than the conventional wheel. Sbarro further claims that the crown safe bearing whose exterior support the rim and whose interior is joined and braking force. Front wheel is fitted with a first crown shaped roller bearing being composed of annular element which is connected to a arm. The device also allow as transmitting forces at a point much closer to the contact area between tire and road.

4) In 2001,Bennett Ross, Dunaon, Dr, Barlett the claims to have developed a hub-less wheel which has no chain drive unlike Franco`s chain driven hub-less wheel. The front rim and the rear rim include groove which will receive the multiple bearings.the general purpose of the present invention,which will be described subsequently in greater detail is provide a new hubless bicycle sustem that has ant of the advantages of the bicycle devices mentioned hereto fore and many novel feature that result in a new hubless bicycle system.

5) In 2005,Willium J. Donakowski discloses a design of hubless caster assembly where the wheel is not disc-shaped but is rather annular. Moreover, the inner diameter is provided with toroidal grooves for the roller bearing. Donakowski in his work mentions that the caster hub-less assembly would have higher stiffness than a conventional wheel. Unlike hu-bless design by other researchers which employs either gear or chain to transmit the power source in his proposed design.

Like Bike has come up with the concept of electrics vehicle which can be folded and has very weight so that it can be carried.it consists of hub-lees wheel which is driven by gear drive on the similar lines, inventist include has developed product named orbit wheel both of which is based on hubless wheel design, Further in this account, Hub-less wheel product G-wheel 49cc sideways stance is similar to surfboard, skateboards and snowboards, where the slender mid-engine chassis uses two large hubless 10 inch tyres which surround each foot asking in the rider feet the axis of the wheel

III. OBJECTIVES

The present invention is relatives to a cycle or an engine-driven vehicle that moves on a bearing surface and more particularly on a road. In the case of a motorcycle, the front steering wheel is fitted with a first crown-shaped roller bearing being comprised of an outer annular element that supports the rim and an interior annular element that is connected to an arm. The arm carries at its front end a second crown shaped roller bearing of which the internal element is made integral by way of a lug of the interior annular element of the roller bearing and of the interior annular element bearing is made integral with the arm. The device allows to transmit the steering forces at the point located as close as possible to the contact areas between the tire and the road. In addition to that, the vehicle becomes more compact. Due to hub mass, it is difficult in steering compare to without hub, which can be easily steered in manual. The power is transmitted with the aid of gear drive mechanism which is more efficient that the chain drive mechanism.

IV. PRINCIPLE

A hub-less wheel or center-less wheel is a types of wheel with no center hub. To be precise, However, the hub is actually almost as big as the wheel itself. The axis is hollow, wheel was invented by Franco Sbarro (who has built a variety of working hub-less wheel vehicles, including at least two motorcycles and a car, the 1989 Sabarro, osmos) and patented by Globe holding of Geneva. The wheel has yet to reach its full technical potential. Tolerances, transfer of energy, and material are element of the design which are yet to be fully exploited. Although hub-lees wheel are striking in appearance, their numerous practical disadvantages have precluded their widespread use as an alternative to conventional wheel. The drives system is especially problematic since a conventional axle and CV joint cannot be used option include using chain or belt drives. Another solution , developed by Sbarro, is to house the entire propulsion system inside the wheel itself.

V. ADVANTAGES

A. Reduce the weight of vehicle
B. Smooth steering system and easy to use
C. Gives more space for loading
D. Better steering and braking characteristics as such forces are applied directly or close to the contact spots of the wheel and ground.
E. More power transmission efficiency.
F. Gives better look to the vehicles

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VI. SCOPE OF FEATURE

A. Advance mobility vehicle
B. Advance breaking system.
C. Smooth steering mechanism.
D. Light weight vehicle

VII.CONCLUTION

Hub-less wheel is a next generation wheel which eliminates the short comings of any conventional hub motored vehicle. In the current scenario, where safety, quality, and accessibility are prime concern, it provides solution to each of them. The current wheel design exhibits its uniqueness in terms of mode by which the power is getting transmitted. The elimination of hub and spokes introduces safety in the device and ride experience enhances as the use of hub-less wheel provides better vehicle stability .The presence of non-complex components in the design makes it more serviceable and accessible. This wheel design has capabilities to be employed any type of electric vehicle with correct synchronization. An attempt is made to communize wheel with different vehicles by making a MATLAB Simulink model and studying different gradient conditions. Present work utilizes the open space near rim by strategically placing the battery packs. Motor is selected considering its size and its ability to provide suitable torque of to maintain a speed of 40kmph. Calculation is carried out to check the strength of sun gear and ring gear. Further development in this wheel generates large scope for improvements in the present design, such as reducing the frictional losses between bearing and rim through design alterations and change in material. Better quality of battery can actually enhance the graded speed of vehicle.

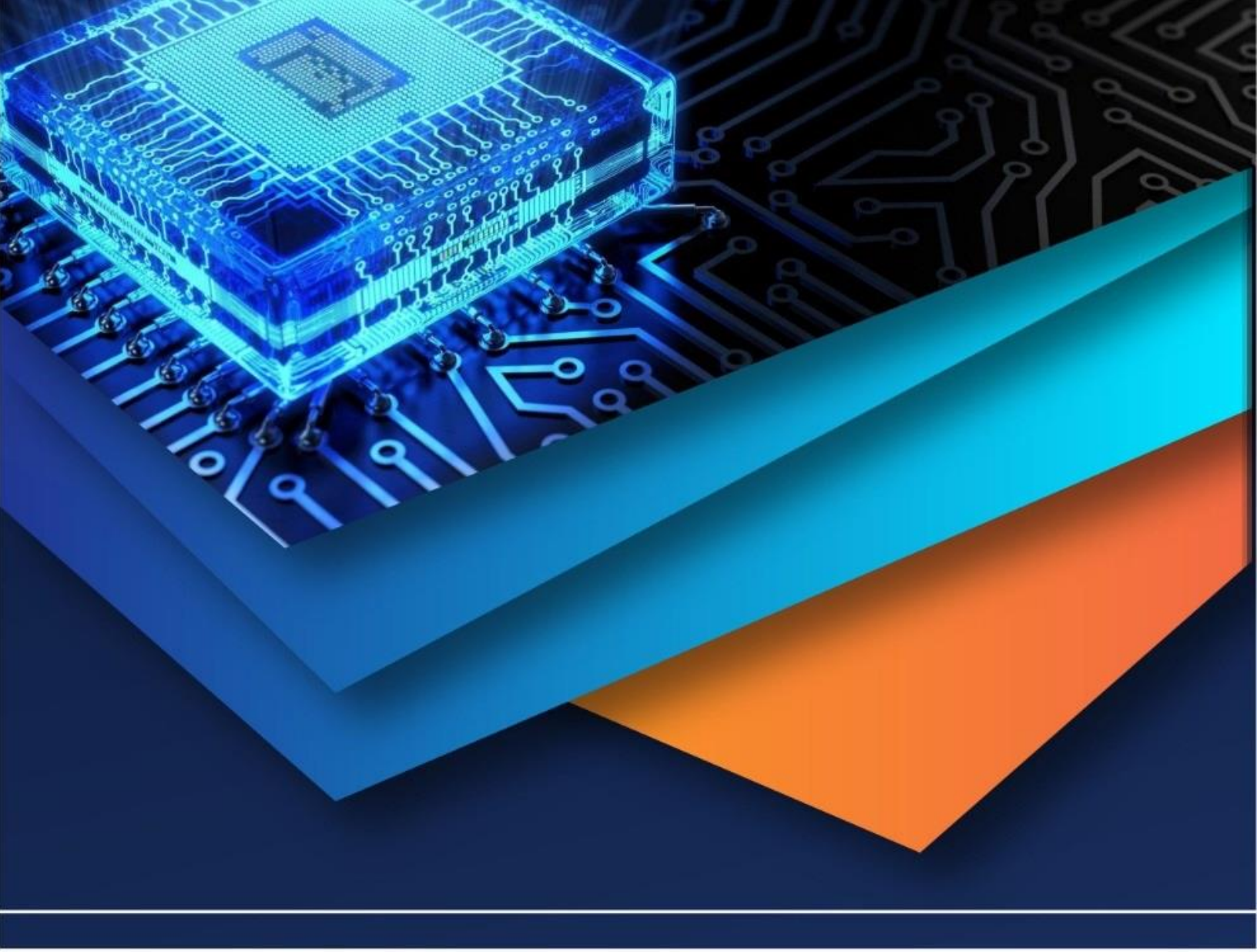
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