



International Journal of Intellectual Advancements and Research in Engineering Computations

Design and fabrication of treadmill bicycle

K. Ganesan¹, R. Sampath Kumar², K. Sanjay Kumar², M. Selva Kumar², M.Sridhar²

¹Professor, Department of Mechanical Engineering, Nandha Engineering College, Erode-52, Tamil Nadu, India.

²UG Students, Department of Mechanical Engineering, Nandha Engineering College, Erode-52, Tamil Nadu, India.

ABSTRACT

In the present living environment, transportation plays an important role, which includes movement of small things to very large equipment. Now a day, green transportation is becoming a significant part considering this situation, transportation using bicycle seems to be cheaper and greener. Also, transportation with physical exercise would be more useful for the end users. It enables the user to the transportation along with moderate physical exercise. In this project, an attempt has been made to design and fabricate the treadmill bicycle. Design calculations and CAD modelling have been carried out. Based on this, the physical working model will be fabricated, the conclusion is presented finally.

Index Words: Treadmill, Walking Belt, Wheels, Rollers, Bearing, Flywheel, Sprocket.

INTRODUCTION

The treadmill bicycle is completely a new way of movement completely designed for runners. Typically using a treadmill basically is similar to running, hiking or walking. Think about the last time you were riding a bike over some kind of obstacles such as train tracks, potholes, speed bumps. Possibilities are you stood up on the pedals

to improve your balance when crossing the obstacle. Basically, the treadmill bicycle will provide the rider a well-balanced position the entire time. People with busy schedule will also be able to take care of their health and physical fitness. Above all, it is not a conventional treadmill to make use of only in closed rooms, person using treadmill bicycle can roam on roads also.

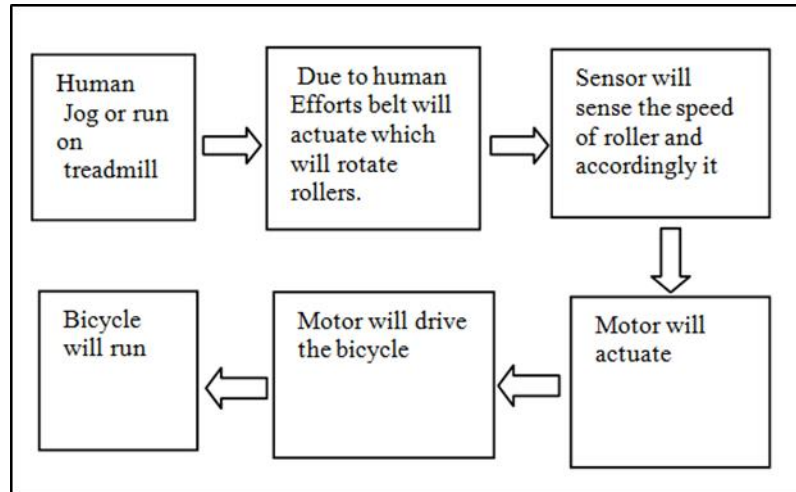


Fig. 1 Working principle of treadmill bicycle

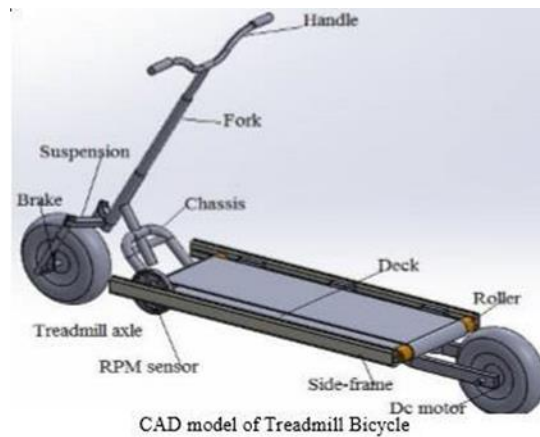


Fig. 2 Model of Treadmill bicycle

For travelling over short distances people often use a commercial vehicle which causes pollution and unnecessary wastage of fuel. So, we came to a solution for this type of problem by providing wheels to the treadmill and the concept is termed as walking cycle.

This project overcomes the drawback of the conventional treadmill which is stationary which in fact does not provide the jogger to get exposed to the natural atmosphere. So, this proposed methodology provides an ultimate solution by making use of wheels and making the treadmill bicycle a walking cycle.

LITERATURE SURVEY

Kacheri jay deep deals with conversion of a conventional bicycle into treadmill bicycle. In this bicycle the frame of the bicycle is completely modified and the treadmill is placed in between the two wheels, on which user will walk. As the user walks or runs on the treadmill the belt moves to the rear. At the rear roller, RPM Sensor is attached to the roller from where Sensor will sense the speed of the roller [1].

Waugh Ganesh Sadashiv is that the one type of bicycle in which a man walks on the treadmill and then treadmill moves backward. The motion of treadmill bicycle is depended upon the human efforts so it is also called as walking bicycle.

Multipurpose treadmill bicycle consists the parts like wheels, treadmill, battery, sprocket, chain drive [2].

Pranav Gujar that following paper deals with conversion and combination of a conventional tricycle and the most popular home exercise equipment, the treadmill, into a commuting vehicle. In this tricycle, the frame of the tricycle is entirely modified and treadmill is placed between three wheels, on which the user will run. As the user walks or runs, the belt moves over the rollers that are attached to the shaft with a chain drive. This chain drives the rear wheels of the tricycle which produces motion for the front wheels and thus the tricycle runs [3].

Parashot Singh is a work which is done to save our precious environment which is destroying and disturbed day by day with the increase in pollution emitted by vehicles and industries. While the

innovations are going all around, our team has applied innovation to the vehicle makes it more unique than any vehicle currently in the mainstream markets [4].

CHAIN DRIVES – ROLLER CHAINS

Simple as moves in bicycle. A chain is a series of connected links which are typically made of metal. A chain may consist of two or more links.

Those designed for lifting, such as when used with a hoist; for pulling; or for securing, such as with a bicycle lock, have links that are torus shaped, which make the chain flexible in two dimensions (The fixed third dimension being a chain's length.) Those designed for transferring power in machines have links designed to mesh with the teeth of the sprockets of the machine and are flexible in only one dimension.

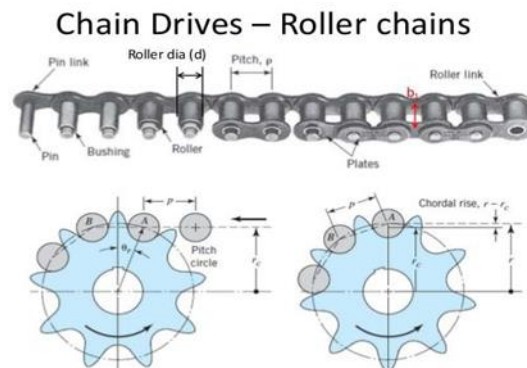


Fig. 3 Chain Drive System

SHAFTS AND BEARINGS

A shaft is a rotating machine element which is used to transmit power from one place to another. The power is delivered to the shaft by some tangential force and the resultant torque (or twisting moment) set up within the shaft permits the power to be transferred to various machines linked up to the shaft. In order to transfer the power from one shaft to another, the various members such as pulleys, gears etc., are mounted on it.

A bearing is a machine element that constrains relative motion to only the desired motion, and reduces friction between moving parts. The design of the bearing may, for example, provide for free linear movement of the moving part or for free rotation around a fixed axis; or, it may prevent a motion by controlling the vectors of normal forces that bear on the moving parts. Many bearings also facilitate the desired motion as much as possible, such as by minimizing friction.



Fig. 4 Bearings

ARC WELDING

Arc welding is a type of welding that uses a welding power supply to create an electric arc between an electrode and the base material to melt the metals at the welding point. They can use either direct (DC) or alternating (AC) current, and consumable or non-consumable electrodes. The welding region is usually protected by some type of shielding gas, vapour, or slag. Arc welding processes may be manual, semiautomatic, or fully automated. First developed in the late part of the 19th century, arc welding became commercially important in shipbuilding during the Second World War. Today it remains an important process for the fabrication of steel structures and vehicles. The types of Arc welding methods: (1) consumable arc welding and (2) non- consumable arc welding.

Consumable electrode methods one of the most common types of arc welding is shielded metal arc

welding (SMAW), which is also known as manual metal arc welding (MMAW) or stick welding. Flux that gives off vapours that serve as a An electric current is used to strike an arc between the base material and a consumable electrode rod or stick. The electrode rod is made of a material that is compatible with the base material being welded and is covered with a shielding gas and provide a layer of slag, both of which protect the weld area from atmospheric contamination. The electrode core itself acts as filler material, making separate filler unnecessary. Gas metal arc welding (GMAW), commonly called MIG (for metal/inert-gas), is a semi-automatic or automatic welding process with a continuously fed consumable wire acting as both electrode and filler metal, along with an inert or semi-inert shielding gas flowed around the wire to protect the weld site from contamination.



Fig. 5 Arc Welding Process

EXPERIMENTAL SETUP

An experimental set up is established as shown in figure. It has a simple mechanism, operated with free wheels, gear, chain, bearing shaft and links arrangement. As by the linear walking motion is converted into rotary motion which indeed done by

the gear chain and free wheel mechanism of the linkages, which takes very simple movement. The rotary motion is again converted in to linear motion of the cycle through mechanical linkages (gear-chain and free wheels) arrangement.



Fig. 6 Walking Belt

The conveyor system is either continuous movement or intermittent which is completely based on the person. So, a basic free wheel mechanism with bearings ease of use is designed with time delay which can be used to halt the movement when necessary. This invention relates to improvements in transport devices, and it relates particularly to devices for transferring people, with

small in number in case of a bike or a cycle. The walking bicycle is the one, which combines walking and cycling into one activity. The walking bicycle combines the two activities into a linear motion, allowing you to propel yourself forward at desired speed, simply by walking on the belt provided.



Fig. 7 Fabricated Model

Usually, the operation of the walking cycle machine is controlled by the user itself by simply walking on the treadmill belt and also balancing the cycle. The operating speed of the walking cycle differs on the amount of force applied by the user. The treadmill is used for walking on it, the motion is transferred by the belt as we walk on it, moreover the motion is also transferred by the shaft.

WORKING PRINCIPLE

When we walk, or run on the walking surface it gives rotation the treadmill bicycle is forward moving. The consists of the treadmill bicycle is moving belt and a rigid plate placed between the two surfaces of belt provided backing when the transverse load is applied. The original and unmodified mill is 0.75 inches pressed in the

support plate. According to the manual provided with the treadmill, the design behind the flexible multi point mounting system to reduce the stiffness plate by providing less support than direct attachment of the two solid rails. In actual practice, the thickness and stiffness when additional aluminium when inserted between the sheets and rails. We concluded that modifications would be necessary to achieve an ideally complaint walking surface capable of reducing the impact related walking and running. Thus, the bottom face of particle board sheet held two outwardly angled metal brackets.

OUTCOMES OF THE PROJECT

Treadmill bicycle is modification of existing walking bicycle. In this, we have made a shear modification of treadmill, which is a non-

conventional. It is completely eco- friendly and emission free with no running cost and less maintenance. It has also played a predominant role in global warming and also took up some part in fuel less transportation method. This cycle can be an adaptable mode of transportation for rural and urban areas.

CONCLUSIONS

This system can be efficiently used anywhere whether it is outdoor or indoor. This utilizes highly

fuel-saving technology which is a major requirement of this era. In the future, it can be used as an indoor locomotive device infrastructure with large roof span i.e. malls, warehouse, open markets, large office spaces, etc. By using such product pedestrian cops can protect themselves from getting exhausted. Pedestrians in large campuses can take benefit from this product the same way. We can replace cycle as an energy efficient vehicle for those who cannot drive a cycle.

REFERENCES

- [1]. Bhandari V. B Design of machine elements, eighteen editions, MC Graw hill companies, 2003.
- [2]. Chetan Mahdi “An improved & efficient electric bicycle system with the power of real time information sharing” 1, 2014.
- [3]. Kacheri jaydeep¹, Latke Amit²,” Design and Fabrication of Treadmill Bicycle”, International Conference on Ideas, Impact and Innovation in Mechanical Engineering ISSN: 2321-8169 5(6), 2017, 1490 – 1495.
- [4]. Pranav Gujar¹, Rohan Kokate²,” Design and Fabrication of Treadmill Cycle”, IJEDR | 5(2), 2017. ISSN: 2321-9939.
- [5]. Parashot Singh¹, Suk winder Singh²,” Designing and Fabrication of Treadmill Bicycle”, International Journal of Advanced Research and Innovative, ISSN (2347-3258).
- [6]. V. R. Gandhewar¹ Priyanka H. Kakade²,” A REVIEW PAPER ON CONCEPT AND UTILITY OF TREADMILL”, International Journal of Innovative Research in Science and Engineering 3(3), 2017 ISSN (O) 254-9665.