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Fabrication of Tri-Wheeler as Gym Equipment and For Power Generation

Hemanth B R[1], Dharmendra Yadav[2], Darshan Kumar S L[3], Shah Faiz[4], Loyd Hendry Azavedo[5]

[1](*Assistant Professor, Mechanical engineering, Bangalore Technological Institute, India*)
[2](*Mechanical engineering, Bangalore Technological Institute, India)*
[3](*Mechanical engineering, Bangalore Technological Institute, India)*
[4](*Mechanical engineering, Bangalore Technological Institute, India)*
[5](*Mechanical engineering, Bangalore Technological Institute, India)*

Abstract: This project work modifies a treadmill to better fit the requirements of users. Treadmill tricycle is designed for those humans who love to run outside. Treadmill equipped on tricycle frame and formulates a big innovation named 'TREADMILL TRICYCLE'. This tricycle has electronic parts and runs perfectly on human momentum. As the rider walks on the treadmill, the belt butts up against the rear wheel propelling the bike forward. Treadmill tricycle is designed for runners as the ideal treadmill device, this device combines the best exercise running and cycling to deliver a low-impact, high-performance workout outdoors. We believe it is the ideal device for healthy runners. It delivers an exercise experience that is closer to running than anything else available today.

Keywords: The Treadmill, Walking Belt, Wheels, Rollers, Bearing, Flywheel and Sprocket.

I. INTRODUCTION

The treadmill tricycle is totally new way of moving it is done by the combination of various mechanical part i.e. chain and gear. Motion of tricycle from one place to another place will be done by human effort. Treadmill tricycle basically shows a new concept for both travelling and exercising. Due to the ever-increasing demand of fuel for various purposes it also eliminates the use of any fuel in any case. The gears present in it provide us the speed which is required for travelling faster. This makes this tricycle different from a simple bicycle.

A treadmill is a device used for exercises by staying in the same place, walking or running can be done on it. From the principle of treadmill working integrated with the principle of electromagnetic induction, a new tricycle is designed which is capable of generating electric power while exercising. The most striking feature of this design is that it can be made possible as a mobile and power generating treadmill.

The walking cycle has a simple mechanism, operated with free wheels, gear chain, bearing shaft and links arrangement. As the straight line motion during walking gets converted to rotary motion through very simple movement by means of a gear chain and free wheel mechanism of the linkages. The rotary motion is again converted in to linear motion of the cycle through gear chain and free wheels arrangement. The conveyor system is either continuous movement or intermittent which is completely based on the person. 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 tricycle is the one, which combines walking and cycling into one activity. This combines the two activities into a straight line motion simply by walking on the belt provided, allowing to propel forward at desirable speed. 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.

II. LITERATURE SURVEY

A literature review is an evaluative report of studies found in the literature related to your selected area. The review should describe, summarize, evaluate and clarify this literature. It should give a theoretical basis for the research and help you determine the nature of your own research. Select a limited number of works that are central to your area rather than trying to collect a large number of works that are not as closely connected to topic area. In order to find out the responsibility of concept made the following literature survey.

JunedBarade et al. [1], Treadmill bicycle is designed for those humans who love to run outside. Treadmill equipped on bicycle frame and formulates a big innovation named 'TREADMILL BICYCLE'. This bicycle has electronic parts and runs perfectly on human momentum. As the rider walks on the treadmill, the belt butts up against the rear wheel propelling the bike forward. Treadmill bicycle is designed for runners as the ideal treadmill device, this device combines the best exercise running and cycling to deliver a low-impact, high-performance workout outdoors. We believe it is the ideal device for healthy runners. It delivers an exercise experience that is closer to running than anything else available today.

Praveen B Vijayanagare et al. [2], Treadmill Bicycle is one type of bicycle in which a man walks on the treadmill and then treadmill moves backward. This motion of treadmill actuates the electric motor and motor rotates the shaft of rare wheel using chain drive and battery. The motion of treadmill bicycle is depend upon the human efforts so it is also called as walking bicycle. In multipurpose treadmill bicycle we are going to attach a reciprocating pump for pumping the water. Reciprocating pump pressurize water. Multipurpose treadmill bicycle consists the parts like wheels, treadmill, battery, dc motor, chain drive, reciprocating pump.

SomnathKolgiri [3], this project deals with the design and fabrication of the treadmill cycle. The treadmills are not used to harness power, but as exercise machines for running or walking in one place, we are utilizing same principle for travelling a shorter distances. The motion of the machine is achieved by transferring the human's energy to the machine through the concept of treadmill. This machine can be helpful for travelling to short distances as well as used for exercise to the peoples. Using this machine, allotting a separate time for their exercise is not needed. The same action performed on the treadmill is used in this machine for the movement of the machine. As we (the operator), walks forward, the machine moves forward.

V. R. Gandhewar et al. [4], In an ancient days concept of treadmill was invented for generating mechanical energy with the help of animals such as horse, dogs etc. First treadmill was introduced by Roman Empire for heavy loading like conveyer belt which we use in industries. Some of those invention required electric power for initial torque. After study the history of treadmill bicycle we get idea to develop new concept of treadmill which will manually operate so that no external energy source is required to run treadmill bicycle.

R. Harsha [5], it deals with the 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 the RPM Sensor is attached to the roller, from where the Sensor senses the speed of the roller and sends the signal to the motor. The motor on receiving the signal transmits its motion to the front wheel which leads to the rotation of the wheel and thus the bicycle runs.

III. OBJECTIVES AND METHODOLOGY

3.1 Objectives

The main objective of the project as follows

- Useful for exercise purpose.
- To reduce the use of non-renewable energy sources.
- To prevent chain failure by using gear mechanism.
- Thus it is based on human power there will not be any fatal injury as the person will be in control of it.
- To avoid consumption of electricity since it is based on human power.
- To provide a alternative to exercise while travelling for shorter distance.

3.2 Methodology

The treadmill tricycle working on the basis of energy conversion. When a man is exercising on a treadmill his effort is gets wasted. But in this treadmill tricycle, the human effort is converted as useful work. Travelling and exercising can be done at a time. The conveyor is driven by manually. The main roller is fixed on the rear side and a helical driver gear is fitted to the roller. When the conveyor moves by leg power which will rotates the roller and the helical gear attached to the roller also rotates. Another shaft is fitted with a driven helical gear is then attached to the main helical gear. A sprocket is fixed on the second shaft will give drive to the rear wheels via chain drive. Rear wheel assembly will support and stabilize the arrangement.

To harness the power of animals or humans for doing work, treadmills were introduced, which are a type of mill operated by a person or animal treading steps of a tread-wheel to grind grain [2]. Treadmills are not used to harness power nowadays, but used as an exercise machines for running or walking. The machine provides a moving platform with a wide conveyor belt (track) rather than the user powering the mill and was driven by an electric motor. This simple, light and low budget treadmills passively resist the motion, moves only when walkers push the belt with their feet. But an addition of small DC generators were done, whose moving parts are mechanically coupled with the moving rollers of machine that moves when belt of the treadmill is

moving. When the rotor of the DC generator starts moving, an emf will be produced across its output terminals. This generated emf can be used for charging of Battery or other purposes.

IV. WORKING PRINCIPLE

The tricycle generator is small and a low torque is required to rotate its rotor. Here in the treadmill, instead of using one single large generator a number of small generators is used, which are electrically parallel connected and mechanically roller coupled. In a treadmill, the belt moves on some cylindrical shape of rollers and those rollers are surrounded by the belt in both upper and lower sides. Each join side (left and right) of the roller is mechanically coupled with the rotor of a small DC generator such that as the roller rotates, the rotor also starts to rotate.The below Fig.1 shows the Basic diagram of mechanical arrangement of treadmill

The electrical connection of the treadmill is shown in the Fig. 2 Electrically these generators are connected in parallel with each other, but the rotor of each DC generator is rotating in opposite direction with respect to them.

The DC generators 1, 2, 3, etc. are rotating in opposite direction with respect to the direction of the rotation of DC generators 1', 2', 3, etc. So, the emfs generated by them is also in 1800 out of phase with respect to the other generator, situated in opposite side of the roller. To eliminate this problem, 1, 2, 3 etc. should be connected parallel to the opposite terminals of 1', 2', 3'etc. Also a diode should be connected with the positive terminals of each DC generators. This will prevent them to work as a motor as they are mainly connected to the battery and their main work is to charge the battery not to take energy from it. If for any reason the belt of the treadmill is running in opposite direction then these diodes will prevent the current to circulate in opposite direction. There is also a capacitor connected across the output terminals Fig. 2 shows the electrical connection of dc generators in treadmill to prevent the fluctuations of the DC output voltage and keep it steady-state or at a constant value. The Fig. 3 shows the Mechanical Layout of Treadmill Tricycle. We developed 3D model with animation as shown in Fig. 4.

V. FIGURES

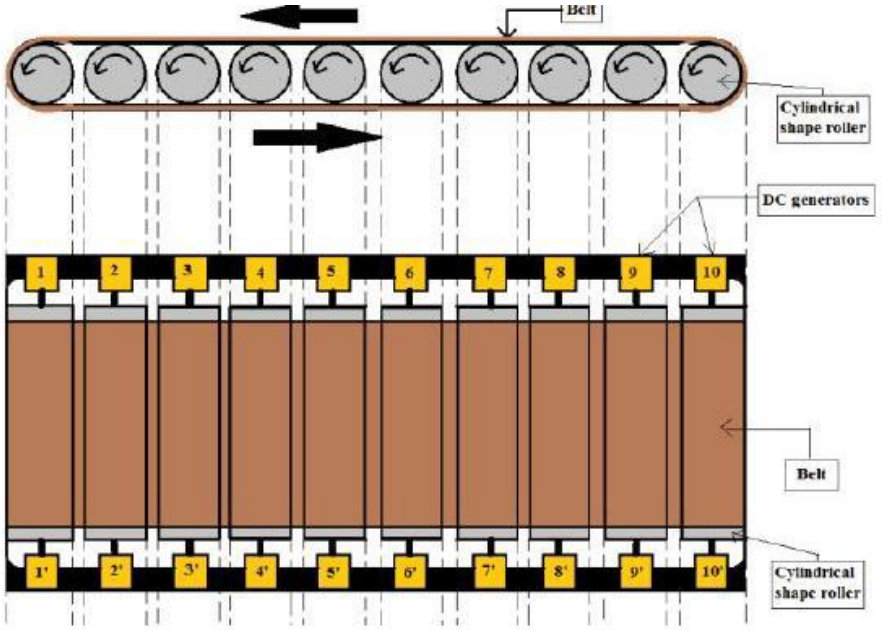


Fig. 1 Basic Diagram of Mechanical Arrangement of Treadmill

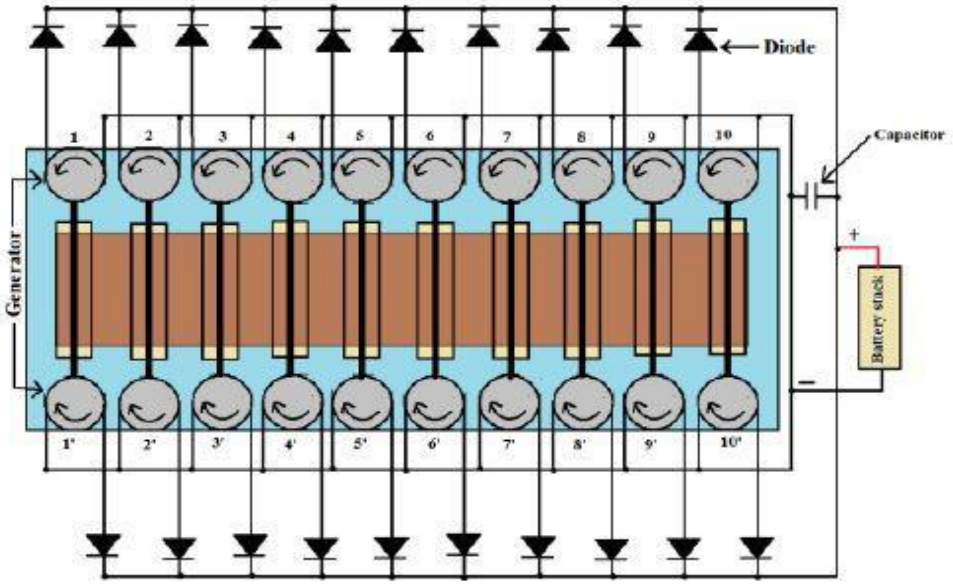


Fig. 2 Electrical Connection of Dc Generators in Treadmill

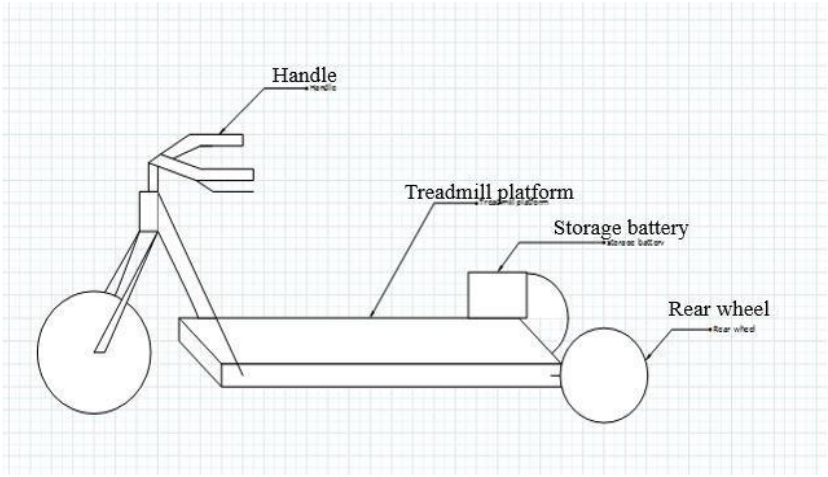
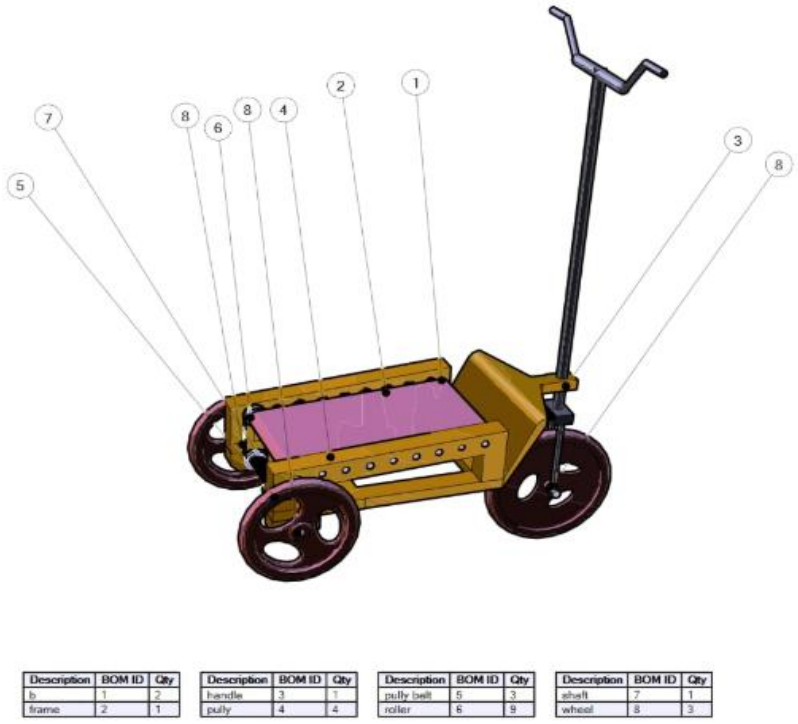


Fig. 3 Mechanical Layout of Treadmill Tricycle



Description	BOM ID	Qty
b	1	2
frame	2	1

Description	BOM ID	Qty
handle	3	1
pully	4	4

Description	BOM ID	Qty
pully belt	5	3
roller	6	9

Description	BOM ID	Qty
shaft	7	1
wheel	8	3

Fig. 4 3D Model of Treadmill Tricycle

VI. CONCLUSION

A new way of travelling as well as exercise with the help of a new model of tricycle which is combination of treadmill and tricycle is discussed. It can be used in place of regular bike at cheaper cost and without use of fuel. The treadmill tricycle will proof to be a future vehicle as no fuel is used for travelling through this and it is pollution free. The treadmill which is used for walking helps to keep us fit as exercise is also one of the important task for a person to be fit and healthy for day to day life. Treadmill tricycle is cheaper than the normal bike which also makes it efficient and economic.

Exercise Treadmill tricycle helps in maintaining proper physique. As physical fitness is important in day to day life. By using treadmill tricycle one can exercise outdoors in fresh air.

Fuel saving People often use vehicle for travelling over short distance. This causes unnecessary wastage of fuel. Due to use of treadmill tricycle over short distance a large amount of fuel can be saved.

Travelling Treadmill tricycle can be used for travelling over short distances. One can also exercise while travelling over short distance. Eco- friendly Treadmill tricycle does not require any fuel. Therefore, it does not emit any pollutants. So, it is an eco-friendly vehicle.

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