

Treadmill Bicycle

Jay D.Bhalekar¹; Ananya N.Tulaskar²; Sabaji A.Sawant³; Prathamesh S.Gosavi⁴

Mehghasham P.Dhanji⁵; Shruti N.Hewalekar⁶ (Lecturer)

^{1,2,3,4,5}Student, Department of Electrical Engineering YBIT College of Sawantwadi Sindhudurg, State Maharashtra

⁶Department of Electrical Engineering YBIT College of Swantwadi Sindhudurg, State Maharashtra

Abstract:- The treadmill bicycle is an innovative exercise machine that aids in fitness and well-being. It resembles a regular bike but with a moving treadmill belt. This bike allows you to run or walk while pedaling at the same time, making it easy to use and comfortable with handlebars and a seat. When you use the treadmill to walk or run, you have the opportunity to control your speed and balance while pedaling, resulting in a full-body workout. This exercise is beneficial in terms of burning calories, improving your heart health, and working out your leg and arm muscles. Furthermore, it's an excellent choice for outdoor exercise, such as in parks or on trails, and it's also environmentally friendly. The best part is that it's gentle on your joints, so even if you have trouble moving around, you can still use it. The treadmill bicycle is designed to combine the enjoyment of biking with the benefits of walking or running on a treadmill, making exercise more enjoyable. Everyone can access it.

Keywords:- Treadmill Bicycle, Exercise Device, Cardiovascular Fitness, Unique, Environmentally Friendly.

I. INTRODUCTION

The treadmill bicycle is a new and innovative method of exercising that combines the benefits of walking or running with cycling. The bike is similar to a regular bike, except it has a treadmill belt between the wheels and an electric motor for assistance. This innovative design allows for both running and walking. Enjoying nature and working out at the same time with pedaling is a new take on stationary treadmills.

This innovative way is a game changing for fitness enthusiasts, allowing them to improve their cardiovascular health in a new way. It offers a workout that targets both lower and upper body muscles by combining the mechanics of a treadmill and a bicycle. It's also excellent for toning muscles, increasing endurance, and burning calories.

Those with hectic lifestyles who find it difficult to find time for exercise will find the treadmill bicycle to be a convenient and comfortable option. Because it's so simple and enjoyable to ride, everyone can do it, regardless of fitness level. Additionally, it supports a healthier lifestyle and lessens dependency on conventional modes of transportation because it promotes outdoor activity.

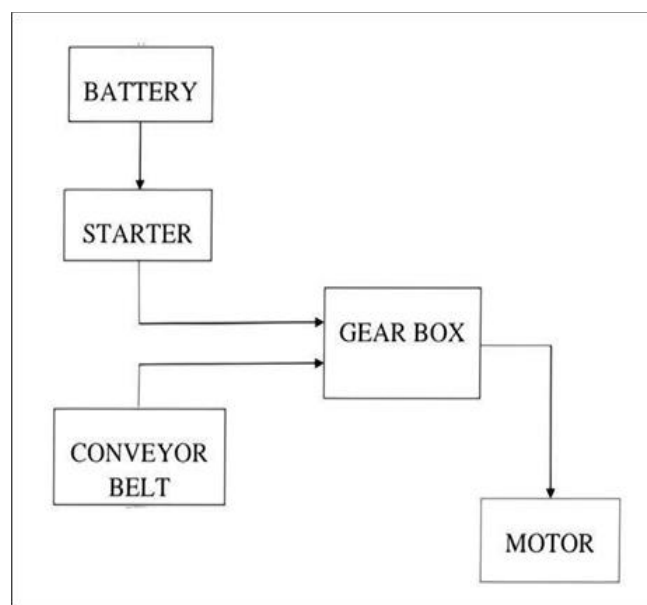


Fig 1 Block Diagram

The process entails walking on the cycle's belt, which rotates the sprocket attached to the system's end roller. Now, the Sprockets use a gear mechanism and chains to rotate the wheels. The wheel's connection to the BLDC electric motion-assisted motor is the most important thing to notice. The treadmill traveller's quick construction and straightforward operation make it a particularly useful design. In a nutshell, this machine mimics what the user does. In other words, the machine travels ahead when the driver walks forward and backward when he walks backward. The purpose of a treadmill setup is to allow the user to walk on the belt. The car is controlled via a handle located at the front. The machine's wheels—typically the back wheels—are connected to the rollers above which the conveyor belt, also known as the treadmill belt, is kept in tension. The rollers are arranged in a way that maximizes motion transmission efficiency and minimizes motion transmission losses. The machine's frame is made to be balanced, so the operator doesn't need to work hard to keep the machine in equilibrium. Now, as the operator advances, the conveyor belt moves in one direction, causing the machine's wheels to revolve and moving the apparatus forward. The car goes backwards when he walks rearward because the belt's motion direction is reversed.

II. METHODOLOGY

Combining elements of a treadmill and a bicycle, treadmill cycles offer an exceptional form of exercise that works both upper and lower body muscles. Compared to standard workout equipment, they are recognized for increasing heart rates and burning calories. These devices have ergonomic designs, easy-to-use adjustments, and even interactive technology for fun training. However, falls can occur, thus safety features and appropriate rules are essential. These cycles are employed in physical treatment and medical research in addition to personal fitness. With rising demand, greater innovation and broader application are anticipated in the fitness industry.

A. Components -

➤ *Wheels:*

A tyre is a ring-shaped part that goes around the rim of a wheel to transfer the weight of the vehicle from the axle to the ground and to provide the wheel traction on the surface it is travelling over. The majority of tyres, including those for cars and bicycles, are made of pneumatically inflated constructions that also act as a flexible cushion to cushion impacts as the tyre rolls over uneven terrain.



Fig 2 Wheels

➤ *Rollers:*

It is possible to ride a bicycle indoors without moving forward with the help of bicycle rollers, a kind of trainer. In contrast to other bicycle trainers, rollers are not fixed to the bicycle frame; instead, the rider must learn to balance while using the rollers. Typically, a bicycle roller consists of three drums, cylinders, or "rollers" two for the back wheel and one for the front upon which the bike is mounted.



Fig 3 Rollers

➤ *Sprockets:*

A profiled wheel with teeth, cogs, or even sprockets that mesh with a chain, track, or other perforated or indented material is called a sprocket or sprocket wheel. Generally speaking, a "sprocket" is any wheel that has radial projections holding a chain that crosses it. It differs from a gear in that the sprockets are never directly conjugated to one another, and it differs from a pulley in that the pulleys are smooth and the sprockets have teeth.

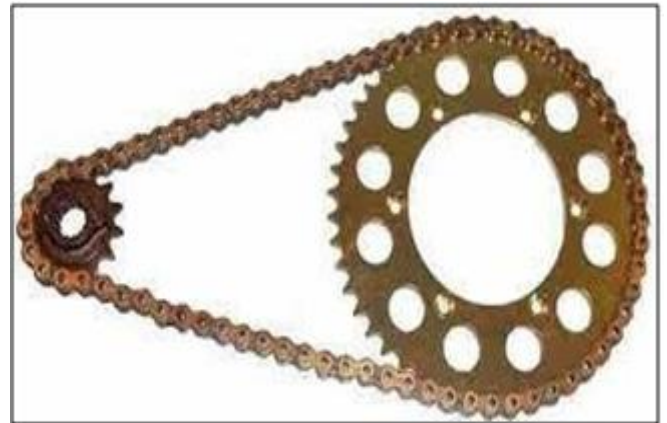


Fig 4 Sprockets

➤ *PMDC Motor:*

Permanent magnet motors are good for low torque applications and have their own benefits. In certain electric hand trucks, it is used when less torque is needed. Handle huge loads with ease and run at a low pace. This kind of motor requires frequent maintenance, has a short lifespan (up to 70–80%), and is an efficient motor.



Fig 5 PMDC Motor

➤ *Drive System:*

The bike is propelled forward by its drive system, which comprises of a number of parts including chains, gears, or a belt drive that transfer motion from the treadmill belt to the wheels.

➤ *Chains:*

A chain is composed of multiple linked pieces, typically made of metal. A chain may consist of two or more links. The torus shape of the links of chains meant for hoisting, tugging, or fastening—like a bicycle lock—gives the chain flexibility in two dimensions. The third fixed dimension is the chain's length. Links designed to mesh with the machine's sprocket teeth and with only one dimension of

flexibility are the ones meant for power transfer in machines. Although there are other kinds of chains, such as block chains, they are known as roller chains.

➤ *Treadmill Belt:*

The walking surface of a treadmill comprises of the thin moving belt and a rigid plate held between the two surfaces of that belt so as to provide support when the transverse load of footfalls is applied. The treadmill belt size is an important characteristic in your treadmill if you are preparing for running or jogging on your treadmill



Fig 6 Treadmill Belt

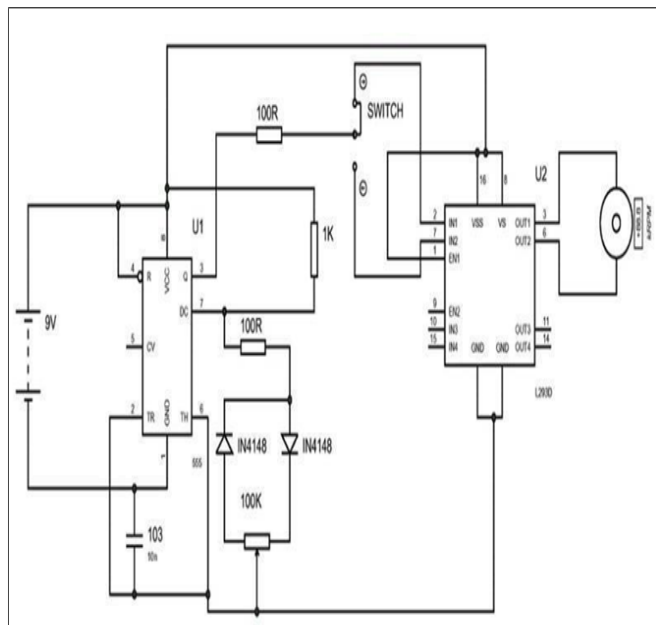


Fig 7 Connection Diagram

This project has a simple electrical setup. We employ batteries to provide DC power; three 12V batteries are connected in parallel to provide a total of 12V 27Ah. Relay modules, step-down modules, transmitters, receivers, Arduino, and other components are used. Six 30W motors are used in the project, and each one has cables connecting to connections on its own.

The motion motor and water pump are also connected to these cables. Via a switch, the primary 12V power from the battery is transferred to the positive and negative wire connectors. The motion motor and water pump's negative wires are connected to a common terminal. Within the circuit box, the receiver, Arduino, a DC-to-DC buck converter, and eight relays are all present.

The normally open contacts of six relays are connected to positive wires; the NO contacts of the other two relays are connected to positive wires; the NO contacts of the other two relays are connected in a similar manner. Six relays have normally closed contacts connected to the negative wire, which permits motor direction changes. The common terminals of relays 7 and 8 are connected to the wires of the motion motor and water pump. Using a breadboard, a DC-to-DC buck converter transforms 12V into 5V for the receiver and 5V relay.

The positive terminal of the breadboard is connected to the VCC pins of the relay and receiver modules, while the negative terminal is connected to their GND pins.

B. Benefits –

➤ *Cardiovascular Health:*

By raising heart rate and enhancing circulation, regular exercise on a treadmill or bicycle can enhance cardiovascular health.

➤ *Low-Impact Exercise:*

Compared to high- impact aerobics or jogging, treadmill cycling provides a low- impact exercise option that is less taxing on joints.

➤ *Calorie Burning:*

Riding a treadmill bicycle can promote weight reduction or weight management by burning calories.

➤ *Strengthening of Muscles:*

Riding a treadmill or bicycle can aid muscles of the legs, such as the calves, hamstrings, and quadriceps.

➤ *Stress Reduction:*

Like any kind of exercise, using a treadmill bicycle can help relieve stress and enhance general mental well-being through the production of endorphins.

III. CONCLUSION

This essay outlines a novel approach to work out and travel using a brand-new bike model that combines a treadmill and a bicycle. It can be utilised for less money and without the need for petrol in place of a standard bike. The treadmill bike will demonstrate itself as a fuel- free future vehicle. is utilised to move through this, and it produces no pollution. Walking on a treadmill is a great way to stay in shape because exercise is essential for maintaining one's health and fitness for daily living. The treadmill is more cost-effective and economical than a traditional bike.

FUTURE SCOPE

- We will Send Message about location on registered number.
- By implementing GPS, we can give real time Location.
- We also have an idea of using dynamo generator, the mechanical energy generated by human due to walking on and converted to electrical energy and it is further used for battery charging of treadmill bicycle.

REFERENCES

- [1]. International Research Journal of Engineering and Technology (IRJET) eissn: 2395-0056 Volume: 05 Issue: 02 Feb-
- [2]. “Electric bicycle using batteries and super capacitors” Conference Paper • October 2007MDOI: 10.1109/EPE.2007.4417425 Source: IEEE Xplore
- [3]. IJRMET Vol. 7, Issue 1, Nov 2016 - April 2017
www. I j r m e t. C o m International Journal of Research in Mechanical Engineering & Technology 73 ISSN: 2249- 5762 (Online) | ISSN
- [4]. IJRMET Vol. 7, Issue 1, Nov 2016 - April 2017
www. I j r m e t. C o m International Journal of Research in Mechanical Engineering & Technology 73 ISSN: 2249- 5762
- [5]. Journal of Transportation Technologies, 2012, 2, 1-12
<http://dx.doi.org/10.4236/jtts.2012.21001> Published Online January 2012 “Campus Mobility for the Future: The Electric Bicycle”
- [6]. “Usage Patterns of Electric Bicycles: An Analysis of the We Bike Project” Christian Gorenflo, cgorenflo@uwaterloo.ca received 7 April 2017; Accepted 24 August 2017; Published 9 October 2017
- [7]. Chetan Mahadik, Sumit Mahindrakar and Prof. Jayashree Deka “An Improved & Efficient Electric Bicycle system with the Power of Real-time Information Sharing” June 2014
- [8]. Dr. Ravikiran Kisan MD, Dr. Swapnali Ravikiran Kisan MD, Dr. Anita OR MD & Dr. Chandrakala SP MD “Treadmill and Bicycle June 2012
- [9]. Virendra Ahire, Nirav Patel, Dhruv Amin, Harshal Barot, “Fabrication of walking cycle”, International Research Journal of Engineering and Technology (IRJET), Volume: 03 Issue: 05 | May-2016.