

Review Paper on Design of Treadmill cycle-an approach.

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Abstract

“In This project” work modifies a treadmill to better fit the requirements of users. 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.

Introduction: Treadmill is a popular type of home exercise equipment, which provides a simple, aerobic workout. Those who want to begin new exercise routine prefer to choose treadmills because most individuals tolerate walking regardless of back conditions and fitness problems. As strength and endurance are developed, the treadmill can be used for jogging and/or for interval training. For walking or running while being at the same place treadmill is generally used. Nowadays treadmills are used for walking, jogging or running. This is a simple workout and is good for beginners. Treadmill bicycle is the unique way of exercising while travelling. As this device works on battery so one can use it as a E-bike also. This gives great riding experience.

Design of Components:

The Design of this treadmill cycle mainly consist of **Two** types of components

- 1) Structural parts.
- 2) Transmission parts

1) Structural parts:

These are the parts which sustains the different loads acting on treadmill bicycle and also supports the whole structure. These are integral for the whole structure, and are mentioned below:

- i. Main frame
- ii. Rollers
- iii. Treadmill belt
- iv. Wheels

2) Transmission parts:

These are the parts which are responsible for transmission of motion or power.

- i. Chain and sprockets
- ii. Battery
- iii. Motor

Main Frame: Main frame is the core structure on which rollers are mounted and are covered by belt. This is the main component on which most of loads are applied. i.e., weight of rider and roller, etc. Here, frame is made of **Aluminum** material because this material has high tensile strength as well as high ductility and light in weight etc.

Roller: The rollers are used for the rolling action of the conveyor belt. The roller is placed at the both end of the machine and the conveyor belt passes over the rollers. The conveyor belt is held under tension so that the belt doesn't slip off the rollers suitable arrangement for transmitting the motion of the belt to the wheels which in turn makes the wheel stop move.

Treadmill Belt: Treadmill belt is one type of belt made of **Nylon Rubber Fabric**, which is covered on rollers in treadmills. Runner runs or walks on this and this is rotated by any external resource. Here, single ply treadmill belt is used. It is one solid piece of rubber.

Wheel: Wheel is a component of circular shape which rotates on axle. Force is applied on the axle and this causes the wheel to rotate. Wheel is a discovery of utmost importance, which makes movements of machine very easy. On the wheel, tubed tires are used, because they are less expensive and consumes less time for fitting compared to tubeless tires.

Chain: This is a series of connected metal links that are joined together. Chains are used to transfer from one sprocket to another. Chain drive can be used for long and short center distances. It can operate without full lubrication film between joints unlike gear drive. Here, two chains of different lengths are used and they are made of stainless steel. This material has good corrosion resistance and wear resistance.

Sprockets: Sprocket is a component used to engage links of chain. One can call it a toothed wheel, with the help of chain and sprockets power transmission system can be formed. Here, there are total six sprockets of different teeth and diameter are used to obtain required speed ratio. The sprockets are made of same material as chain.

Battery: Battery is a device consisting of single or multiple electrochemical cells. This is used for supplying electric power. It has two terminals. We are using **Lithium-ion battery** of **12V** each. Here we are using 2 batteries to power the vehicle the output is 250W.

Motor: Motor is an electrical device which converts electrical energy into mechanical energy. In this work, the brushless hub motor is used because they are simple, lightweight, more rugged and requires low maintenance as compared to ordinary motors. The specifications of motor are:

Rated Voltage: 24V

Output Power: 250W

Rpm: 300

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