DESIGN AND FABRICATION OF TREADMILL TRICYCLE

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ABSTRACT

In this paper, a brief overview of design and fabrication of a treadmill tricycle is given. The design of the model and the actual model of the tricycle is also given. The design process and steps are also mentioned in it. The stationary treadmill is converted to a moving model. The user will be able to exercise and well as commute sing the model. The conventional treadmill are stationary and only can be used in the house or in a gymnasium. The model thus provides user to use it outdoors and exercise at the same time. The mechanism consists of chain and sprocket as well a spur gear mechanism for transmission. Three wheels are used for cost cutting, one at front and two at rear side. The rest mechanism is same as a treadmill. The walking motion of a user rotates the gear mechanism which in turn gives motion to the rear wheel using chain and sprocket mechanism. The model is based on experiment so as to create an innovative model. A treadmill is an exercise device used for walking, running and cardio purpose. To remove the constraint of treadmill as fix position and to use it outdoors is the objective of the project. The model has a scope in future where it can be used in various organization, personal use, exercising purpose.

Keyword: *Treadmill, tricycle, exercise, model, mechanism.*

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1. INTRODUCTION

Treadmill tricycle is an interesting concept which mainly focuses on changing the conventional fixed treadmills. The purpose of the project is to make to moving so that it can be used outdoors. Also, the cost cutting will reduce the price of the model which is lower than actual treadmill device used in the gymnasium. The mechanism used is a simple mechanism consisting of chain sprocket, spur gear mechanism. A simple mechanism is thus used. The users can be able to use the model outdoors so they can be able to enjoy the surrounding environment. The model consist of system to maneuver as per the user's requirement. In future, further modifications can also be done to make it more advance and efficient. Further upgradation can lead to various features. The model is suitable for users who are interested in outdoors travelling. For indoor users they can make it fix using simple modification. It requires no fuel at all and it is environment friendly.

1.1 Objectives

The main objective of the model is to make conventional treadmill movable.

The users must be able to experience outside environment.

To make the design simple and affordable.

To make it more flexible for usage.

2 LITERATURE REVIEW

Anmol Bhatia et al, in the paper presented the design of the walkable bike with all the calculations. They have mentioned various advantages of treadmill such as helping in reduction of weight being fit physically, chargeable battery.They have also mentioned that modifications can also be done on it. [1]

P.Madhu Raghava et al, in the paper have discussed various different methods of transmission using wheels in the past, their advantages and disadvantages. They have also mentioned various uses of pedal operated mechanisms. [2]

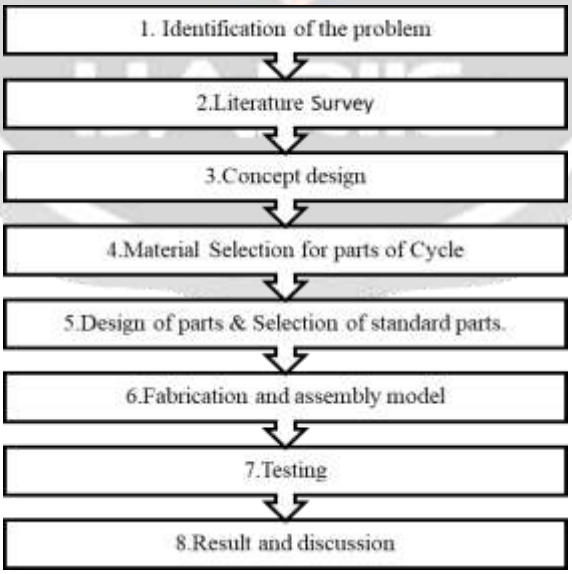
M. Sampathkumar et al, have given a detailed design on electric system that can be used to modify existing model. They have offered a new and improved way of transportation with improved technology, more features and that too at an affordable price. [3]

P. R. Gajbhiye et al, have mentioned various factors regarding the treadmill generator and their advantages such as low-cost, quick implementation, simple operation and low maintenance. [4]

V.Eswaraiah et al, have explained the system in which it utilizes highly fuel-saving technology. In the future, it can be used as an indoor locomotive device infrastructure and pedestrians in large campuses can take benefit from this product the same way. [5]

P. P. Kudale et al, in this have explained a detailed methodology in which they have given steps to help the designer to making it economical as well as efficient for the elliptical cycle. They have also mentioned the features like frame design, wheel size, materials required, method of fabrication and troubleshooting. [6]

3. METHODOLOGY



4. DESIGN

Table no. 4.1- Components

Sr.no.	Components	Material	FOS	Working stress (MPa)	Dimensions(mm)
1	Chassis	Stainless steel 304	3	61.59	35
2	Fork	Stainless steel 304	4	42.09	40
3	Bicycle axle	SAE 1010 Steel	3.5	65.12	10
4	Handle	Cast Aluminium alloy	2.5	83.77	25
5	Treadmill axle	Stainless steel	3	13.14	12
6	Roller	Mild steel	5	38.24	20
7	Side frame	Aluminium alloy	3	10.83	70 x 30

4.1 Actual Model

Fig-1: Actual Model (Side View)

Fig-2: Actual Model (Rear View)

Fig-3: Transmission Mechanism

5 CONSTRUCTION:

The model consists of a base frame on which the components are fixed such as sprocket chain mechanism, spur gear mechanism and the roller. It consists of three tires, one in the front and two at the rear side. A handle is provided at the front for handling purpose. The below images show the 3D Model.

Fig-4: 3D Model using Solidworks software

Fig-5: 3D Model Side View

Table no. 5.1- Weight of Components

Component	**Weight(Kg)**	**Component**	**Weight(Kg)**
Chassis	8.00	Treadmill axle	8.00
Fork	12.00	Side frame	3.00
Bicycle axle	5.00	Tyres	5.00
Handle	9.00	-	-

Table no. 5.2- Cost Estimation

Component	Cost
Belt	3000
Bearing	2000
Tire	1000
Roller	1500
Axle	3500
Total Cost	11000

5.6 Advantages

- Incline setting for comfortable usage.
- Consistent pace.
- Easy to use
- Easy repair and Maintenance

- Can be used for outdoor purpose

5.7 Limitations

- Suspension need modification.
- Need space to store.
- Can only be used by walking or running.

5.8 Applications

- Outdoor exercising
- Walking and running

CONCLUSION

Treadmill bicycle can be used for physical exercises. Running and walking can be done along with experiencing the outdoor atmosphere and fresh air. We can commute from one place to another. No fuel required and no pollution is created using it and zero emission from the treadmill tricycle. Overall it a simple model with many advantages and has a lot of scope for further modification.

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