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Fabrication of Treadmill Bicycle by using Chain Drive

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Abstract: *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.*

Keywords: Bearings, Rollers, Sprockets, Chains, Shafts, Treadmill Belt, Tyres, Brakes

I. INTRODUCTION

A Treadmill is a device generally for walking or running while staying in the same place. Treadmills were introduced before the development of powered machines, to harness the power of animals or humans to do work, often a type of mill that was operated by a person or animal treading steps of a tread wheel to grind grain. In later times, treadmills were used as punishment devices for people sentenced to hard labour in prisons.

The terms treadmill and tread wheel were used interchangeably for the power and punishment mechanisms. More recently, treadmills are not used to harness power, but as exercise machines for running or walking in one place. Rather than the user powering the mill, the machine provides a moving platform with a wide conveyor belt driven by an electric motor or a flywheel. The belt moves to the rear, requiring the user to walk or run at a speed matching that of the belt.

The rate at which the belt moves is the rate of walking or running. The simpler, lighter, and less expensive versions passively resist the motion, moving only when walkers push the belt with their feet. The latter are known as manual treadmills.

The conveyor belt is coupled to the wheels of the treadmill cycle by a suitable arrangement so that when the user walks, the machine is moved forward and vice versa

II. DESIGN OF COMPONENTS

The design of treadmill bicycle is such a typical task. The design is based on parameters like ergonomics, speed of treadmill bicycle, weight of rider, etc

The components are used in this treadmill bicycle are divided into two parts.

1) Structural Parts

- Main frame
- Rollers
- Treadmill belt
- Steering assembly
- Wheels

2) Transmission Parts

- Chain and sprockets

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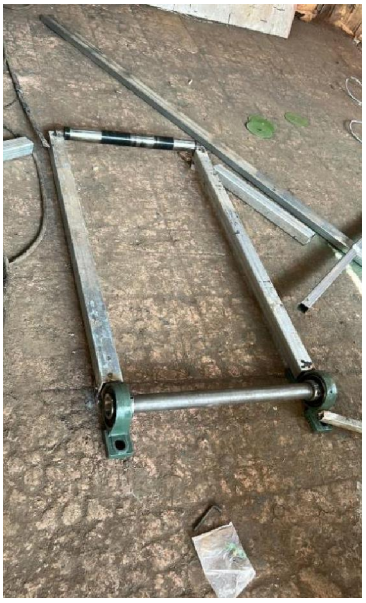
Roller is a part that is designed like cylinder or pipe or tube and used for pressing, smoothing, spreading, shaping operations. One can say that they are revolving cylinders.
Here, the material selected for rollers is C45 steel round bar (standard=ASTM A29 1045) Material Properties Moderate carbon steel Good machinability and good tensile properties

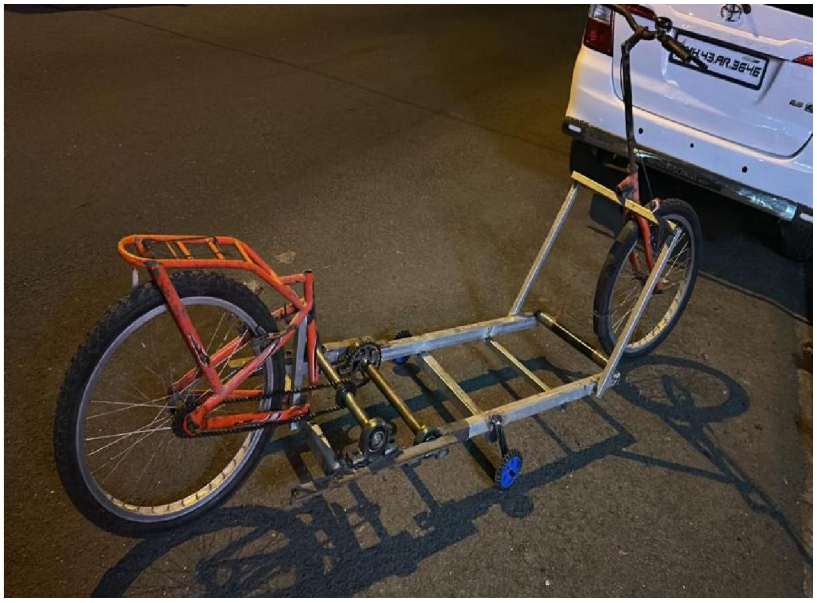
Wheel

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. Here, both the wheels are of different sizes. Front wheel is larger than rear wheel because, to match with the ergonomic design. The rear wheel is smaller because, to keep CG (centre of gravity) nearer to ground and for best arrangement of space for battery. On the wheel, tubed tires are used, because they are less expensive and consumes less time for fitting compared to tubeless tires.

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 mild steel material of grade IS 2062 because this material has high tensile strength as well as high ductility, etc.





Chain

This is a series of connected metal links that are joined together. Chains are used to transfer from one sprocket to another. A chain drive is intermediate between belt drive and gear drive. Chain drive has some characteristics of belt drive and some of gear drive. Chain drive can be used for long and short centre distances. It can operate without full lubrication film between joints unlike gear drive. The efficiency of chain drive is more than belt drive. It is compact compared to belt drives

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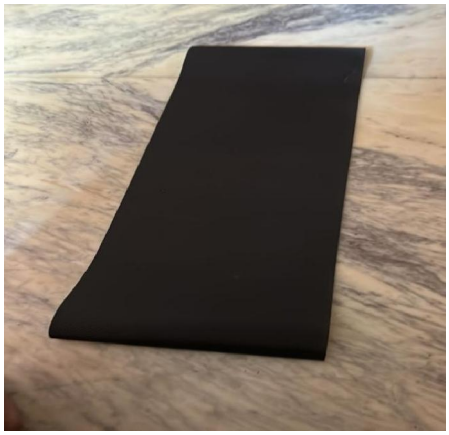
Conveyer Belt

The treadmill belt is the part of the treadmill you walk, jog or run on that moves around the belt. It is covered on rollers in treadmills. It is covered on rollers in treadmills.

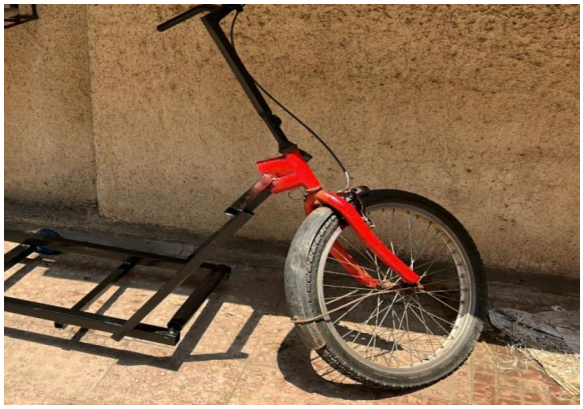
The dimensions of treadmill belt are as under:

Width of belt = 32 cm, Length of belt =196 cm, Thickness of belt = 1.6 mm



Steering Assembly

Steering is used to guide the direction of any vehicle. A system formed by various components like fork, handle bar, stem, etc.(specially for bicycle). Handle bar is used to guide the vehicle and also to mount break levers and hand grips. Stem is a component which connects the handle bar and fork.



III. CONCLUSION

This innovation can be perfectly used for both travelling and exercising purposes. It is pleasant to those people who loves to exercise. In future, an alternator can also be added for generation of electricity to charge a battery itself while walking on the treadmill and the stored energy can be utilized in requirement of excess power.

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