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DESIGN AND FABRICATION OF WALKABLE PUSHBIKE

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Abstract - *The design and fabrication of a treadmill bicycle involves creating a hybrid exercise machine that combines the benefits of both a treadmill and a bicycle. The device allows users to walk or run on a motorized treadmill while also pedaling a bicycle, providing a full-body workout that targets multiple muscle groups. The design process involves incorporating safety features, such as automatic shut-off mechanisms, to ensure the user's safety. The fabrication process involves using durable materials and innovative design techniques to create a stable and comfortable machine. The resulting product offers an alternative to traditional stationary bikes and treadmills, providing users with a dynamic and challenging workout that simulates outdoor running and cycling.*

Key Words: Bearings, Rollers, Gears, Shaft, Belt, selection & designing of walkable pushbike.

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1.INTRODUCTION

A Walkable pushbike, also known as a "treadmill bike," is a unique piece of exercise equipment that combines the features of a treadmill and a bicycle. It consists of a treadmill belt, similar to those found on a traditional treadmill, mounted on a lightweight frame with two wheels and handlebars. The user stands on the belt and uses the handlebars to steer and maintain balance while walking or running on the belt.

The concept of a treadmill bicycle originated as a way to provide an outdoor running experience while indoors, and has gained popularity as a fun and efficient way to get a cardio workout. The design allows for a low-impact exercise that is easy on the joints, making it a suitable option for people of all ages and fitness levels. The treadmill bike is also portable, making it ideal for outdoor activities and events, such as marathons and triathlons. Overall, the treadmill bicycle provides a unique and engaging exercise experience that combines the benefits of walking or running with the added excitement of cycling.

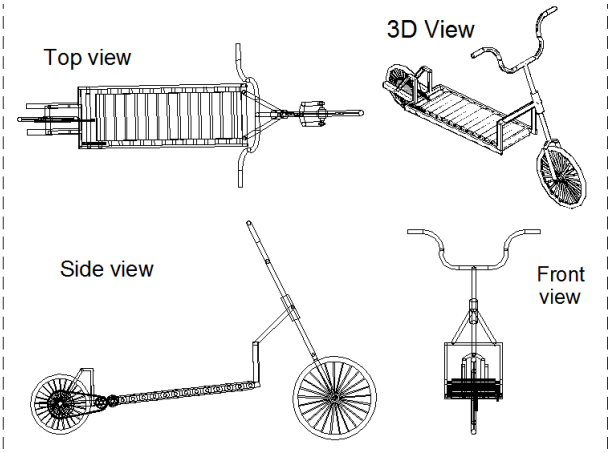

Plate.1.1 Schematic layout of walkable pushbike

2. WORKING PRINCIPLE

The fabrication of the treadmill traveler is very advantageous because of its simple construction and easy working principle. To say in a one line, this machine follows the action of the user. That is, when the driver walks forward, the machine moves forward and when he walks backward, the machine moves backward. A treadmill setup is made so that the operator can walk on the belt. A handle is placed in the front for the controlling of the vehicle. The rollers above which the conveyor belt (treadmill belt), held in tension are coupled to the wheels of the machine, usually rear wheels. The rollers are connected by a suitable arrangement, One advantage of using rollers is that they can reduce friction between surfaces in contact, which can lead to lower energy losses during motion transmission. This can help to improve the efficiency of the overall system and reduce the amount of energy required to achieve the desired motion. The frame of the machine is designed in such a way that it is balanced and the operator doesn't put any effort in balancing the machine. Now when the operator walks forward, the conveyor belt moves in one direction which makes the wheels of the machine to rotate so that the machine moves front. When he walks

backwards, the motion direction of the belt is reversed and thus the vehicle moves backwards.

2.1 DESIGN

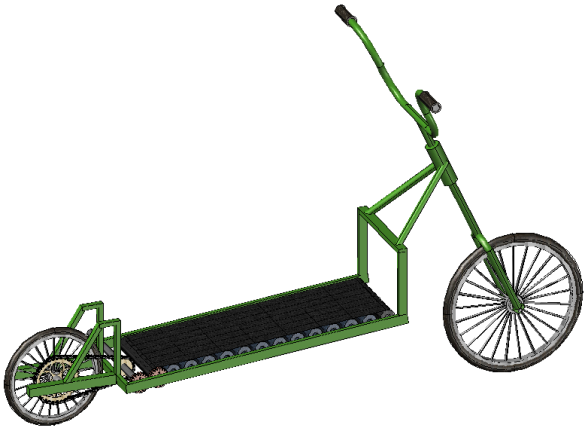

Plate.2.1 Overall design of walkable pushbike

2.2 List Of Parts

1. Conveyor Belt
2. Frame
3. Wheels
4. Set Of Gears
5. Bearings
6. Rollers
7. Handle
8. Chain Sprocket
9. Chain
10. Brakes
11. Stand
12. Basket

1. **Conveyor Belt:** The conveyor belt is the part of the walkable pushbike and it is the carrying medium for this system. A conveyor belt is a common application of rollers connected by a suitable arrangement for efficient transmission of motion. A conveyor belt is a continuous loop of material that moves from one end to the other, usually used for transporting goods or materials from one location to another. It is used to provide a surface for walking or running on a conveyor belt, allowing you to exercise indoors regardless of the weather or time of day. The dimensions of belt is 44 inch*15.5 inch. It is made up of fibre material.

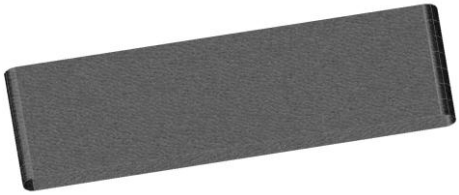

Plate.2.2. Conveyor Belt

2. **Frame:** It is the horizontal section of the vehicle that connects other components of the structure together. This frame makes it possible to transfer power from the drive unit to the wheels. And it's function is to maintain the shape of the pushbike so that it remains rigid and does not deform when used. The parts of the frame are welded together using arc welding process. The materials used in frame are mild steel bars.

PLATE.2.3. FRAME

3 **Wheels:** Wheels are another common application of rollers connected by a suitable arrangement for efficient transmission of motion. A wheel is a circular object that rotates around an axle, and is typically used for transportation or for providing mechanical advantage in various applications.

Plate.2.4 Wheels

4 **Set Of Gears:** A set of gears is another example of rollers connected by a suitable arrangement for efficient transmission of motion. Gears are circular discs with teeth around the edges, which mesh with other gears to transmit motion and power.

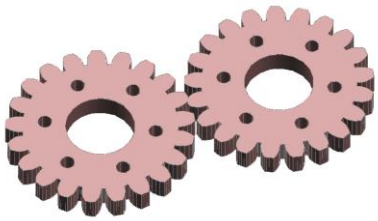

Plate.2.5 Set Of Gears

5 **Bearings:** Bearings are a type of roller connected by a suitable arrangement for efficient transmission of motion, which are specifically designed to reduce friction and facilitate motion between two moving parts. Bearings typically consist of an inner and outer ring, which are separated by rolling elements, such as balls or rollers.

Plate.2.6 Bearings

6 **Rollers:** The 6301 type bearings (outside diameter 37mm and inside diameter 12mm) are used in the rollers. Each roller is made up of mild steel and each roller is specified as length 19 inch. The pipe used in rollers is 1.25inch M.S pipes. The ends of the M.S pipes are welded with rollers. so, that the rollers can be easily rotates.

Plate.2.7 Rolllers

7 **Handle:** A cycle handle, also known as a handlebar, is another example of rollers connected by a suitable arrangement for efficient transmission of motion. The handlebar is a horizontal bar that is mounted on the top of a frame and is used to steer the vehicle.

Plate.2.8 Handle

8 **Chain Sprocket:** A chain sprocket is another example of rollers connected by a suitable arrangement for efficient transmission of motion. A chain sprocket is a toothed wheel that meshes with a chain to transmit motion and power between rotating shafts.

Plate.2.9 Sprocket

9 **Chain:** A chain is a series of interconnected links that are designed to transmit motion and power between rotating shafts. Chains can be made of various materials, such as metal, plastic, or even wood, and can vary in size and shape depending on the specific application.

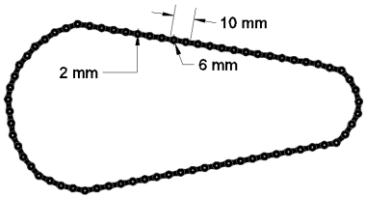

Plate.2.10 Chain

10 **Brakes:** Brakes are a mechanical or hydraulic system that is used to slow down or stop a moving vehicle or machine. Brakes work by converting the kinetic energy of the moving object into heat energy, which is dissipated through friction.

Plate.2.11 Brakes

11 **Stand:** A stand is a mechanical device used to support an object or machine in a stationary position. Stands can be designed to support various types of objects, from small household items to large industrial machines.

Plate.2.12 Stand

12. **Basket:** The basket is placed in above the front wheel and below the handle and It helps in carrying small things on bike during your ride with hassle and risk free.

Plate.2.13 Basket

3. Complete Assembly:

Fig: Walkable Pushbike

4. CONCLUSIONS

In conclusion, both the treadmill and bicycle are excellent examples of machines that utilize various mechanical components to efficiently transmit motion and energy. The treadmill consists of a conveyor belt and rollers that are connected by a set of gears and powered by a motor to simulate walking or running. The bicycle, on the other hand, utilizes wheels, chain sprockets, a chain, and pedals to efficiently transmit motion and power between the rider and the wheels.

Both machines can be optimized for efficiency by taking various design considerations into account, such as the use of high-quality materials, precise alignment and adjustment of the mechanical components, and appropriate lubrication and maintenance. By improving efficiency, these machines can provide users with a more comfortable and effective workout experience while minimizing energy losses and maximizing performance.

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