



Effect of Modification of Treadmill Bicycle by Chaindrive

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Abstract:

This paper deals with conversion of a conventional bicycle into treadmill bicycle. In this bicycle the frame of the bicycle is completely modified and the treadmill is placed in between the two wheels, on which user will walk. As the user walks or runs on the treadmill the belt moves to the rear. The mechanism used in this walking cycle is versatile of its kind in which, the cycling pedals are replaced with a treadmill belt. This treadmill belt drives the cycle forward by introducing free wheels and shafts mechanism. The prototype design requires a treadmill belt, shafts, the frame of treadmill, the free wheels, gears, chain-drive and gear-chain. The platform on which the treadmill belt is placed is fabricated. All the links are made up of normal MS (mild steel) including the head which has a direct contact with the treadmill belt.

Keywords:Treadmill, Bicycle axle, chaindrive, Chassis, Treadmill axle

1. INTRODUCTION

The walking cycle has a simple mechanism, operated with free wheels, gear, chain, bearing shaft and links arrangement. As by the linear walking motion is converted into rotary motion which indeed done by the gear chain and free wheel mechanism of the linkages, which takes very simple movement. The rotary motion is again converted in to linear motion of the cycle through mechanical linkages (gear-chain and free wheels) arrangement. The conveyor system is either continuous movement or intermittent which is completely based on the person. So a basic free wheel mechanism with bearings ease of use is designed with time delay which can be used to halt the movement when necessary. This invention relates to improvements in transport devices, and it relates particularly to devices for transferring people, with small in number in case of a bike or a cycle. The walking bicycle is the one, which combines walking and cycling into one activity. The walking bicycle combines the two activities into a linear motion, allowing you to propel yourself forward at desired speed, simply by walking on the belt provided. Usually, the operation of the walking cycle machine is controlled by the user itself by simply walking on the treadmill belt and also balancing the cycle. The operating speed of the walking cycle differs on the amount of force applied by the user.

Components used in walking cycle:

- Cycle
- Treadmill
- Bearings
- Chain and Sprockets
- Free wheels
- Shafts operations performed
- Arc welding and cutting
- Brazing
- Lathe operation (turning, threading, and knurling)

Our aim is to make a cycle run through a manual treadmill such that in a very less effort more work can be done. As we all know a manual treadmill does not consume any electricity, thus using treadmill and some arrangements of gears and chain drive, we will make a treadmill cycle. With a very less effort this bicycle can be driven as well as a new format of the bicycle design can be launched in the market. The treadmill cycle is driven manually, more or less the same effort is required to drive the bike as the effort required in treadmill, consisting of various gear arrangements and two shafts provided to change the motion. The treadmill cycle will be the best in its segment.

2. TREADMILL

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 Chain-drive. 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. Thus, the speed of running may be controlled and measured.

3. WORKING OF TREADMILL CYCLE

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Figure.1. Treadmill

4. TREADMILL MECHANISM

The treadmill is used for walking on it, the motion is transferred by the belt as we walk on it, moreover the motion is also transferred by the shaft. The gears reversing the motion and transferring to countershaft, hence the rear wheel moves as

simple as moves in bicycle. A chain is a series of connected links which are typically made of metal. A chain may consist of two or more links.

- Those designed for lifting, such as when used with a hoist; for pulling; or for securing, such as with a bicycle lock, have links that are torus shaped, which make the chain flexible in

two dimensions (The fixed third dimension being a chain's length.)

- Those designed for transferring power in machines have links designed to mesh with the teeth of the sprockets of the machine, and are flexible in only one dimension. They are known as roller chains, though there are also non-roller chains such as block chain.

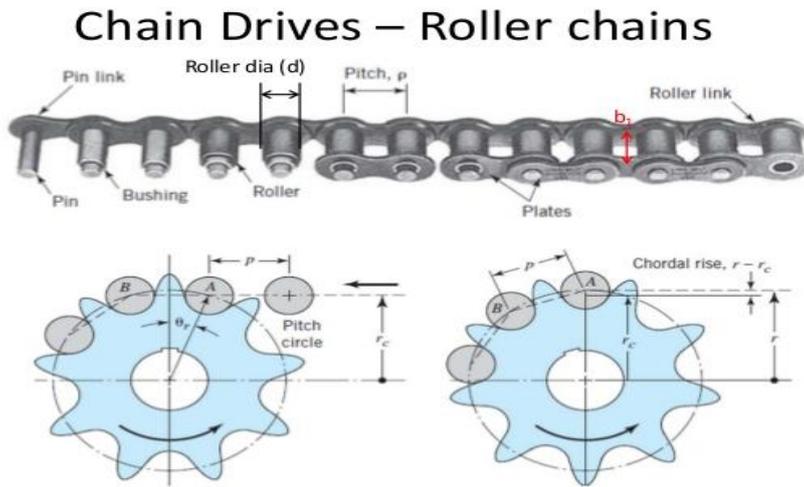


Figure.2. Chain Drive System

4.1 SHAFT

A shaft is a rotating machine element which is used to transmit power from one place to another. The power is delivered to the shaft by some tangential force and the resultant torque (or twisting moment) set up within the shaft permits the power to be transferred to various machines linked up to the shaft. In order to transfer the power from one shaft to another, the various members such as pulleys, gears etc., are mounted on it. These members along with the forces exerted upon them causes the shaft to bending. In other words, we may say that a shaft is used for the transmission of torque and bending moment. The various members are mounted on the shaft by means of keys or splines.

4.2 BEARINGS

A bearing is a machine element that constrains relative motion to only the desired motion, and reduces friction between moving parts. The design of the bearing may, for example, provide for free linear movement of the moving part or for free rotation around a fixed axis; or, it may prevent a motion by controlling the vectors of normal forces that bear on the moving parts. Many bearings also facilitate the desired motion as much as possible, such as by minimizing friction. Bearings are classified broadly according to the type of operation, the motions allowed, or to the directions of the loads (forces) applied to the parts.

Motions Common motions permitted by bearings are:

- Axial rotation e.g. shaft rotation
- Linear motion e.g. drawer
- Spherical rotation e.g. ball and socket joint
- Hinge motion e.g. door, elbow, knee

3.1 ROLLER BEARINGS

A rolling-element bearing, also known as a rolling bearing, is a bearing which carries a load by placing rolling elements (such as balls or rollers) between two bearing rings called races. The relative motion of the races causes the rolling elements to roll with very little rolling resistance and with little sliding

3.2 FREE WHEEL

In mechanical or automotive engineering, a free wheel or overrunning clutch is a device in a transmission that disengages the driveshaft from the driven shaft when the driven shaft rotates faster than the driveshaft. An overdrive is sometimes mistakenly called a free wheel but is otherwise unrelated. The condition of a driven shaft spinning faster than its driveshaft exists in most bicycles when the rider holds his or her feet still, no longer pushing the pedals. In a fixed, without a free wheel, the rear wheel would drive the pedals around. Mechanics of free wheel

3.3 ARC WELDING

Arc welding is a type of welding that uses a welding power supply to create an electric arc between an electrode and the base material to melt the metals at the welding point. They can use either direct (DC) or alternating (AC) current, and consumable or non-consumable electrodes. The welding region is usually protected by some type of shielding gas, vapor, or slag. Arc welding processes may be manual, semiautomatic, or fully automated. First developed in the late part of the 19th century, arc welding became commercially important in shipbuilding during the Second World War. Today it remains an important process for the fabrication of steel structures and vehicles.

3.4 TYPES OF ARC WELDING

- Consumable electrode method
- Non-consumable electrode method

Consumable electrode methods One of the most common types of arc welding is shielded metal arc welding (SMAW), which is also known as manual metal arc welding (MMAW) or stick welding. An electric current is used to strike an arc between the base material and a consumable electrode rod or stick. The electrode rod is made of a material that is compatible with the base material being welded and is covered with a flux that gives off vapors that serve as a shielding gas and provide a

layer of slag, both of which protect the weld area from atmospheric contamination. The electrode core itself acts as filler material, making separate filler unnecessary. Gas metal arc welding (GMAW), commonly called MIG (for metal/inert-gas), is a semi-automatic or automatic welding process with a continuously fed consumable wire acting as both electrode and filler metal, along with an inert or semi-inert shielding gas flowed around the wire to protect the weld site from contamination. Constant voltage, direct current power source is

most commonly used with GMAW, but constant current alternating current is used as well. Flux-cored arc welding (FCAW) is a variation of the GMAW technique. FCAW wire is actually a fine metal tube filled with powdered flux materials. An externally supplied shielding gas is sometimes used, but often the flux itself is relied upon to generate the necessary protection from the atmosphere. The process is widely used in construction because of its high welding speed and portability.

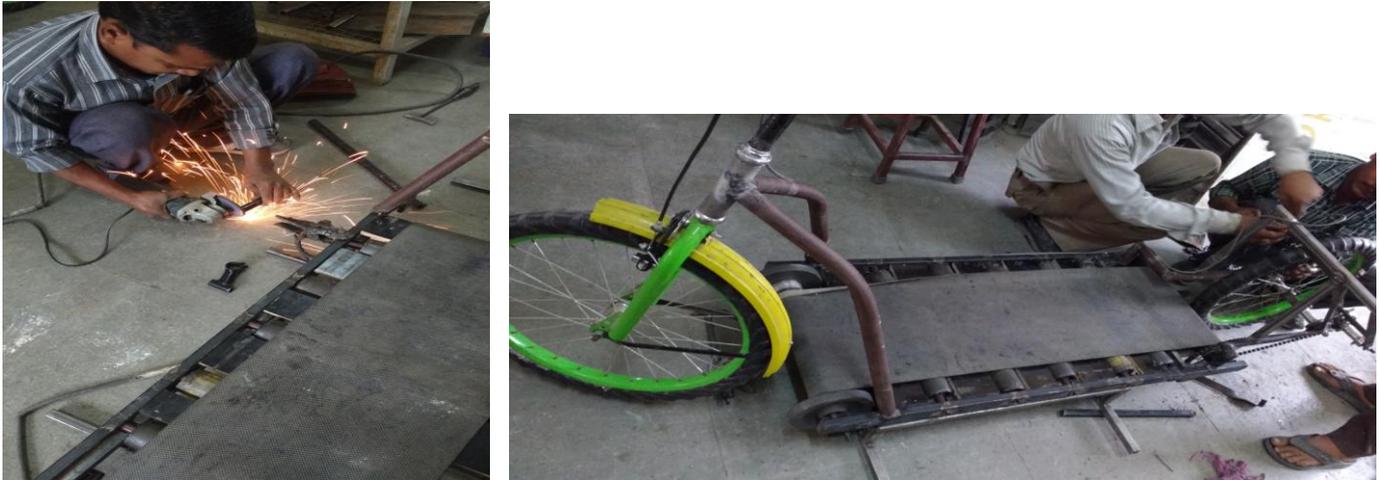


Figure.3. Manufacturing of Treadmill

5. CONCLUSION

The Treadmill Cycle has a variable resistance feature which means people of all ages with a semblance of balance and fitness should be able to ride the device. It is used to reduce the manual effort i.e. in place of conventional cycle, this walking cycle will give more displacement in a very less effort. The WALKING CYCLE has a variable resistance feature which means people of all ages with a semblance of balance and fitness should be able to ride the device. We featured the WALKING CYCLE. The WALKING CYCLE has only two wheels, looks a little more robust and lets you take it “off road” according to its design.

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