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Laufband Zyklus

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ABSTRACT

Laufband Zyklus a German name for treadmill cycle is designed for those people who love to walk outdoor. Treadmill belt constructed on cycle and innovation named Laufband Zyklus' is made. Electronic parts are assembled and run smoothly on walking momentum. As the person walks on the treadmill belt, the belt starts up and the rear wheel starts propelling the bike in the forward direction. Laufband Zyklus is designed for walkers as the conventional treadmill, this project is the combination of best fitness device and travelling long distance without producing any of pollution,

Keywords— *Treadmill belt, Gear sprockets, Bearings, Batteries, Motors*

1. INTRODUCTION

Laufband Zyklus is a new device of mobility specially designed for walkers. Basically, using a treadmill for travelling is the better part of mobility. Walking on an even road can cause many problems for knees for old peoples which possibly can be cured by using Laufband Zyklus. It is a combination of DC motor and many other components to upgrade you're walking. As we know it does not consume any kind of fuel it is a very conventional option for the people in the busy schedule to take care of their complete health. Overall, this project is neither like a conventional treadmill used in the gym; this can also be used outdoors. Laufband Zyklus overcomes the major drawback of the stationary conventional treadmill which does not allow the athlete to get exposed to nature. This methodology provides an ultimate solution by making use of wheels and treadmill belt a walking cycle.

2. PROBLEM DEFINITION

Experimental analysis of variable spacing of walking passage and study of the treadmill for fuel and time saving also for travelling long distance using less effort.

3. METHODOLOGY USED

(a) Defining the problem.
(b) Studying gear ratio arrangements and basics in detail for calculation purpose.
(c) Preparing a prototype model.
(d) Carrying out an experiment.
(e) Catia diagram simulation.
(f) Results and discussion.

4. EXPERIMENTAL LAYOUT

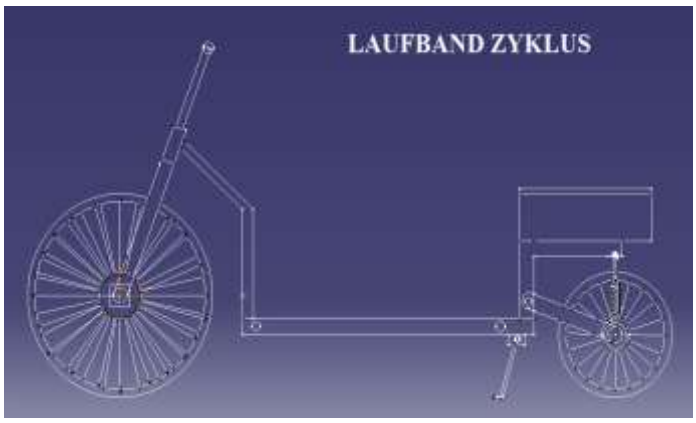

Fig. 1: Experimental Layout

Fig. 2: Experimental Image

5. COMPONENTS USED

5.1 The Treadmill frame

The material of the frame for standard treadmill used is Mild steel. For better stability and firm hold to the rollers to which the treadmill belt is fitted. The frame used is for the walking passage which should bear the weight of the person walking as well as the entire cycle. The rollers are fitted with adjusting screw for varying the tightening of the treadmill belt, Also the frame (chassis) is used to fit the other components like motor bracket etc.
(18"x40" frame)

Fig. 3: Treadmill frame

5.2 Treadmill Belt

The walking passage of the frame consist of the treadmill belt and a wooden plate bolted between the two-long membranes of the frame so as to provide walking support when the foot load is applied. For walking on the base, the dimensions of the treadmill belt are to be decided the basic size of belt used for walking used in Laufband Zyklus is 14 inch by 70 inch which is a convenient dimension for walking for ordinary person of any age, as well as for running at different speed and torque. Different sizes of the treadmill belt are available in the market as per the need of the walking conditions.
(35"x14" and 2mm thickness)

Fig. 4: Treadmill belt

5.3 Wheels

The wheel is one of the major components of any moving machine. The wheel and axle allow heavy objects to move easily allowing movement or transportation. Wheelreduces friction by smoothing the motion by rolling together with the usage of axles. For rotations of the wheel, an external force must be applied. The dimensions of the wheels are very important for speed and torque variations. The wheels used in the Laufband Zyklus dimensions are as follows front wheel is of 26-inch diameter and the rear wheel is of 18inch diameter. The spokes wheels are used for proper dynamic movement on both the side front as well as rear wheels. The steering geometry is fitted on the front wheel for better turning and giving direction to the vehicle.brakes are been mounted on the wheels for stopping or reducing the speed of the vehicle. (front 26" diameter and rear 18" diameter)

Fig. 5: Wheels

5.4 Rollers

Rollers used in this project is to move the treadmill belt smoothly without any roughness, two rollers are been used in the cycle .one on the front and other on the rear of the treadmill frame. The front roller is been fitted in such a way that it can change its place forwards and reverse to loosen or tighten the treadmill belt. In case of replacement of the belt, the roller is to loosen and the belt is dismantled. This roller is fitted to the frame of the cycle. Bearings are used in the roller for the free motion of the belt. (Outer diameter = 50mm and inner diameter = 25mm)

Fig. 6: Rollers

5.5 Bearing

Bearings are used in each and every moving part for smooth rotation is needed. In Laufband Zyklus bearings are used in wheels, steering system. Rollers etc. Types of bearings used were block bearings, ball bearings, roller bearings etc. Four block bearings were used for fitting of the rollers, also the rollers itself consist of the roller bearings. The ball bearings were used in sprockets, front and rear wheels, steering etc.

Fig. 7: Bearings

5.6 Sprocket

A sprocket is a wheel having teeth, cogs etc. On which the chain is fitted. The name 'sprocket' applies usually to any wheel on which a chain is transient over it. Sprockets are different from a gear in that sprockets are never conjugated together directly.
(18 teeth's)

Fig. 8: Sprockets

6. SPECIFICATIONS

- DC motor.
- Voltage: 24V
- Wattage: 350W
- Rotation: 3300 RPM
- Torque: 0.7 N.M to 2 N.M
- Efficiency (%): >75
- Dimension (Width x Length) = 101*69
- Battery 12AMH 2 nos.

7. CONCLUSION

- The work theory provides an effective combination of battery power and gear mechanism.
- It is an energy efficient vehicle for those who cannot drive cycle.
- It has '0' emission, as well as highly fuel redeeming /saving technology.

8. FUTURE SCOPE

- Simulation Analysis of treadmill belt and overall frame.
- The CFD (Aerodynamics) analysis to observe an actual working model.

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