



Air Hybrid Bicycle

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ABSTRACT

This project is design, fabrication and development of a design and fabrication of pneumatic bicycle it is rear wheel drive. The conceptual design of this model is taken from manually operated bicycle. The complete body looks like a bicycle in which manual operation followed. This product is a pneumatic vehicle, useful for handicapped people, and also normal persons. The power transmission takes place from rear wheel through chain drive. The entire arrangement of power transmission by means of connecting rod of the actuator is taken along with the chain sprocket. When the Compressor is connected to, it would give a driving force due the pressure at which air is sent. Only one person is allowed on the bicycle at any time. The material, mild steel is choose as a main structure fastening by joint, and main components of this project is , air cylinder, solenoid valve, electrical control unit, pneumatic actuator, power transmitting chain, sprocket wheel, two wheeler rear wheel components of model attach by welding, part by part create then be fabricating together. At the end of the project, the model is tested by several people and their comment then being recorded and performed some tests. The concept of compressed air bicycle in practice reduces the air pollution to large extend as its exhaust is nothing but air.

Keywords-- Bicycle, Solenoid valve, Mild steel, Power transmission, Crankshaft, Air compressor

I. INTRODUCTION

Fossil fuels (i.e., petroleum, diesel, natural gas and coal) which meet most of the world's energy demand today are being depleted rapidly. Also, their combustion products are causing global problems, such as the greenhouse effect, ozone layer depletion acid rains and pollution which are posing great danger for environment and eventually for the total life on planet. These factors are leading automobile manufactures to develop cars fuelled by alternatives energies. Hybrid cars, Fuel cell powered

cars, Hydrogen fuelled cars will be soon in the market as a result of it One possible alternative is the air powered vehicle. Air, which is abundantly available and is free from pollution, can be compressed to higher pressure at a very low cost, is one of the prime option since atmospheric pollution can be permanently eradicated.

A bicycle is an air-operated one-person capacity vehicle that is specially designed for low mobility. It is generally used by those who have difficulty walking or moving frequently from one place to another (Handicapped people).bicycles are available in variety of designs, those intended for outdoor use. A bicycle is different from a manually operated wheel chair as source of supply is air motor which utilize freely available air as the working medium that is to transmit power from the source to destination.

II. CONCEPT DESIGN

A bicycle have 2 wheels powered by a hp pneumatic Ratchet which is fixed at bottom of the main frame. A bicycle is rear wheel drive get the power from ratchet by sprocket and chain drive. This bicycle provides all the controls for driving to the driver. Some people are a little worry about purchasing a auto mated bicycle as compared to manually operated bicycle because it will be difficult to operate. In fact, the control console makes it quite simple, once a person gets the feel for it. Power scooters are also equipped with disc brake system, so stopping is simple, safe and comfortable. There is no automatic bicycle available in market for handicapped people, which can reduce their manual effort, this core idea makes the project unique. The problem is, most of that bicycle is not flexible.

III. IDEA DEVELOPMENT



- i. Road are designed for traveling at speed on paved roads.
- Touring bicycles are designed for bicycle touring and long journeys. They are durable and comfortable, capable of transporting baggage, and have a wide gear range.
 - Randonneur or Audax bicycles are designed for randonnées or brevet rides, and fall in between racing bicycles and those intended for touring in terms of frame geometry and weight.
 - Hybrid bicycles are a compromise between the mountain and racing style bicycles which replaced European-style utility bikes in North America in the early 1990s. They have a light frame, medium gauge wheels, and derailleur gearing, and feature straight or curved-back, touring handlebars for more upright riding.
 - Flat bar road bikes are road bikes fitted with mountain bike-style shifters, brake levers and a flat handlebar. They fit into the continuum between hybrids and road bikes.

IV. LITERATURE REVIEW

The simplicity in design, durability and compact size of pneumatic systems make them well suited for mobile applications. Pneumatic control system plays very important role in industrial system owing to the advantages of low cost, easy maintenance, cleanliness, readily available, and cheap source, etc. [1]. A particularly well suited application for vehicle operating on compressed air is material handling and for visitors in industry. Compressed air storage energy (CASE) is a promising method of energy storage, with high efficiency and environmental friendliness [2]. The moped has top speed of about 18 mph and could go 7 miles before its air pressure ran out. An inventor, JemStansfield, has been able to convert a regular scooter to a compressed air moped [3]. Behavior of compressed air Compressed air is clean, safe, simple and efficient. There are no dangerous exhaust fumes of or other harmful by products when compressed air is used as a utility. It is a non-combustible, non-

polluting utility. When air at atmospheric pressure is mechanically compressed by a compressor, the transformation of air at 1 bar (atmospheric pressure) into air at higher pressure (up to 414 bar) is determined by the laws of thermodynamics. They state that an increase in pressure equals a rise in heat and compressing air creates a proportional increase in heat. Boyle's law explains that if a volume of a gas (air) halves during compression, then the pressure is doubled. Charles' law states that the volume of a gas changes in direct proportion to the temperature [4]. The air expands outward with so much energy that the balloon explodes. Compressing a gas into a small space is a way to store energy. When the gas expands again, that energy is released to do work. That's the basic principle behind what makes an air cargo. In which the importance of the impact of the fossil fuels in the present and future generations is explained which led them to design a new vehicle which runs by renewable energy sources. Compressed air vehicle are more suitable for low speed, short range and flammable environment [6, 7]. The first compressed-air vehicle was devised by Bompas, a patent for a locomotive being taken out in England in 1828. There were two storage tanks between the frames, with conventional cylinders and cranks. It is not clear if it was actually built.

V. OBJECTIVES

I. Fabrication model development of single rider automatically operated bicycle. II. By some modification and improvement inside the engine increase the power and efficiency of motor.

VI. METHODOLOGY

I. Literature study Make review on other model and focusing on how to make it simple and relevance to the project title. **II. Conceptual design** Sketching several type of design based on concept that being choose. State the dimension for all part. **III. Materials Selection** Selected the true material based on model design and criteria. Light, easy to joining and easy to manufacture. Assemble all the part to the design. **IV. Fabrication model refinement.** Fabricate the bicycle according to the main frame and design. Refinement at several part of joining and sharp edge. **V. Performance testing.** Speed. Power developed. **VI. Documentation** Preparing a report for the project.

Advantages

1. It is flexible and easy to drive and control due to its simple construction as that of a bicycle and light weight.
2. It is automatic as well as manual in operation.
3. In case if the automatic operation fails or discontinues in case of inadequate air supply, the operation can be switched to manual mode
3. It has compact structure and aesthetic shape.
4. It is intended for indoor and outdoor

Disadvantages

- 1) It cannot be used for long distance.
- 2) It cannot be used effectively in uneven road conditions due to the possibility of disturbances in the alignments.
- 3) Lack of braking system.
- 4) Vibrations in the system can cause disturbances in the running mechanism.

VII. MAINTENANCE AND SERVICE

1. Start the air compressor fill the air and drive it.
2. Maintain the lubricant in FRL or pressure regulator.
3. If the pneumatic ratchet has abnormal noise, get it check by professional service provider.
4. Front and rear brake adjustment Adjust rear brake using adjusting screw. When fasten hold the brake bar, the wheel should not be turned around. The brake rubber should be back to its position at once when unfold the brake bar. If the surface of the rubber is worn hardly, change it.
5. Keep the vehicle clean, and to avoid, higher temperature and corrosive air places.

Environmental Condition

- When bicycle is not in use at that time, bicycle should be kept away from rain water, combustible and chemical corrosive products.
- When there is no use of bicycle for long time then drain the air tank.
- When there is no use of bicycle

VIII. TROUBLE SHOOTING

- 1) The pneumatic ratchet does not start
 - Check the air compressor.
 - Check the battery connections.
 - Make sure valve is in open position.
- 2) Pneumatic ratchet starts but fail to run at high speed.
 - Check if the lever is fully compressed.
 - Adjust FRL or pressure regulator.
 - Adjust pressure as per requirement.
- 3) Pneumatic ratchet runs but has no power or acceleration.
 - Check the guage in compressed position.
 - Adjust pressure regulating valve.
- 4) Pneumatic ratchet fails to run smoothly.
 - Check the lever in fully in compressed position.
 - Adjust pressure regulating valve.

IX. CONCLUSION

Even though the vehicle is in its early stage of development, it holds a lot of promise and provides scope for further research. Considerable efforts have been focused on the better understanding of various design developments in bicycle. Various forms of bicycle in the past history through which the existing form has evolved

are discussed in this paper. The different empirical methods of transmission of human power on the pedal to the rotation of the wheels are discussed and the major advantages and disadvantages of these transmission methods are listed out. Generally, new mechanisms should be developed such that the design should be eco- friendly and more energy efficient. The project presented has involved the development and implementation of automatic transmissions for bicycles. The motivation of this work is to implement this idea in pneumatic featured bicycles with a suitable air control. The automatic transmission can be also used in 3 and 4 speed versions by altering few changes in the program. Therefore from the above calculations it is evident that the forces exerted by the cylinders are optimum to move the shifting levers (pedals). According to the achieved results, the suggested mechanism is realizable and workable. Using the simplest mechanism and required hardware enables to convert the old traditional gear shifting mechanism to semi automatic one. The application of this mechanism leads to make the driving process easier, reduces the risk of destabilizing the car, the lap/stage time, and the chance of miss shifting.

FUTURE SCOPE

- In future we can use flexible seating arrangement.
- In this pneumatic Bicycle we can use high power motor.
- We can use suspension system.
- This bicycle is very flexible and can be modified according to once interest.
- In future this bicycle can used for normal people.

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