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Pneumatic Bike: A Step to Future

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Abstract: ***The fact that you pick up this paper shows that there is something common among all! If you have your own two wheeler; if you feel spending more money in your petrol; if you feel drive in a polluted environment and if you are futuristic and so the project is designated with you all in mind. This paper is a paper put together to show that responsibility to create awareness among the people about the importance of vehicle trends and show them what lies ahead. No doubt, indeed this field of advance vehicle technology is poised for steady growth in decades to come and could definitely be considered as the current hot spot. For industry in India to meet global challenges. This can be achieved only by the engineers with the help of their innovations and creations. We hereby present BIKE OF THE FUTURE-THE PNEUMATIC BIKE and proceed with sense of awakening ideas on ECO FRIENDLY VEHICLES believing that only we engineers can bring such an optimizing product in the world, so get ready to Change your future with today energy.***

Keywords: pneumatic, energy crisis, innovation and creation.

1. Introduction

Everyone has dream but only few have the will, power, determination, and goal to fulfil the dream and so are we. The paper is new horizon between us and you where bring our dreams into thoughts and thoughts into reality.

We proudly present BIKE OF THE FUTURE-PNEUMATIC BIKE before you. This is a vehicle section where, the conventional [I.C. power engines are replaced by fluid power. The power system in the vehicle is not by combustion of fuel but by means of pressurized fluid power (air). To put in a nut shell it runs on air instead of petrol and making it to be non petrol vehicle. Yes, it may seem to be an impossible or mammoth task or it can be even beyond your view of your imagination but never mind, we reveal the feasibility and the practical aspects of vehicles in the following of this paper

2. Bike of Future

Now a days the two wheelers play an important role in creating a polluted environment. The vehicle is so designed to produce a zero pollution vehicle. The vehicle is made to run by means of air. This is pneumatic bike.

3. Objective

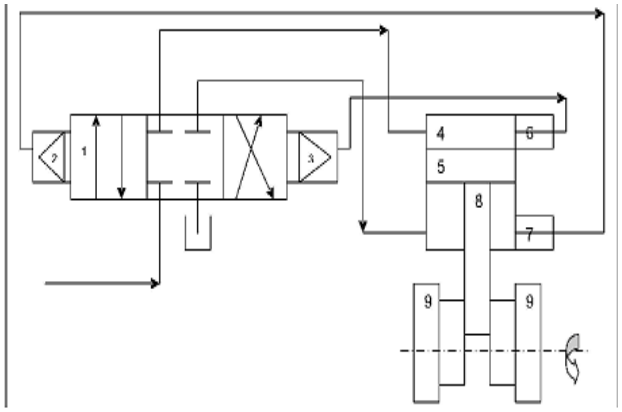
1) o replace the conventional two wheeler power source by fluid power source.
2) o meet environment pollution and regulation act.
3) o save the economy of the nation and as well as every individual.
4) o bring zero pollution factor.

4. Working Methodology

The principle of generation of power in a two wheeler is by means of fluid power and there by replacing the power system of conventional I C engine. This is achieved by the continuous reciprocation of pneumatic cylinder where its rod ends are dotted with a mechanism (i.e.) linked to the crank of an I C engine. The linear reciprocation of cylinder is converted into a rotary motion.

Working

The vehicle runs on the power produced by the air. The fluid hitch is the main source of supply is sent in the pressurized form. The fluid is compressed in the rated pressure to the rated pressure for the desired power



5. Compressor

The compressor used is an air compressor. The compressor has a motor whose supply is fed from a rechargeable battery. The compressor increases the pressure of gas by reducing the volume of gas as described by the perfect gas laws. The compressor air is piped to each circuit through a filter regulator lubricator (FRL) unit.

Electric Motor

Electric motor is a rotary actuator which is used initially to drive the vehicle to overcome the initial torque required to drive the vehicle with load. It can provide initially up to 4000rpm and the torque can be varied from 1000-10000lb.
Once the vehicle gains the initial momentum and the running torque and a stipulated speed say (20 km/hr), the

power system is switched over to the pneumatic system from the electrical. This is achieved by simple relay operation.

NC& NO Relay (Normally Closed and Opened Relay)

The NC-i relays which feeds the signal from the torque sensor whose signal is of the analog form and therefore NC-i becomes NO-i i.e. no longer motor is used to drive the system. Similarly, signal from the other end from the same sensor is fed to NO-2 there by making NO-2 as NC-2. Therefore the relay operation acts as a bridge for switching the power system.

Torque Sensor

Torque sensor is a transducer which converts the torque acting on the wheel into analog signal. The signal is then send to the relays and thereby playing an immigrant part in switching over the power from motor to cylinder. The cylinders which now start reciprocating become the drive source.

Pneumatic Cylinder

Pneumatic cylinder is made to reciprocating continuously by means of reed switches (sensor). The sensor picks up the pressure caused by the cylinder during extension and retraction. The signal from the sensor is fed to solenoid valve which subsequently shifts the ports based on the side the signal is fed to the valve. The reed switches are of high precision and resolution thereby giving approximately 450 strokes/mm. The pneumatic cylinder is prime actuator once the power system transfers to pneumatic system.

Part no	Part name
1	4/3 SOLENOID
2,3	3 SOLENOID
4	CYLINDER
5	PISTON
6,7	REED SWITCHES
8	CONNECTING ROD

6. Speed and Braking

Speed is regulated by means of metering valve which meters the flow of the air inside the cylinder. The valve can be used to regulate the flow to increase and as well as decrease. The regulation would give the speed variation or the vehicle.
Braking is achieved to stop the vehicle at the instantaneous hindrances. This is achieved by metering the valve which completely stops the air flow. Note once the torque increase the motor is employed so in order to stop this, the hand brake is applied which act as switch between the supply and the motor, eventually cutting of the supply.

7. Mechanisms

The design mechanism is the key part in achieving it. The arrangement is in such a way that linear motion of the pneumatic cylinder is converted into rotary motion by connecting the rod end of the cylinder to the crank of [C engine. The entire head of the [C engine is dismantled and only the crank rod is taken along with the chain sprocate. When the cylinder is connected to, it would give a driving force due the pressure at which air is sent.

This is an effort to substitute and optimize the conventional design of the vehicle to simple and lighter construction. The designed vehicle has maximum speed of only 45 km/hr due various constraints. The vehicle is so designed that the initial dead weight of it is reduced. This is done in order to achieve the rated speed. The optimal design ids achieved by considering the various design parameters.

8. Design Parameters:

The various parameters bike are as follows:

1) **PISTON**
   Diameter
   The piston dia d= 25mm
2) **FLOW**
   That reveal utmost possibilities of making of the pneumatic
   The flow required from the compressor to the system is Q0.25 L/s
3) **POWER**
   The power delivered from the cylinder to drive the system once the initials torque is overcome 0.89 HP to 1 HP (for pressure of 20bars only).
4) **TORQUE**
   The torque is the essential parameter. The calculated torque is given by
   T= 3.15 N-m after initial torque is overcome
   T= 3.15 KN-m initial torque is overcome by the motor.
5) **SPEED**
   The speed regulation is achieved by metering valve. The wheel rpm is made proportion to engine rpm. The max speed is about 51 km/hr approximately.

   Thus looking into the design parameters these indicate the utmost possibilities of research. Making of the pneumatic bike, but preceded by certain constraints. These constraints can be eliminated on further research. Despite of these small constraints, there salient features clearly overcome them.

9. Salient Features

The paper itself is a vision of a dream in achieving the bike of tomorrow with various salient features:
(a) Pollution free vehicle.
(b) To save economy of individual and as well as nation.
(c) Non-inflammable.
(d) Provide safety from explosion.
(e) Light in construction.
(f) Dynamic braking.
(g) Reverse rotation capability may be possible.
(h) Exhaust air is sent back to atmosphere.

10. Conclusion

We hope this paper gives a vision of what extent we engineers can value to this nation. It is true say that our future is ahead of every one,, horizon because only we can turn the mission impossible into possible. With the

advancement in this field future of tomorrow is not only in its trend, but it is much dependent on how we engineers conceptualize and visualize it. It is very evident although the technology has brought the THE WORLD TOGETHER but it is us who can bring THE WORLD CLOSER and there by initiating a technological revolution and SO DO WE.

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