

Design of Automatic Pneumatic Clutch System

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ABSTRACT:The main Objective of this concept is used to apply the gear by using automatic vehicle. This is the new innovation model mainly used for the vehicle to control the vehicle. Here we are concentrating to design the automatic pneumatic clutch mechanism in two wheeler vehicle by using the electronic and pneumatic devices. This is very useful for the gear changing mechanism in automatic vehicle. By using this we can easily control the vehicle and improve the performance of the vehicle also we can avoid the wear and tear of the gear.

KEYWORDS:Automatic Vehicle, Automatic Pneumatic Clutch, Mechanism, Pneumatic Devices

I. INTRODUCTION

A Clutch is the mechanical device that engage and disengages power transmission, Especially from a drive shaft to driven shaft. Clutches allow to bikes to change gear, chainsaws to idle, drills to spin bites and large machine to run at optimum power. pneumatic clutches are no different where mechanical clutches does everything with moving, tangible part, pneumatic brake clutches transfer power from one part of a machine to another using compressed air or other gases. upon clutch disengagement, an air is opened and an air flow is initiated through a rotary inlet through the shaft toward the pneumatic throw out bearing, which opens the clutch re-engagement bleeds the air out of the system, a set of spring release, and the clutch reattaches to the flywheel. Then you are ready to go. Compressed air is usually clean and easy to handle. In fact, the simplicity of pneumatic clutches leads to much more accurate torque control (with generally less than 5 per variance) compared to mechanical clutches (often around 10 per). When combined with pneumatic brakes, the brake/clutch packages provide reduced breaking

distance and are often use in larger, heavier vehicles like buses.

1.1 LITERATURE SURVEY

The literature related to pneumatic clutch is presented in this section

The word 'pneuma' comes from Greek and means breather wind. The word pneumatics is the study of air movement and its phenomena is derived from the word pneuma. Today pneumatics is mainly understood to means the application of air as a working medium in industry especially the driving and controlling of machines and equipment.

Pneumatics has for some considerable time between used for bike riding out the simplest mechanical tasks in more recent times has played a more important role in the development of pneumatic technology for automation. Pneumatic systems operate on a supply of compressed air which must be made available in sufficient quantity and at a pressure to suit the capacity of the system. When the pneumatic system is being adopted for the first time, however it will indeed the necessary to deal with the question of compressed air supply. The key part of any facility for supply of compressed air is by means using reciprocating compressor. A compressor is a machine that takes in air, gas at a certain pressure and delivered the air at a high pressure. Compressor capacity is the actual quantity of air compressed and delivered and the volume expressed is that of the air at intake conditions namely at atmosphere pressure and normal ambient temperature.

The compressibility of the air was first investigated by Robert Boyle in 1662 and that found that the product of pressure and volume of a particular quantity of gas.

The usual written as

$$PV = C \text{ (or) } P_1V_1 = P_2V_2$$

In this equation the pressure is the absolute pressured which for free is about 14.7 Psi and is of courage capable of maintaining a column of

mercury, nearly 30 inches high in an ordinary barometer. Any gas can be used in pneumatic system but air is the mostly used system now a days.

SELECTION OF PNEUMATICS :

Mechanization is broadly defined as the replacement of manual effort by mechanical power. Pneumatic is an attractive medium for low cost mechanization particularly for sequential (or) repetitive operations. Many factories and plants already have a compressed air system, which is capable of providing the power (or) energy requirements and the control system (although equally pneumatic control systems may be economic and can be advantageously applied to other forms of power).

The main advantage of an all pneumatic system are usually economic and simplicity the latter reducing maintenance to a low level. It can also have out standing advantages in terms of safety.

1.2 COMPONENTS :

1.2.1 SOLENOID VALVE:



Fig –1: Solenoid Valve

A solenoid is an electrical device that converts electrical energy into straight line motion and force. These are also used to operate a mechanical operation which in turn operates the valve mechanism. Solenoids may be push type or pull type.

The push type solenoid is one which the plunger is pushed when the solenoid is energized electrically. The pull type solenoid is one in which the plunger is pulled when the solenoid is energized. The control valve is used to control the flow direction is called cut off valve or solenoid valve. This solenoid cut off valve is controlled by the electronic control unit.

In our project separate solenoid valve is used for flow direction of vice cylinder. It is used to flow the air from compressor to the double acting cylinder.

1.2.2 DOUBLE ACTING CYLINDER:



Fig-2 : Double Acting Cylinder

A double acting cylinder is employed in control systems with the full pneumatic cushioning and it is essential when the cylinder itself is required to retard heavy loads. This can only be done at the end positions of the piston stock. In all intermediate positions a separate externally mounted cushioning device must be provided with the damping feature. The normal escape of air is out off by a cushioning piston before the end of the stock is required. As compressed since it cannot escape but slowly according to the setting made on reverses. The air freely enters the cylinder and the piston strokes in the other direction at full force and velocity.

1.2.3 POLYURETHIN TUBE:



Fig – 3 :Polyurethin Tube

Polyurethane is naturally flexible and exhibits virtually unlimited flexural abilities. Combining good chemical resistance with excellent weathering characteristics sets polyurethane apart from most other thermoplastics. It has optional resistance to most gasolines, oils, kerosene, and other petroleum based chemicals, making it an ideal choice for fuel lines (although additives in today's gasoline and petroleum products warrant field testing).

1.2.4 AIR COMPRESSOR:



Fig -4 : Air Compressor

Air compressor is a pneumatic device that converts power (using an electric motor, diesel or gasoline engine, etc.) into potential energy stored in pressurized air (i.e., compressed air). By one of several methods, an air compressor forces more and more air into a storage tank, increasing the pressure. When the tank's pressure reaches its engineered upper limit, the air compressor shuts off. The compressed air, then, is held in the tank until called into use.

The energy contained in the compressed air can be used for a variety of applications, utilizing the kinetic energy of the air as it is released and the tank depressurizes. When tank pressure reaches its lower limit, the air compressor turns on again and re-pressurizes the tank. An air compressor must be differentiated from a pump because it works for any gas/air, while pumps work on a liquid.

1.2.5 BATTERY:



Fig -5 : Battery

Its main purpose is to provide an electric current to the electric-powered starting motor, which in turn starts the chemically-powered internal combustion engine that actually propels the vehicle.

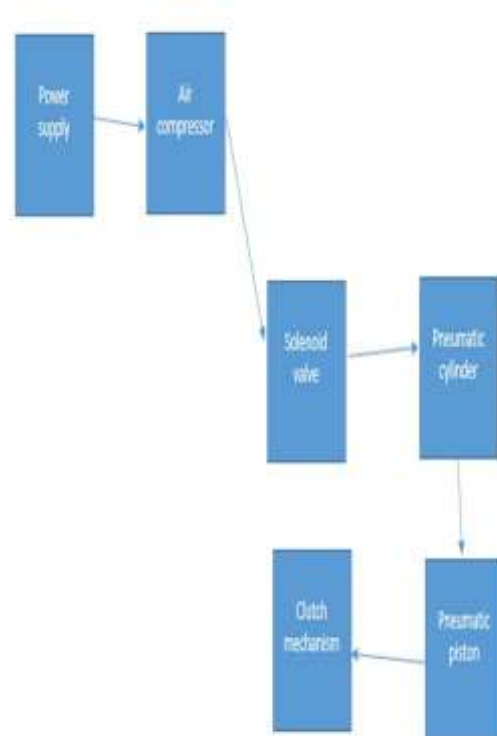
1.2.6 GEAR SHIFTING PEDAL:



Fig -6 : Gear Shifting Pedal

A gear stick will normally be used to change gear while depressing the clutch pedal with the left foot to disengage the engine from the drivetrain and wheels.

1.3 BLOCK DIAGRAM :



1.4 WORKING PRINCIPLE :

Here have one pneumatic cylinders arrangements which are arranged on either side of the vehicle pedal rest when applying the gear. The pneumatic cylinder is fixed at the end of the clutch mechanism. The cylinders are operated with the help of electric power supply and of electric power supply and it is controlled by the control unit.

Depending up on the signal the clutch will automatically changed with the help of the control unit. When the gear pedal press to change gear automatically clutch engage and disengage. The arrangement is clearly shown in the block diagram.



Fig -7 : Actual model

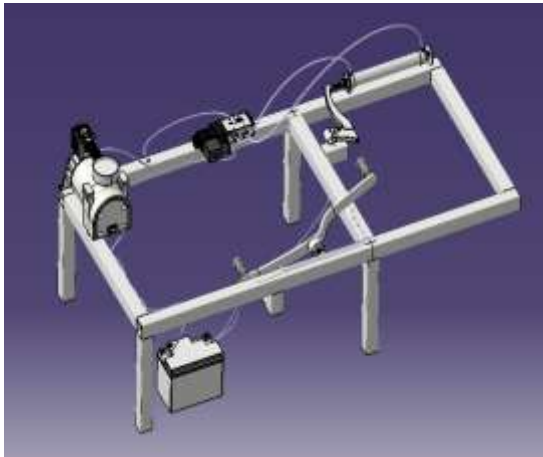


Fig 8 : Catia Model

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1.4.1 ADVANTAGES :

- 1.System is helpful for the drivers
 - 2.Avoids fear while driving the vehicle
 - 3.Quick response is achieved
 - 4.Simple in construction
 - 5.Easy to maintain and repair
 - 6.Cost of the unit is less
 - 7.Continuous operation is possible without stopping
- Application
It is applicable in all type of two wheeler vehicles

II. CONCLUSIONS

The project presented has involved the development and implementation of automatic transmission for bikes

The project work is to implement the idea of pneumatic clutch system in clutch featured bikes with suitable clutch control. Therefore the forces exerted by the cylinder are optimum to move the clutch mechanism.