

DESIGN AND FABRICATION OF AIR CAR CONTROLLING SYSTEM

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ABSTRACT-Our project works is the environmental pollution in the metropolitan cities is increasing rapidly mostly because of the increased number of fossil fuel powered vehicles. There are many alternative options are now being studied throughout the world. One of the best alternative solutions can be a compressed air powered vehicle. Best advantage of this engine that is no hydrocarbon fuel that is required which means no combustion process is taking place.



The so many vehicles running out. So, fuel prices especially the petrol is rising steadily day by day. Again, the many pollution due to vehicles in metro cities & urban areas is increasing continuously

1. INTRODUCTION

The Vehicles name of, derived from the Latin word, vehiculum, are non-living means of the transport. The most often they are manufactured many vehicles (e.g. child bicycles, cars, bikes, trains, ships, boats, and aeroplane), like that so other means of the transport which there are not made by humans also may be called vehicles; examples include icebergs and floating tree trunks. The Vehicles is old days may be propelled or pulled by animals, for instance, a chariot, a stagecoach, a mule-drawn barge, or an ox-cart. Forever, animals on their own, though used as well as means of transport, are not called vehicles, but rather beasts of the burden or draft animals.

The since at 1834, the first vehicle actually a tricycle, powered by battery, was developed. So, but we are improvement in the compressed air engine (CAE), ICE vehicles have occupied many places an absolute share in the market; pure electric vehicles (PEVs) have almost disappeared since 1930's. The global population will increase from 6 billion in 2000 to 10 billion in 2060, and the global vehicles will be increase from 800 million to 3.5 billion consequently. The fossil fuel engines which were good enough for us before 30- 50 years but now they are one of the sources of contributor of global warming and pollution with fossil fuel crises.

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2. INTRODUCTION

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3. STEERING SYSTEM

The steering system is mostly used for all four-wheeler vehicles. The activate angular motion of the front wheels to negotiate a turn. That is done through to the linkage and steering to gear which convert to the rotary motion of the steering wheel into angular motion of the front road wheels. When the driver is turning the vehicle to turn the left and right in front wheels using with rack and pinion mechanism.



Figure 2. steering system

RACK AND PINION

Rack and pinion are one type of mechanical mechanism the type of linear actuator that mainly used to gears which convert rotational motion into linear motion. When the driver rotating the steering, the circular pinion engages teeth on a linear "gear" bar- the rack. The rotational motion applied to the pinion will cause the rack to move to the side, up to the limit of its travel. For example, in a normal four-wheeler, the rotation of a pinion mounted on a locomotive or a rail car engages a rack between the rails and pulls a train along a steep slope

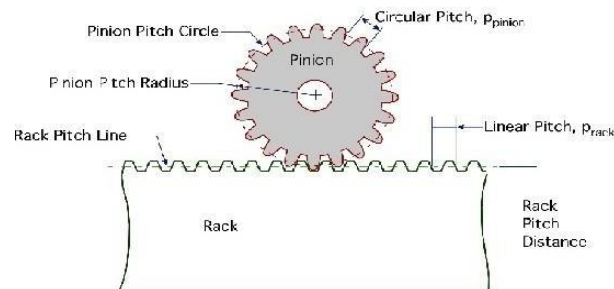


Figure 2.1 rack and pinion

SPECIFICATION

Material	: cast-iron
Outside diameter	: 75mm
Circular pitch	: 4.8mm
Tooth depth	: 3.386m

Pitch circle diameter	: 78
Circular tooth Thickness	: 2.367mm
Fillet radius	: 0.48mm
Clearance	: 0.389mm

2.2 PINION

Pinion With high precision and load-bearing capacity as well as smooth running properties, the pinions from WMH Herion are extremely reliable power transmitters even during continuous operation.

2.3 RACK

Rack Precision-ground racks its commonly used to allow the rotary movement of the pinion to be transformed exactly into a linear movement.

The rack is mainly used to all normal steering system it has main parts is rack pitch line and rack pitch distance. When the rotating the steering is engage with the pinion. In this process using the material is cast iron.

3. BRAKE DRUMS

The brake drum is commonly made of the cast iron that is heat-conductive and wear-resistant. It rotates with the wheel and axle. The running time when the driver applies the brakes, the lining pushes radially against the inner surface of the drum, and the ensuing friction slows or stops rotation of the wheel and axle, and thus the vehicle. This friction generates substantial heat

WHEEL CYLINDER

One-wheel cylinder is fixed on each wheel. The two pistons operate the shoes, one at each end of the wheel cylinder. There are two pistons inside the brake shoe. The piston one end connected to wheel cylinder another end connected to the brake shoe.

BRAKE SHOES

Brake shoes are generally making of two pieces of steel welded together. The used to friction material is either riveted to the lining table or attached with adhesive. The brake shoes are most used for all vehicles to applies the brake to expanded to brake shoe to creating the friction between brake shoe and brake drum and finally stop the vehicles.

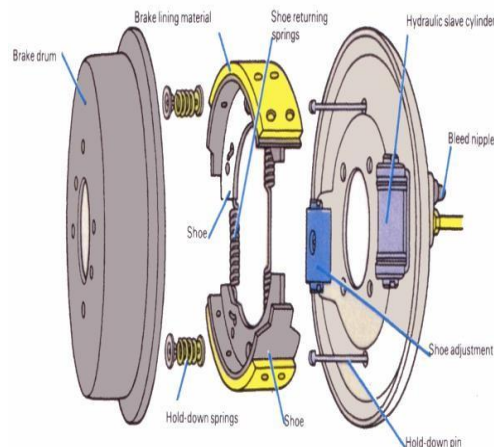


Figure 3. Drum brake

4. SOLENOID VALVE

The solenoid valve is known as directional valve is one of the most important parts of a pneumatic system. This is Commonly known as DCV, this valve is used to control the direction of air flow in the pneumatic system. There is directional valve by changing the position of its internal movable air parts.

The wheel cylinder work is the connected to master cylinder. When the driver applies to the brake the master cylinder pushes the oil to wheel cylinder, then wheel cylinder moves to the piston opposite direction.

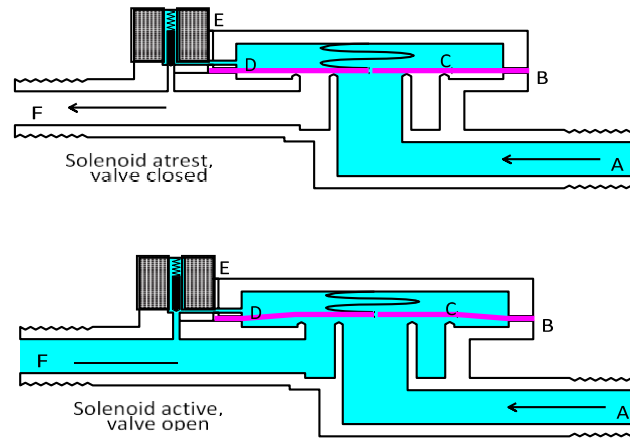


Figure 4. solenoid valve

WORKING OF SOLENOID VALVE

The solenoid valve working for controlling the air. There is ensure easy exhausting air of 3/2 valve. This spool of the 3/2 valve slide inside the main bore according to spool position; the ports get connected and disconnected. The working principle is as follows.

Position-1

When the air come to actuated towards direction to right side coil was energid to open the valve and left valve was closed then air was going through the right-side valve.

Poision-2

When the pushed to air left side direction left coil was energid to open the left valve and right-side valve was closed then air was going through the left side valve.

Flow Control Valve

This valve is used to control the speed of the piston movement and also it acts as a one – way restriction valve which means that the air can pass through only one way and it can't return back. This valve is using, the time consumption is reduced because of the faster movement of the piston.

Technical data

- Size : ¼"
- Pressure : 0 to 10 kg / cm2
- Media : Air



Figure 4.2 Flow control valve

DIRECTIONAL CONTROL VALVES

Directional control valves control the way the air passes and use for controlling the commencement, termination and direction of air flow. There is depending on the number of paths the air is allowed to take, directional valves are termed as two- way, three way, and four way or multi way valves. The many different number of ways by means the number of controlled connections of the valve, inlet connections to the compressed air supply.

5. PRESSURE GAUGE

Pressure Gauge is used for the analysis of an applied force of compressed air in surface. The pressure is typically measured in units of force per unit of surface area. There is Many techniques have been developed for the measurement of pressure and vacuum.



Figure5. Pressure Gauge

BATTERY

The batteries are used for storage of excess solar energy converted into electrical energy. The battery is must using the all running vehicles. This main function is to help of start the vehicles.



figure 5.1 Battery

METAL FRAME

They are available in bright rounds, squares and flats, and hot rolled round. The metal frame is mostly made of mild steel bars for machining, suitable for lightly stressed components including studs, bolts, gears and shafts. It can be case-hardened to improve wear resistance.



Figure 5.2 metal frame

There is a two end is one end connected to pneumatic cylinder and another end connected to cam shaft. The crank shaft main function is to convert rotary to linear motion.



Figure 6. crank shaft

AIR TANK

The air tank can be used to store the compressed air system by reducing both the amount of pressure drop and the rate of decay. The storage can be used to protect critical pressure applications from other events in the system. The air storage can also be used to control the rate of pressure drop in demand while supporting the speed of transmission response from supply. There is some systems, it is important to provide a form of refill control such as a flow control valve.



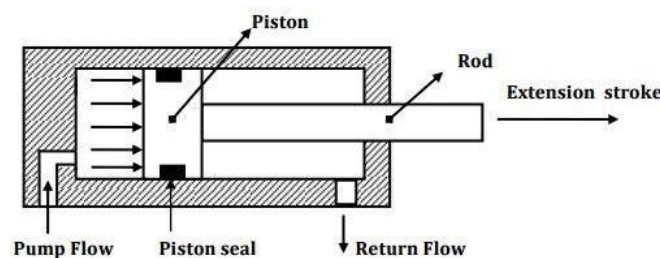
5.3 compressed air tank

6. CRANK SHAFT

A crankshaft related to crank is a mechanical part able to perform conversion between reciprocating motion and rotational motion. This is a reciprocating engine, its convert to reciprocating motion of the piston into rotational motion; however, the piston rod is more vulnerable to buckling and bending. Additional calculations should be performed as well.

6.1 PNEUMATIC CYLINDER

The Double-acting cylinders (DAC) used the force of air to move in both forward and return strokes. In this process they have two ports to allow air in, one for outstroke and one for instroke. The return stroke length for this design is not limited,

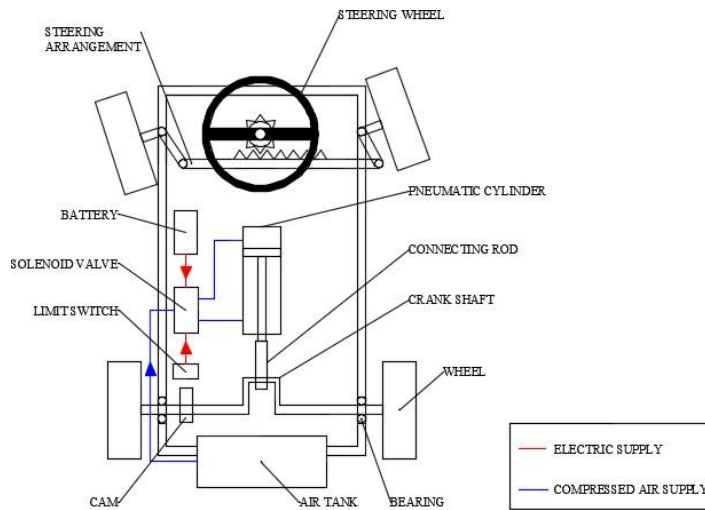


Double acting cylinder

ADVANTAGES

- The Compressors use electricity for generating compressed air which is relatively much cheaper and widespread.
- In our project is Compressed-air vehicle reduces the cost of the vehicle 25%, because of there is no need for build a cooling system, fuel tank, Ignition Systems or silencers.
- In this project low manufacture and maintenance costs as well as easy maintenance.
- This is a lighter vehicle cause less damage to roads, resulting in lower maintenance cost.

LAYOUTS OF MODEL



CONCLUSION

The conclusion of the compressed air vehicles is not new. In fact, it has been around for years. The Compressed air technology allows engines that are both non-polluting and economical. This paper explores the most effective application of pneumatic power. This pneumatic vehicle will replace the battery- operated vehicles used in industries. This Pneumatic powered vehicle requires very less time for refueling as compared to battery operated vehicle. This is all clean, light weight circuit, can work in all environment and requires less maintenance.

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