Pneumatic Power Steering System

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Abstract- *As a rule, all power controlling frameworks at present utilize liquid strain to help the driver in turning the front wheels. In this paper a pneumatic power guiding framework is presented and pneumatic machines are utilized to take care of business. In this kind of pneumatic directing framework, high tension packed air is communicated all through the machine to different pneumatic chambers. The air is controlled straight by control valves and appropriated through the cylinders. This paper is primarily centered around to lessen driver exhaustion and made driving a more charming encounter.*

Keywords- Wheel, Pneumatic, cylinder, Direction, control valve, Hose and connector, Frame, Shaft, Metal strip, Bearing, Disc, Air compressor

I. INTRODUCTION

Power guiding frameworks have added to diminished driver weariness and made driving a more charming encounter. Essentially all power directing frameworks as of now, utilize liquid strain to help the driver in turning the front wheels. Pneumatic hardware are machines and apparatuses which use gaseous tension to take care of business. Pneumatic apparatus are machines and instruments which use gaseous tension to take care of business.

In this sort of machine, high strain compacted air is sent all through the machine to pneumatic actuator. The air is controlled straight by control valves and circulated through the cylinders. This framework comprises of pneumatic actuator, two haggles directing linkage mounting on outline.

There pneumatic actuator shaft is connected to one of the wheels. The other wheel is appended with linkage mounting. Pneumatic chamber stroke is constrained by Course control switch, and guiding happens. Pneumatic Power Guiding Framework makes it extremely simple to drive the vehicle than the vehicle which presently utilizes liquid power and furthermore these vehicles can be kept up with without any problem.

II. MAJOR COMPONENTS

1. valves
2. Wheel
3. Pneumatic cylinder
4. Direction control valve
5. Hose and connector
6. Frame
7. Shaft
8. Metal strip
9. Bearing
10. Disc
11. Air compressor

1. wheel

Hub Material: Steel
Tire: Plastic

2. Pneumatic cylinder

Stroke Length: Cylinder Stoker Length 160mm = 0.16 m
• Quantity: 1
• Seals : Nitride (Buna – N) Elastomer
• End Cones : Cast Iron
• Piston : EN-8
• Media : Air
• Temperature: 0.80 º C
• Pressure Range: 8N/m

3. Directional control valve:

Directional control valves control the manner in which the air passes and use for controlling the beginning, end and course of wind stream. Contingent upon the quantity of ways the air is permitted to take, directional valves are named as two way, three way, and four way or multi way valves. The unique number of ways by implies the quantity of controlled associations of the valve, bay associations with the packed air

supply. The Power source association is given to the air shopper what's more, exhaust association is given to the air.

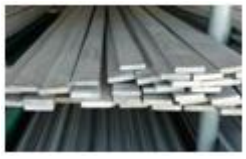
4. Hose and connecter:

A hose coupling is a connector on the finish of a hose to interface(or on the other hand couple) it with another hose or with a tap or a hose machine, like a water system sprinkler. It is typically made of steel, metal, tempered steel, aluminum or plastic

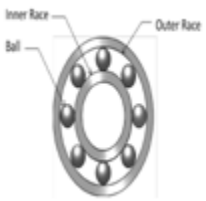
5. Shaft

6. Metal strip Specifications

Material: Mild Steel Strip Length:40cm Width:5cm



7. Design of ball bearing

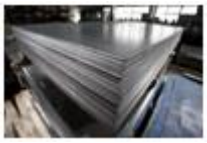


Bearing No. 6202 (Data book page.no 4.13)
Outer Diameter of Bearing (D) =37mm Thickness of Bearing (B)= 12 mm
Inner Diameter Of the Bearing (d) =15mm r_1 = Corner radii on shaft
And
Housing r_1=1(From design data book)
Maximum Speed = 14,000 rpm (From design data book)

8. Circular disc

9. **Frame:**

Material: Mild steel

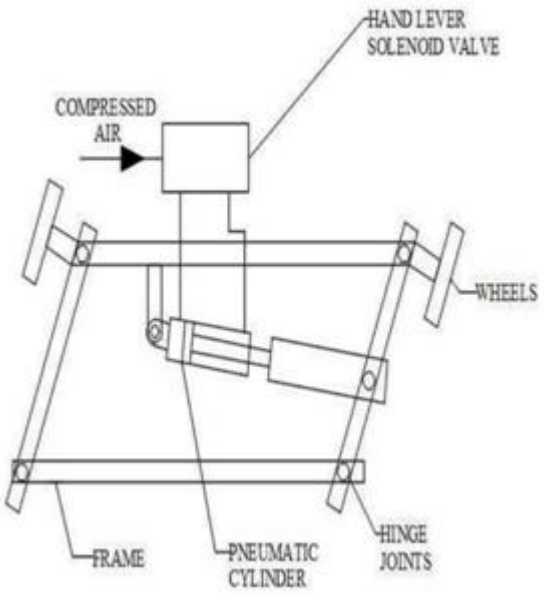


- Material: Mild Steel
- Outer Diameter: 6 Inch
- Thickness: 3mm
- Use fluid pressure to assist the driver in turning the front wheels.

10. Air compressor:

Plunging chamber, utilized by scuba jumpers to hold air and other breathing gases at high tension submerged; Pneumatic strain vessel, for putting away compacted air to work hardware, for example, slowing mechanisms, paint containers and paintball weapons, Air tank is additionally air blower.

10.1. Block diagram:



10.2. Working principle

At the point when the switch of solenoid valve is pushed towards the left end it permits the air to go through the pneumatic chamber get joined with it makes the wheel turn towards left, likewise when the valve is pushed towards the right end it permits the air to go through the second port of pneumatic chamber which makes it to broaden, this power the connection coupled to it move outward and causes the wheel to turn towards right side. Thus, the simple steering activation system is performed with the help of pneumatic system.

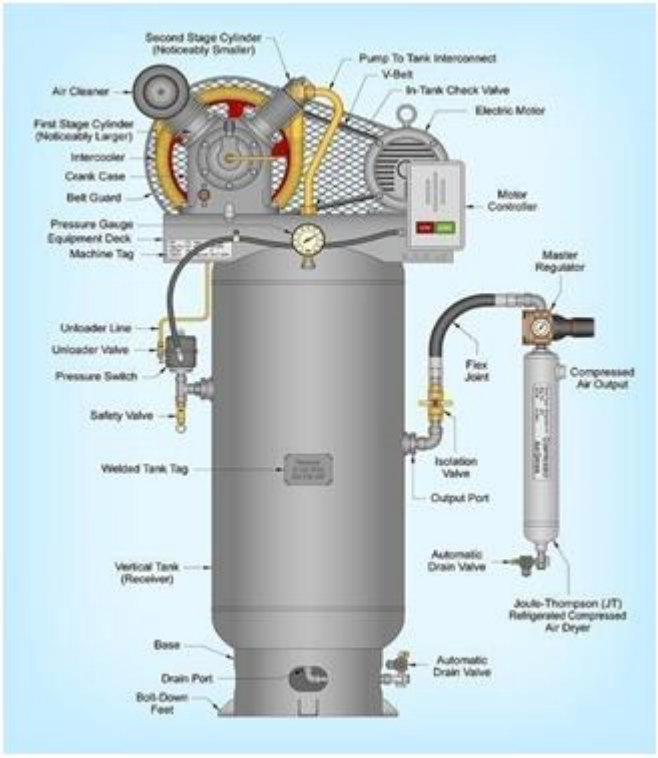
10.3. Advantages

- Construction is simple.
- Cost of steering system is completely reduced, since usage of complex mechanisms is avoided.
- Operation is simple so less skilled operators can handle the system.
- This system can also be applied for miniature vehicle models.
- Installation and maintenance cost is less

10.4. Applications

- The air is controlled directly by control valves and distributed through the tubes.
- High pressure compressed air is transmitted throughout the machine to pneumatic actuator.
- Use fluid pressure to assist the driver in turning the front wheels.

10.5. Working layout



2.1 Integral power-assisted steering system

In the fundamental power-helped directing framework, the siphon is rushed to a section on the motor, and the recycling ball controlling stuff is mounted on the edge close to the motor. This kind of directing framework is utilized on many back tire drive vehicles and light duty trucks. The siphon is driven by a belt from the driving rod and a basic repository is mounted on the siphon. A high-pressure hose and a return hose are associated from the siphon to the controlling stuff

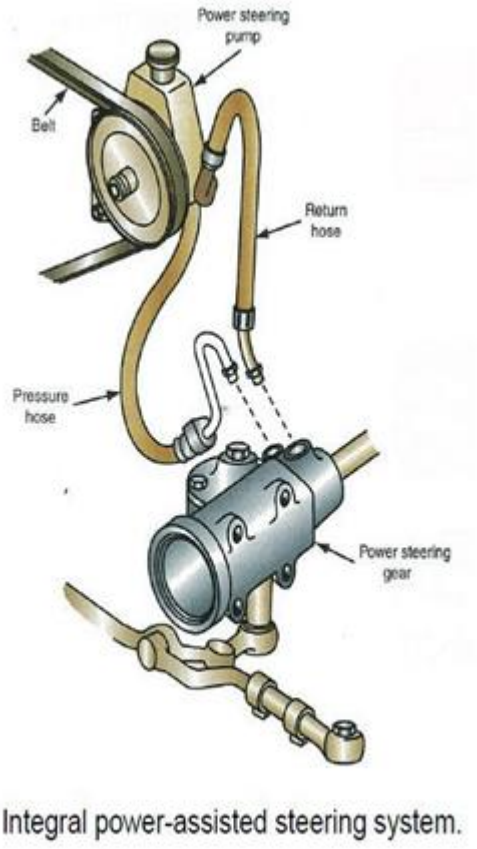


Fig:1.1 Integral power-assisted steering system

Introduction

Pneumatic hardware are machines and devices which use air ability to take care of business. Weighty hardware is a typical model. In this kind of machine, high strain Packed air is communicated all through the machine to different Pneumatic engines and Pneumatic chambers. The air is controlled straight forwardly or consequently by control valves and dispersed through hoses and cylinders.

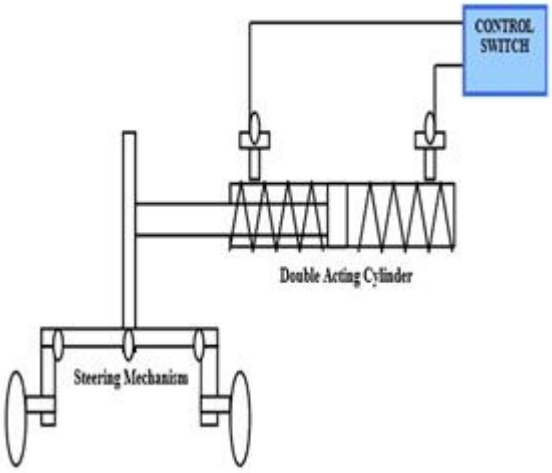
Scope objective

The notoriety of Pneumatic apparatus is because of the exceptionally enormous measure of force that can be moved through little cylinders and adaptable hoses, and the powerful thickness also, wide cluster of actuators that can utilize this power. These hardwares are based on the Chambers, Blower and Siphon.

Working

Pneumatic chambers are compressed by Pneumatic strain and get their power for the Pneumatic air under tension. They change the air's energy to direct work. A Pneumatic chamber works in a Pneumatic framework and is the engine side of this framework. The generator side of the air Pneumatic framework is the siphon or Blower that brings a fixed or controlled wind stream into the framework. The Pneumatic chamber starts the tension of the air, which can never be bigger than the tension that is asked by the heap. The chamber comprises of a chamber barrel, in which a cylinder associated with a cylinder bar is moving. The barrel is shut by the chamber base at the base side and by the chamber head along the edge where the cylinder bar emerges from the chamber. Mounting section or clevises are mounted to the chamber base as well as the cylinder bar. The cylinder has sliding rings and seals. The cylinder separates within the chamber in two chambers, the base chamber and the cylinder pole side chamber.

In the event that the air is siphoned into the cylinder pole side chamber and the air from the cylinder region streams back to the air supply without pressure, the tension in the cylinder pole region chamber is Burden/(cylinder region - cylinder bar region). In such a manner the Pneumatic chamber can go back and forth. By siphoning Pneumatic air to the base side of the Pneumatic chamber, the cylinder bar begins moving out. The cylinder pushes the air in the other chamber back to the air supply. Assuming that we expect that the gaseous tension in the cylinder pole chamber is zero, the strain in the chamber is currently Power/Cylinder region. At the point when the vehicle weight expands, the power expected to control the vehicle likewise increments. The majority of the vehicles are have liquid power for directing. In this task pneumatic power (compacted air) is utilized instead of Mechanical power.



Application

1. Used in all light duty vehicles like cars

Expected outcome

1. Very easy to drive vehicle than fluid power.
2. No moving parts.
3. Easy maintenance.
4. No separate drive is required to drive the compressor as the brake system has the compressed air for operation

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