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Review Paper on Automatic Car Parking Brake System Using Hydraulic Brake Circuit in Any Four Wheeler

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Abstract- A parking brake is an important tool in any automotive parking system. The parking brake system is designed toused the basic hydraulic system or circuit present in the four wheeler itself. The mechanical hand brake system is quite difficult for the driver to use. However the present designed circuit operates on an additional use of a small 'ON-OFF' switch to apply parking brake to the vehicle or refuse the parking brake. It comprises of hydraulic master cylinder, high pressure parking, wheel cylinder, disc brake, solenoid valve and 'ON-OFF' switch.

Keywords- Hydraulic Brake, Master cylinder.

I. INTRODUCTION

In most passenger cars the mechanical brake is operated by hands or foot by which the brake is applied for parking and also for emergency brakes. These brakes either act on the rear wheel or are attached to transmission or to propeller shaft. The brake lever is mounted under the instrument panel to the left of the driver when the brake is applied the lever is locked in place by a ratchet for releasing the brake, different methods are used.

The real wheel type parking brake, a cable or pull rod usually connects the parking lever to an ideal lever which is mounted on a cross number of frame.

The two cabel engaging the real sheelbrockers are also pulled when the system is applied. A parking brake controls the rear brakes and is completely separate during from vehicle regular hydraulic brakes. Its function is to keep a parked vehicle stationary; it will prevent rolling down a hill or moving. The parking brake is part of the overall braking system originally this secondary braking mechanism is intended to stop a vehicle when the main brake system fails but today it is primarily used to keep a vehicle in place. When parked especially on a steep inclines or declines.

II. LITERATURE REVIEW

Heavy goods vehicles exhibit poor braking performance in emergency situations when compared to other vehicles. Part of the problem is caused by sluggish hydraulic brake actuators, which limit the control bandwidth of their antilock braking systems. In addition, heuristic control algorithms are used that do not achieve the maximum braking force throughout the stop. In this article, a hydraulic braking system is introduced for hydraulic braked heavy goods vehicles.

The conventional brake actuators are improved by placing high-bandwidth, binary-actuated valves directly on the brake chambers.

III. HYDRAULIC BRAKE

A hydraulic brake is an arrangement of braking mechanism which uses brake fluid, typically containing glycol ethers or diethylene glycol, to transfer pressure from the controlling mechanism to the braking mechanism. Hydraulic brakes transfer energy to stop an object, normally a rotating axle.In hydraulic System, fluids do not compress or produce any measurable friction.

Also, fluid pressure does not diminish when transferred within a closed system. That means that if there is no leak in a system, the pressure at the wheels will be the same as the pressure from the master cylinder.

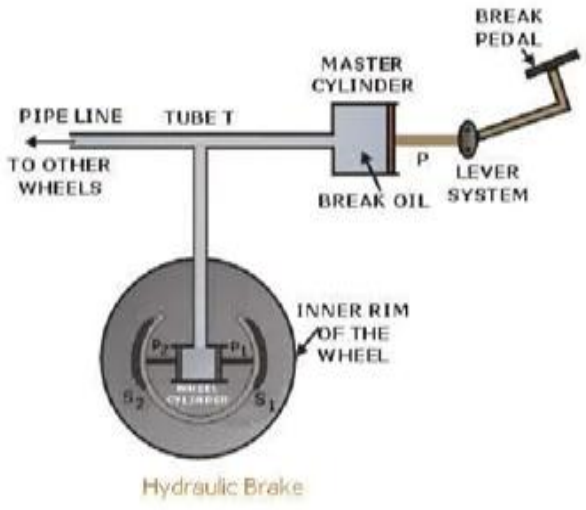

Fig 1. Hydraulic Brake.

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IV. WORKING PRINCIPLE

This system is designed to operate the parking brake system using the basic components used in a hydraulic brake circuit of any car or four wheeler few component such as Non Return Valve (NRV), Solenoid valve 12 volt DC operated are provided in addition to the toggle switch and 12 volt battery. The schematic diagram shows the basic layout of the system made.

Now, when the brake pedal is operated the hydraulic cylinder generated pressure on the oil there by the pressurized oil goes to the disc brake assembly on the vehicle via a spring operated Non Return Valve (NRV). This is the pressure line which operates the disc brake pads there by stopping the rotary motion of the disc. (Disc is to be rotated manually during applying the brake pedal).

The disc assembly gets lock in this way which is responsible for applying of parking brake for the vehicle. The disc is the brake circuit can be kept lock in order to prevent rotary motion using this system. Now when the vehicle is started and to be moved from one place to another the toggle switch is to be made ON which operates the solenoid switch and allow the flow of high-pressure brake fluid to return it to master cylinder. Thus the vehicle can easily move from one place to another after release of parking brake

V. MASTER CYLINDER

The master cylinder is the heart of the hydraulic brake system. It consists of two main chambers- the fluid reservoir which contains the fluid to supply to the brake system and the compression chamber in which the piston operates. The reservoir supplies fluid to the brake system through two ports.

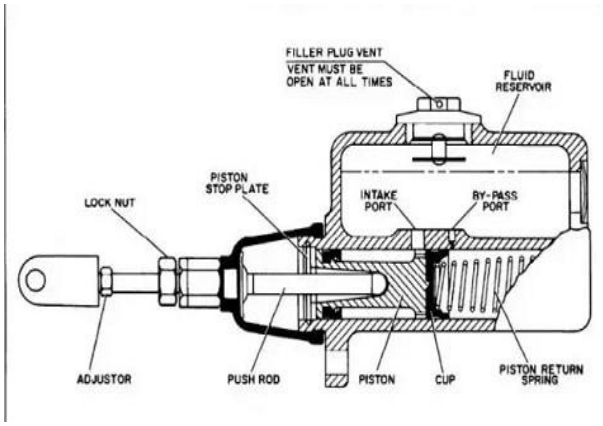

Fig 2. Master Cylinder.

The larger port is called the filler or intake port and is connected to the hollow portion of the piston between the primary and secondary cups which acts as piston seals. The smaller port is called the relief, bypass or compensating port which connects the reservoir directly with the cylinder and lines when the piston is in the released position. The reservoir is vented to the atmosphere so that the atmospheric pressure causes the flow through the filler port.

VI. DISC BRAKE ASSEMBLY

Very little of the water we use every day comes out of the ground completely pure. Some of the impurities are microscopic, but many are large enough to remove with a crude filtration system that you can make yourself using sand and rocks. It's important to remember that this filter does not render the water potable. Enjoy the experiment, noting how much clearer the water appears after passing through it, but don't drink any of the filtered water, because it may still contain pathogens.

A disc brake assembly of car is mounted on the above main frame which has a rotating disc, brake pads, hydraulic pipe connection, wheel cylinder, air removal valve, etc. The M.S. handle is provided for manual rotation of the wheel disc.

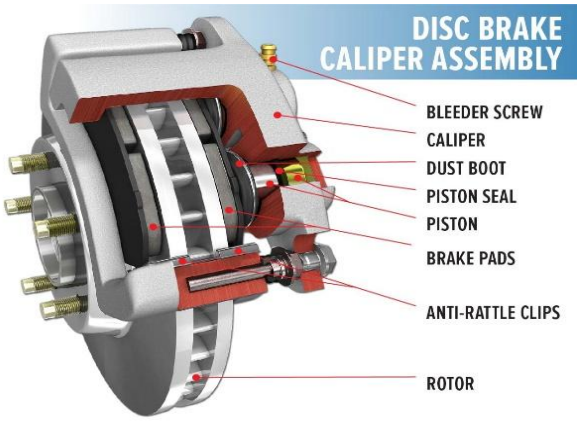

Fig 3. Disc Brake assembly.

VII. WORKING METHODOLOGY

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pressure brake fluid to return it to master cylinder. Thus the vehicle can easily move from one place to another after release of parking brake. The force is applied to the pedal which is transmitted to all the brake shoes.This system is based on Pascal's law which states that *pressure exerted anywhere in aconfined incompressible fluid is transmitted equally in all directions throughout the fluid."

This principle is stated mathematically as:

P=pgh

Where P is the hydrostatic pressure (given in pascals in the SI system), or thedifference in pressure at two points within a fluid column, due to the weight ofthe fluid.p is the fluid density (in kilograms per cubic meter in the SI system).g is acceleration due to gravity.h is the height of fluid above the point of measurement, or the difference inelevation between the two points within the fluid column (in meter in SI)

VIII. OBJECTIVE

While making the project following points should be covered as much as possible:

- It's very simple and cheap to increment this system in the vehicle.
- This system is able to provide more safety to the passengers.
- This provides a braking system that is easily accessible for repair purpose.
- No extra cost required for these system.
- By operating a small toggle switch the system works.
- This system can be used in any two wheeler or four wheeler.
- To increase safety during car parking.

IX. CONCLUSION

This system is designed to facilitate quick and easy operation of Parking Brake by using hydraulic brake circuit in the vehicle. Also, this system works as an immobilizer tool for car behind the designing of this system, our main aim is to improve the technique of prevention of accidents and also reducing the hazard from accidents like damage of vehicle, injury of humans, etc.

The application of hydraulics produces smooth operation. By using more techniques, they can be modified and developed according to the by implementing this project, we can reduce cost of high-end cars by giving similar kind of safety.

This project work has provided us an excellent opportunity and experience, to use our limited knowledge. We have gained practical knowledge regarding, planning, purchasing, assembling and machining while doing this project work. Towards the end of completion of the project, we felt that the project has helped us to bridge the gates between institution and industries.

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