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Design of Hydraulically Operated Main Stand

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ABSTRACT

The conventional main stand which we use in our two wheeler is very problematic, especially for weak people and the drawback of side deployed stand are also unavoidable. Generally, the vehicle needs to be lifted on the center stand for following reasons At winter season the fuel needs more heat to acquire its ignition temperature, and battery is not capable of providing proper cranking, thus it needs to be lifted for the kick start. When there is shortage of parking space the vehicle needs to be lifted on main stand, and at the time of maintenance and washing, it again needs to lifted. While performing this task one can get severe back pain on sprain in leg or can face long term back pain.(as observed). Considering the problem in above mentioned areas we are opting for semi automation, and our project's main aim is to reduce man power through Hydraulically Operated Main Stand and Hydraulic fluid plays main role in our project.

Keywords: semi automation, reduced man power, kick start, fuel ignition temperature, hydraulically operated main stand.

I. INTRODUCTION

Normally, we have seen in our surrounding, conventional method of applying main stand requires lots of human effort which is a tough & hard task for a group of people who have less strength and physically weak like older aged people and females of all age groups.To eliminate this problem we are introducing this concept. It is hydraulically operated main stand, and it will work on fundamental principle of hydraulic that is Pascal's law.

The operation is mainly controlled by a switch which will help to mount the vehicle on the main stand. Through 12V battery the pump will get power and then through pump the hydraulic cylinder will be operated and as a result the stand will be able to lift the vehicle and mount on it with a proper ground clearance. The side stand generally on observation basis leads to more accidents and when the weight of the vehicle is continuously given on the side stand then fatigue occurs in the stand and effects the life of side stand. And normally its seen that people can easily drive 2 wheelers but when it comes to mounting it on the main stand then one always requires others help to mount it on the main stand. Also, it is always instructed by the manufacturer that put the vehicle on the main stand as much as possible.

Currently it is not possible to change the position of the stand , usually it is deployed under the engine where the ground clearance is minimum.

Project description:

We are introducing our project so as to reduce the human efforts, and for this we are using hydraulic system for optimum result. The hydraulic system basically consists of gear pump (positive displacement pump), hydraulic fluid, oil reservoir, hydraulic cylinders and strainer, control valves.

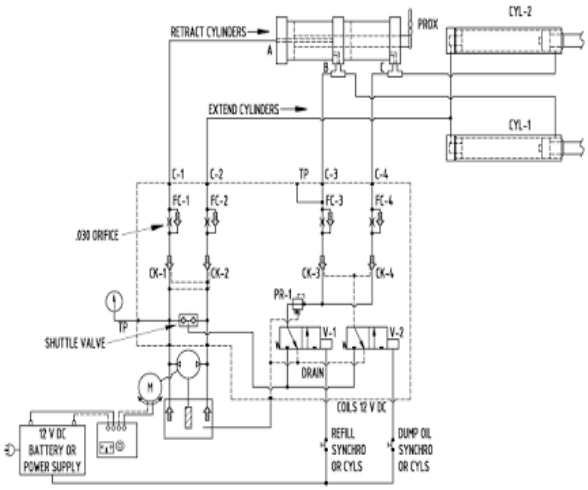

Figure 1

The above diagram is the brief explanation of the hydraulic circuit.

Similarly on the basis of hydraulic circuit we have designed our main stand, here we are using the switch which will be operated by the 12V battery and the battery will supply the current to the pump the pump will operate the hydraulic cylinder and when the cylinder will be operated then the inclined stand will be come down and then opposite moment will act w.r.t. the point where the stand is touched in ground and then the vehicle will be lifted up.

The whole idea is based on Pascal's law and it states that the pressure exerted anywhere in a confined incompressible fluid is transmitted equally in all direction throughout the fluid such that the pressure ratio remains the same. A change in pressure at any point in an enclosed fluid at rest is transmitted undiminished to all points in the fluid.

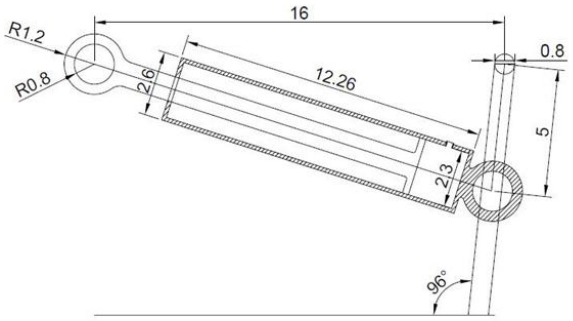

Figure 2. Design of cylinder

Hydraulic cylinder:

Hydraulic cylinder get their power from pressurized hydraulic fluid, which is typically oil. The hydraulic cylinder consists of a cylinder barrel in which a piston connected to a piston rod moves back and forth, the barrel is closed on one end by the cylinder bottom and the other end by the cylinder head where the piston rod comes out of the cylinder .

The hydraulic cylinder is the actuator or motor side of the system. The generator side of the system is pump which delivers a fixed or regulated flow of oil to the hydraulic cylinder to move the piston.

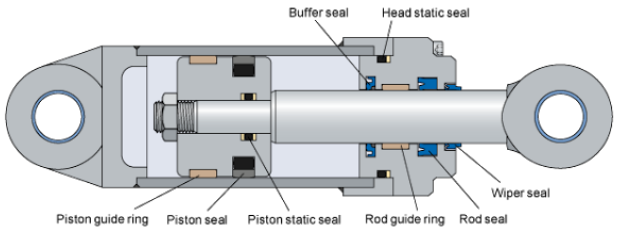

Figure 3

Gear pump:

A gear pump uses the meshing of gear to pump fluid by displacement. It used to deliver constant pressure fluid at the discharge point. Once fluid is

discharged it is not possible for the fluid to return back in the pump.

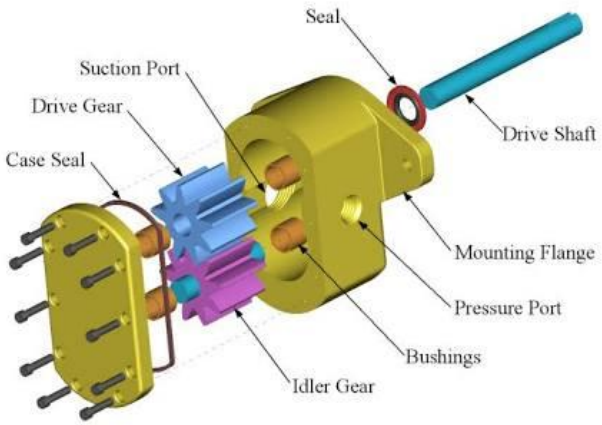

Figure 4

Hydraulic fluid and its properties:

Hydraulic fluid is used to transfer the power in the desired component the system will work more efficiently if the fluid used has zero compressibility. The oil used in the system also provides cushioning effect for the shock load so as to increase the life of the components.

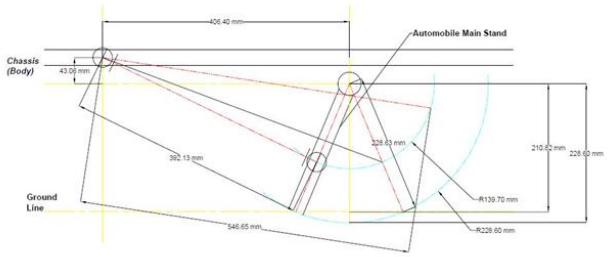

Figure 5. line diagram of the main stand

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