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Button Operated Gear Shifting System for Two-Wheeler

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Abstract--- *There are disclosed an automatic gear change control apparatus for an automobile and a method of controlling such apparatus. A rotational output of an internal combustion engine is connected to drive wheels of the automobile and a load device. When a gear shifting-up of an automatic transmission is to be effected, the load applied by the load device is increased, or the load is connected to an output rotation shaft of the engine via a selectively-connecting device, thereby reducing the rotational speed of the output rotation shaft of the engine to a required level. In this project, the push button is used to activate/deactivate the solenoid valve. The switch is 'ON' at the time of gear changing; the solenoid valve is activated, so that the compressed goes to the pneumatic cylinder. There are disclosed an automatic gear change control apparatus for an automobile and a method of controlling such apparatus. A rotational output of an internal combustion engine is connected to drive wheels of the automobile and a load device. Then the compressed air passes through the tube, and then pushes the pneumatic cylinder, so that the gear is changed from one speed to another speed with the help of gear box arrangement. There are disclosed an automatic gear change control apparatus an automobile and a method of controlling such apparatus. A rotational output of an internal combustion engine is connected to drive wheels of the automobile and a load device. When a gear shifting-up of an automatic transmission. The load applied by the load device is increased, or the load is connected to an output rotation shaft of the engine via a selectively-connecting device, thereby reducing the rotational speed of the output rotation shaft of the engine to a required level. There are disclosed an automatic gear change control apparatus for an automobile and a method of controlling such apparatus. A rotational output of an internal combustion engine is connected to drive wheels of the automobile and a load device. When a gear shifting-up of an automatic transmission is to be effected, the load applied by the load device is increased, or the load is connected to an output rotation shaft of the engine via a selectively-connecting device, thereby reducing the rotational speed of the output rotation shaft of the engine to a required level. In this project, the push button is used to activate/deactivate the solenoid valve. The switch is 'ON' at the time of gear changing; the solenoid valve is activated, so that the compressed goes to the pneumatic cylinder. Then the compressed air passes through the tube, and then pushes the pneumatic cylinder, so that the gear is changed from one speed to another speed with the help of gear box arrangement.*

Keywords--- *Two-Wheeler, Button Operated, Gear Ratios, Automatic Transmission.*

I. INTRODUCTION

Combustion engine; an automatic transmission connected to an output rotation shaft of said engine so as to transmit the rotational output of said engine to drive wheels of said automobile through any selected one of a

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plurality of gear ratios; a load device selectively connectable to said output rotation shaft of said engine via selectively-connecting means; and means for generating a gear change control signal for selecting one of said gear ratios of said automatic transmission in accordance with one of operational conditions of said automobile and said engine said method comprising the steps of controlling said selectively-connecting means when said gear change signal-generating means generates the control signal for shifting up the gear in said automatic transmission, in such a manner that said selectively-connecting means connects said load device to said output rotation shaft of said engine. An automatic gear change control apparatus for an automobile, said automobile comprising an internal combustion engine; an automatic transmission connected to an output rotation shaft of said engine so as to transmit the rotational output of said engine to drive wheels of said automobile through any selected one of a plurality of gear ratios.

The apparatus comprising a load device for applying a load; means for connecting said load device to said output rotation shaft of said engine and for generating a gear change control signal for selecting one of said gear ratios of said automatic transmission in accordance with one of operational conditions of said automobile and said engine; and load control means for increasing the load of said load device when said gear change signal-generating means generates the control signal for shifting up the gear in said automatic transmission.

II. GEAR SHIFTING MECHANISM

Main Components:

1) PNEUMATIC CYCLINDER
2) SOLENOID VALVE WITH PUSH BUTTON
3) GEAR BOX ARRANGEMENT
4) PU CONNECTOR, REDUCER, HOSE COLLAR
5) STAND
6) SINGLE PHASE INDUCTION MOTOR WITH PULLEY

1) Pneumatic cylinder

Pneumatic cylinder consist of

A) Piston B) Cylinder

The cylinder is a Single acting cylinder one, which means that the air pressure operates forward and spring returns backward. The air from the compressor is passed through the regulator which controls the pressure to required amount by adjusting its knob. A pressure gauge is attached to the regulator for showing the line pressure.

Then the compressed air is passed through the single acting 3/2 solenoid valve for supplying the air to one side of the cylinder. One hose take the output of the directional Control (Solenoid) valve and they are attached to one end of the cylinder by means of connectors. One of the outputs from the directional control valve is taken to the

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flow control valve from taken to the cylinder. The hose is attached to each component of pneumatic system only by connectors.

III. CYLINDER TECHNICAL DATA

Piston Rod

M.S. hard Chrome plated

Seals

Nitrile (Buna – N) Elastomer

End Covers

Cast iron graded fine grained from 25mm to 300mm

Piston

Aluminium

Media

Air

Temperature Range

0^c to 85^c

Parts of Pneumatic Cylinder

Piston

The piston is a cylindrical member of certain length which reciprocates inside the cylinder. The diameter of the piston is slightly less than that of the cylinder bore diameter and it is fitted to the top of the piston rod. It is one of the important parts which convert the pressure energy into mechanical power.

The piston is equipped with a ring suitably proportioned and it is relatively soft rubber which is capable of providing good sealing with low friction at the operating pressure. The purpose of piston is to provide means of conveying the pressure of air inside the cylinder to the piston of the oil cylinder.

Generally piston is made up of

- Aluminium alloy-light and medium work.
- Brass or bronze or CI-Heavy duty.

The piston is single acting spring returned type. The piston moves forward when the high-pressure air is turned from the right side of cylinder.

The piston moves backward when the solenoid valve is in OFF condition. The piston should be as strong and rigid as possible. The efficiency and economy of the machine primarily depends on the working of the piston. It

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must operate in the cylinder with a minimum of friction and should be able to withstand the high compressor force developed in the cylinder and also the shock load during operation.

The piston should possess the following qualities.

1. The movement of the piston not creates much noise.
2. It should be frictionless.
3. It should withstand high pressure.

Piston Rod

The piston rod is circular in cross section. It connects piston with piston of other cylinder. The piston rod is made of mild steel ground and polished. A high finish is essential on the outer rod surface to minimize wear on the rod seals. The piston rod is connected to the piston by mechanical fastening. The piston and the piston rod can be separated if necessary.

One end of the piston rod is connected to the bottom of the piston. The other end of the piston rod is connected to the other piston rod by means of coupling. The piston transmits the working force to the oil cylinder through the piston rod. The piston rod is designed to withstand the high compressive force. It should avoid bending and withstand shock loads caused by the cutting force. The piston moves inside the rod seal fixed in the bottom cover plate of the cylinder. The sealing arrangements prevent the leakage of air from the bottom of the cylinder while the rod reciprocates through it.

Cylinder Cover Plates

The cylinder should be enclosed to get the applied pressure from the compressor and act on the pinion. The cylinder is thus closed by the cover plates on both the ends such that there is no leakage of air. An inlet port is provided on the top cover plate and an outlet ports on the bottom cover plate. There is also a hole drilled for the movement of the piston.

The cylinder cover plate protects the cylinder from dust and other particle and maintains the same pressure that is taken from the compressor. The flange has to hold the piston in both of its extreme positions. The piston hits the top plat during the return stroke and hits the bottom plate during end of forward stroke. So the cover plates must be strong enough to withstand the load.

Cylinder Mounting Plates

It is attached to the cylinder cover plates and also to the carriage with the help of ‘L’ bends and bolts.

IV. SOLENOID VALVE WITH PUSH BUTTON

Technical Data

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

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The directional valve is one of the important parts of a pneumatic system. Commonly known as DCV, this valve is used to control the direction of air flow in the pneumatic system. The directional valve does this by changing the position of its internal movable parts. This valve was selected for speedy operation and to reduce the manual effort and also for the modification of the machine into automatic machine by means of using a 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.

Solenoid operated valves are usually provided with cover over either the solenoid or the entire valve. This protects the solenoid from dirt and other foreign matter, and protects the actuator. In many applications it is necessary to use explosion proof solenoids

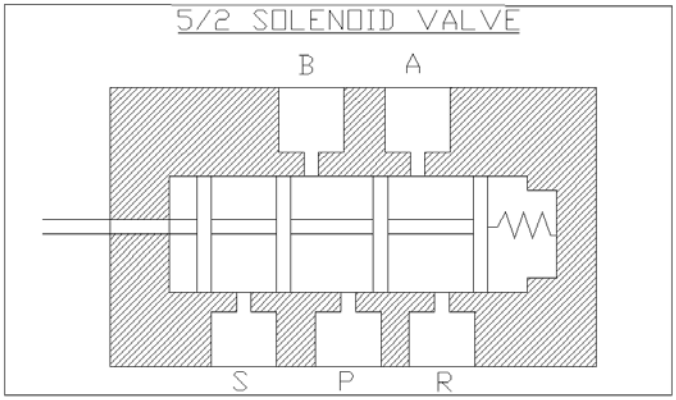

Fig 1

The push type solenoid is one in 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 name of the parts of the solenoid should be learned so that they can be recognized when called upon to make repairs, to do service work or to install them.

Parts of a Solenoid Valve

1. Coil

The solenoid coil is made of copper wire. The layers of wire are separated by insulating layer. The entire solenoid coil is covered with an varnish that is not affected by solvents, moisture, cutting oil or often fluids. Coils are rated in various voltages such as 115 volts AC, 230 volts AC, 460 volts AC, 575 Volts AC, 6 Volts DC, 12 Volts DC, 24 Volts DC, 115 Volts DC & 230 Volts DC. They are designed for such frequencies as 50 Hz to 60 Hz.

2. Frame

The solenoid frame serves several purposes. Since it is made of laminated sheets, it is magnetized when the current passes through the coil. The magnetized coils attract the metal plunger to move. The frame has provisions for attaching the mounting. They are usually bolted or welded to the frame. The frame has provisions for receivers,

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the plunger. The wear strips are mounted to the solenoid frame, and are made of materials such as metal or impregnated less fibre cloth.

3. Solenoid Plunger

The Solenoid plunger is the mover mechanism of the solenoid. The plunger is made of steel laminations which are riveted together under high pressure, so that there will be no movement of the lamination with respect to one another. At the top of the plunger a pin hole is placed for making a connection to some device. The solenoid plunger is moved by a magnetic force in one direction and is usually returned by spring action.

Solenoid operated valves are usually provided with cover over either the solenoid or the entire valve. This protects the solenoid from dirt and other foreign matter, and protects the actuator. In many applications it is necessary to use explosion proof solenoids.

4. Working of Solenoid Valve

The solenoid valve has 5 openings. This ensure easy exhausting of 5/2 valve. The spool of the 5/2 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 spool is actuated towards outer direction port ‘P’ gets connected to ‘B’ and ‘S’ remains closed while ‘A’ gets connected to ‘R’

Poisition-2

When the spool is pushed in the inner direction port ‘P’ and ‘A’ gets connected to each other and ‘B’ to ‘S’ while port ‘R’ remains closed.

1. GEAR BOX ARRANGEMENT:

In our gear box there are two different speeds is used. The normal position the gear box shaft is running in one seed and the solenoid valve is ON condition, the pneumatic cylinder is used to change the speed automatically.

2. PU CONNECTIORS, REDUCER AND HOSECOLLAR:

In our pneumatic system there are two types of connectors used; one is the hose connector and the other is the reducer. Hose connectors normally comprise an adapter (connector) hose nipple and cap nut. These types of connectors are made up of brass or Aluminium or hardened steel.

Reducers are used to provide inter connection between two pipes or hoses of different sizes. They may be fitted straight, tee, “V” or other configurations. These reducers are made up of gunmetal or other materials like hardened steel etc.

3. STAND:

This is a supporting frame and made up of mild steel.

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4. SINGLE PHASE INDUCTION MOTOR WITH PULLEY:

This is used to drive the wheel by using two pulleys with belt drive mechanism.

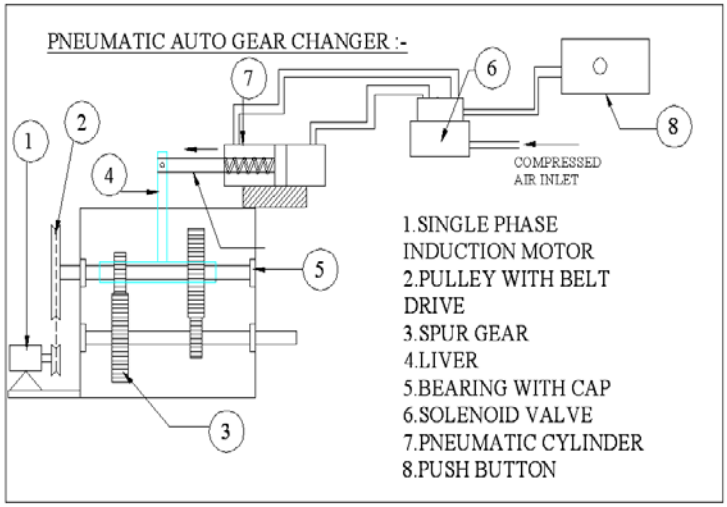
ADVANTAGES AND APPLICATIONS

Advantages

- It requires simple maintenance cares
- The safety system for automobile.
- Checking and cleaning are easy, because of the main parts are screwed.
- Easy to Handle.
- Low cost automation Project
- Repairing is easy.
- Replacement of parts is easy.

Applications

- It is very much useful for Car Owners & Auto-garages.
- Thus it can be useful for the two wheeler application



V. CONCLUSION

This project work has provided us an excellent opportunity and experience, to use our limited knowledge. We gained a lot of practical knowledge regarding, planning, purchasing, assembling and machining while doing this project work. We feel that the project work is a good solution to bridge the gates between institution and industries.

We are proud that we have completed the work with the limited time successfully. The **"BUTTON OPERATED GEAR SHIFTING SYSTEM FOR TWO-WHEELER"**is working with satisfactory conditions. We are able to understand the difficulties in maintaining the tolerances and also quality. We have done to our ability and skill making maximum use of available facilities. In conclusion remarks of our project work, let us add a few more lines about our impression project work.

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Thus we have developed an **"AUTOMATIC GEAR CHANGER"** which helps to know how to achieve low cost automation and automobile application. The application of pneumatics produces smooth operation.

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