EXHAUST HEAT RECOVERY ASSISTED WITH BUTTON OPERATED GEAR SHIFTING MECHANISM

Mr.D.Ramesh kumar[1], Mr.S.Dinesh[2], Mr.V.Jevin Abbishek[3], Mr.C.N.Kamaleshwaran[4] & Mr.R.Kishor[5]

[1]Assistant Professor, Dept. of Mechanical Engineering, Adithya Institute of Technology, Coimbatore, Tamil Nadu.

[2,3,4,5]UG Scholar, Dept. of Mechanical Engineering, Adithya Institute of Technology, Coimbatore, Tamil Nadu.

ABSTRACT: In the project, we aim at developing easy gear shifting mechanism for transmission which will make motor bike rider's gear shifting very easy. Every one desires for the smooth running of the vehicle what so ever may be the speed of pickup of the vehicle a person is operating, but one of the most important system which every engineer is concerned about in vehicle is gear shifting system for ensuring smooth and desired ride on their two wheelers. Some simple mechanism is arranged with the electromagnetic coil which will help us to change the gear as per the desired torque. In this gear shifting mechanism, gear shifting is done with the help of two electromagnetic coil. During this mechanism the clutch is operated automatically. The up shifting and downshifting of gears is done with the help two electromagnetic coil by the switches. These two switches are connected to the electromagnetic coil and it is connected to the battery. And by the process of preheating the exhaust heat recovery from the exhaust gases from the silencer is again allowed into the carburetor. By which the engine performance will increase. Also the millage of the vehicle will also increase.

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

One of the most important processes of riding a motorcycle is shifting gears. This may seem like a challenge to master, but shifting gears is really a simple process. How you shift gears, however, will depend on whether your motorcycle has a manual transmission or a semi-automatic transmission.

II. LITERATURE REVIEW:

The automate and manual transmission in two wheelers hydraulic and pneumatic drives are used. But these equipment results higher weight of vehicle. Also the response of this system gives sluggish response and leakages issue. To avoid this AMT is used. Electro mechanical device based on electromagnetic coil is used to shifting the gear in two wheeler. This mechanism reliable and quick as compare to hydraulic and pneumatic drive. Also this system used for a physically challenged persons. This Button operated gear shifting mechanism is very flexible due to its reaction time. This system having quick response due to its simple mechanism and it is comfortable to Women's point of view. Due to its simple mechanism and quick response is has very good performance in gear shifting. It is very easier to operate over feet operated gear shifting. For easy gear shifting mechanism many researchers did theory and experiments.

For easy gear shifting mechanism many researchers did theory and experiments. MuntaserMomani, Mohammed Abuzalata, Igried Al-Khawaldeh and Hisham Al-Mujafethad designed gear shifting mechanism and applied to make the shifting process faster and less destructible for the driver. They used many devices like pneumatic double acting cylinder; four pneumatic two positions five ways DCV, Programmable logical controller (PLC) were used. Automotive gear shifting or manual transmissions come in two basic types: simple un x synchronized systems, where gears are spinning freely. Whereas the other one is the synchronized systems, in which all gears are always in mesh but only one of these meshed pairs of gears is locked to the shaft on which it is mounted at any one time, the others being allowed to rotate freely; thus greatly reducing the skill required to shift gears.

III. EXPERIMENTAL SETUP:

This system basically consists of components such as, IC Engine, Coil, Battery, Chain Sprocket, Bearing with bearing cap, Silencer, Pre-heating Coil, Button Switches.

3.1 IC ENGINE:

An internal combustion engine is a engine that powers a motor cycle. It is typically two stroke and four stroke. The fuel system pumps fuel from the petrol tank into the carburator. There it mixes with air and is sucked into the engine cylinders. The ignition system supplies the spark to ignite the fuel mixture in the cylinder. By means of the ignition coil and contact breaker, it charges a 12- volt battery, which in the turn produces pulse of 20,000 volts.

3.2. COIL:

The electromagnetic coil is an electrical conductor such as a wire in the shape of a coil, spiral or helix.

Electromagnetic coils are used in electrical engineering, in applications where electric currents interact with magnetic fields, in devices such as electric motor, generators, inductors, electromagnets, transformers, and sensor coils. Either an electric current is passed through the wire of the coil to generate the magnetic field, or conversely an external time varying magnetic field through the interior of the coil generates a EMF (voltage) in a conductor. An electromagnetic coil is an electrical conductor such as a wire in the shape of a coil, spiral or helix. Electromagnetic coils are used in electrical engineering, in applications where electric currents interact with magnetic fields, in devices such as inductors, electromagnets, transformers, and sensor coils. It is fixed to the bottom of the our project and it is used to transmit the power button from the gear box.

3.3. BATTERY:

A lead acid battery is made up of lead acid cell of three basic component such as the electrodes (anode + cathode) and electrolyte. The anode is negative terminal and the cathode is positive terminal. Connecting these is the electrolyte which drives the electrochemical reaction that provides electricity. In a deep cell lead acid cell, the negative plate is made up of solid lead, and the positive plate is made lead dioxide Between them is a insulator that provides electricity. The electrolyte in a lead acid battery is water and electrolyte. Oxidation occurs at the negative, causing release of electron. Reduction takes place at positive, causing absorb of electron. This battery will be connected to the two electromagnetic coils, and the battery will be supported to the power in gear shifting switches. The gear shifting switches will be operated to 12V75 made battery.

3.4.CHAISROCKET

Filter box is a important device to filter the carbon dioxide and carbon monoxide from the exhaust gas of the engine. The filter tank is made up of the cast iron and the filter box is the square type box so that the box it should to be fully covered and the exhaust pipe is to be fixed at the one end (or) one corner of the box that exhaust pipe is very useful to allow the filtered pure air from the filter tank to the atmosphere. The carbon monoxide and carbon dioxide gas it should to be totally filtered from the pure gas and the temperature of the exhaust gas it should to be totally reduced and the aluminum coating is to be applied inside the box and the sodium hydroxide is applied in the mixture of coating that the sodium hydroxide.

3.5 BEARING WITH BEARING CAP:

Ball and roller bearings are used widely in instruments and machines in order to minimize friction and power loss. While the concept of the ball bearing dates back at least to Leonardo da Vinci, their design and manufacture has become remarkably sophisticated. This technology was brought to its p resent state o f perfection only after a long pe riod of research and development.

The benefits of such specialized research can be obtained when it is possible to use a standardized bearing of the proper size and type. However, such bearings cannot be used indiscriminately without a careful study of the loads and operating conditions. In addition, the bearing must be provided with adequate mounting, lubrication and sealing.
For this reason, we are interested in providing a condensed overview of the subject matter in an objective manner, using data obtained from different texts, handbooks and manufacturers' literature. This information will enable the reader to select the proper bearing in an expeditious manner. If the designer's interest exceeds the scope of the presented material, a list of references is provided at the end of the Technical Section.

3.6 SILENCER:

The function of a silencer in vehicle is to cool the exhaust gases by the by expansion through it and to reduce the noise of outgoing gases. The exhaust gas must be discharged into the atmosphere with minimum restriction. The restriction in flow of exhaust gases cause gas pressure. It is generally 0.7-0.9 kg/cm at maximum rpm. The back pressure at low value by proper designing of exhaust system. It reduce noise efficient with more rise in back pressure. In our project the silencer will be participated in to main function, because the pre-heating air will be directly connected to the pre-heating box. The pre-heating air will be continuously passed to the carburetor from silencer.

3.7 PRE-HEATING COIL:

Preheat elements are the first element in the air stream following the intake and pre-filter, which is a position that allows them to protect the rest of the system and building from freezing air. frequently this heating element is a coil that uses stream, hot water, or electricity as a energy source. The pre-heating coil is said to copper rod. And the coil will be winded to particular operation, So the winding copper rod will be taking a high heat temperature. So we choose the copper rod, The coil will be fixed to the side portion of the engine and it's a wide connection of silencer to carburetor. In this method to use for a increase the mileage of the engine capacity. Pre-heating is basically a volatile liquid fuel mixture of hydro carbons. As described already it is a product during the distillation of crude mineral oil and refining it further by other processes. It does not have a fine composition. The constituents vary depending upon the origin of the crude mineral oil.

PRINCIPLE:

The heat exchanger is located in the engine exhaust pipe. The exhaust pipe consists of a muffler and stay plates etc. The heat exchanger is made up of 18 SWG M.S. plate. The inner tube is inserted tightly on the muffler tube. A spiral baffle plate arrangement is made in between the two concentric tubes so us to make a spiral path to the incoming air. So that the heat transfer to the air can be increased. More over the air is flowing in counter direction to the exhaust gas. There by effective heat transfer achieved.

The heat exchanger inlet is fitted with a pre-filter. The outlet is connected to a by-pass mechanism through a hose pipe. The by-pass mechanism is connected to the carburetor intake. The temperature of the air entering to the carburetor can be maintained constant for a particular degree centigrade. When the temperature of air is increased above the predetermined valve the thermal relay opens butterfly valve an allows the atmospheric air to mix with the heater air from the heat exchanger.

3.8 BUTTON SWITCHES:

The two button switches are needed to our button operated gear shifting project. These buttons are connected to the electromagnetic coil. Through the button the gears are shifted upward and downward. The button transmission makes the gear shifting easier than the shifting through legs. The two button switches are directly connected to the gear pedal. When you press the left button to increase the gear. When you press the Right button to decrease the gears. It is a simultaneous function.

3.9 EXPERIMENTAL DESIGN:

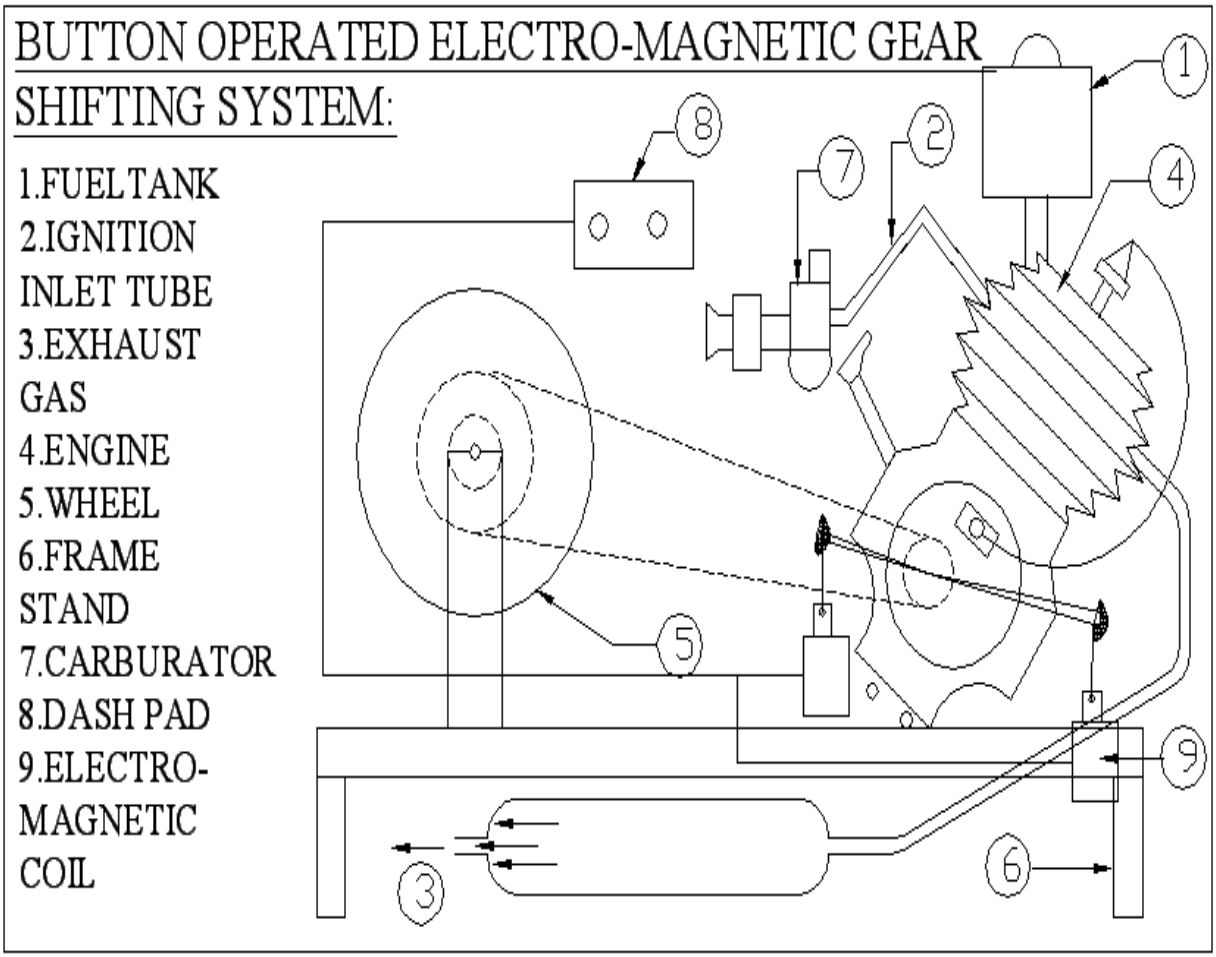

Fig.3.9 Experimental Design

3.10 EXPERIMENTAL MODULE

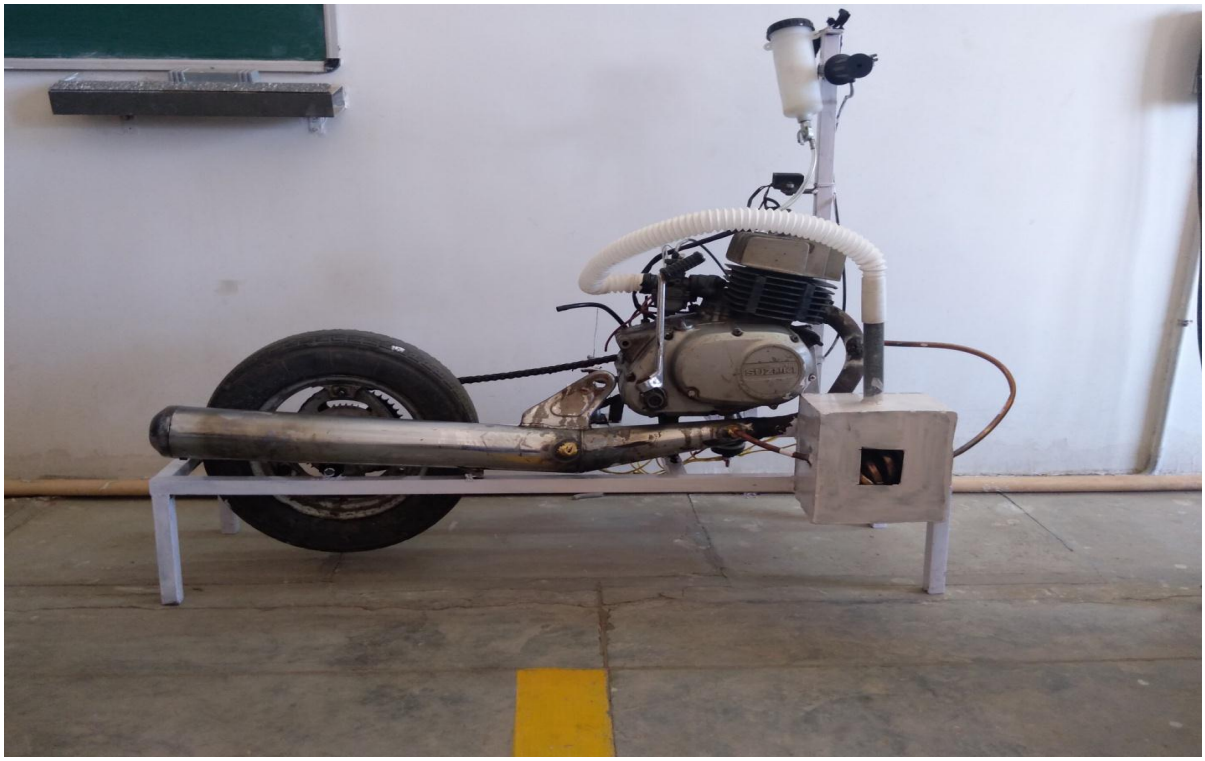

Fig 3.10 Experimental Model

IV.EXPERIMENTATION AND WORKING:

4.1WORKING:

A method of controlling a gear change of 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; 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.

Battery is giving the supply to the electromagnetic coil. The two electro-magnetic coils are fixed to the gear shaft of the two ends. One is used to shift the gear in upward direction. Another one is used to shift the gear in downward direction. These two coil is operated depends upon the activation of the push button.

The heat exchanger is located in the engine exhaust pipe. The exhaust pipe consists of a muffler and stay plates etc. The heat exchanger is made up of 18 SWG M.S. plate. The inner tube is inserted tightly on the muffler tube. A spiral baffle plate arrangement is made in between the two concentric tubes so as to make a spiral path to the incoming air. So that the heat transfer to the air can be increased. Moreover the air is flowing in counter direction to the exhaust gas; thereby effective heat transfer can be achieved.
The heat exchanger inlet is fitted with a pre-filter. The outlet is connected to a by-pass rough a hose pipe. The by-pass mechanism is connected to the carburetor intake. The temperature of the air entering to the carburetor can be maintained constant for a particular degree centigrade. When the temperature of air is increased above the predetermined valve the thermal relay opens the butterfly valve (4- wheeler Application) and allows the atmospheric air to mix with the heater air from the heat exchanger. So the hot air is diluted with atmospheric air and reducing the temperature.

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 ELECTRO-MAGNETIC GEAR SHIFTING SYSTEM" 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. Thus we have developed a "BUTTON OPERATED ELECTRO-MAGNETIC GEAR SHIFTING SYSTEM*"* which helps to know how to achieve low cost automation. The application of electro-magnetic coil produces smooth operation. By using more techniques, they can be modified and developed according to the applications.

VI. REFERENCES:

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