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BUTTON OPERATED GEAR CHANGER FOR TWO WHEELER

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Abstract - In our project we are using dc gun to change the gear in two wheelers. It is very useful for the development in automobile field. The total operation can be controlled by the microcontroller. The block diagram with explanation is given below.

1.INTRODUCTION

A motorcycle (also called a motor bicycle, motorbike, bike, or cycleis asingle track two-wheeledmotor vehiclepowered by an engine. Motorcycles vary considerably depending on the task for which they are designed, such as long distancetravel, navigating congested urban traffic,cruising,sportand racing, or off-road conditions. In many parts of the world, motorcycles are among the least expensive and most widespread forms of motorized transport.

In the two wheelers the transmission is carried out by manually. This may result in fatigue during driving in cities or traffic areas.

2.LITERATURE SURVEY

MOTOR:

An electric motor uses electrical energy to produce mechanical energy. The reverse process which of using mechanical energy to produce electrical energy is accomplished by a generator or dynamo. Traction motors used on locomotives and some electric and hybrid automobiles often performs both tasks if the vehicle is equipped with dynamic brakes. Electric motors are found in household appliances such as fans, refrigerators, washing machines, pool pumps, floor vacuums, and fanforced ovens. They are also found in many other devices such as computer equipment, in its disk drives, printers, and fans; and in some sound and video playing and recording equipment as DVD/CD players and recorders, tape players and recorders, and record players. Electric motors are also found in several kinds of toys such as some kinds of vehicles and robotic toys.

The principle of conversion of electrical energy into mechanical energy by electromagnetic means was demonstrated by the British scientist Michael Faraday in 1821 and consisted of a free-hanging wire dipping into a pool of mercury. A permanent magnet was placed in the middle of the pool of mercury. When a current was passed through the wire, the wire rotated around the magnet, showing that the current gave rise to a circular magnetic field around the wire. This motor is often demonstrated in school physics classes, but brine (salt water) is sometimes used in place of the toxic mercury. This is the simplest form of a class of electric motors called homopolar motors. A later refinement is the Barlow's Wheel. These were demonstration devices, unsuited to practical applications due to limited power.

The first real electric motor, using electromagnets for both stationary and rotating parts, was demonstrated by ÁnyosJedlik in 1828 Hungary. He built an electric-motor propelled vehicle in 1828.

The first English commutator-type direct-current electric motor capable of a practical application was invented by the British scientist William Sturgeon in 1832. Following Sturgeon's work, a commutator-type direct-current electric motor made with the intention of commercial use was built by the American Thomas Davenport and patented in 1837. Although several of these motors were built and used to operate equipment such as a printing press, due to the high cost of primary battery power, the motors were commercially unsuccessful and Davenport went bankrupt. Several inventors followed Sturgeon in the development of DC motors but all encountered the same cost issues with primary battery power. No electricity distribution had been developed at the time. Like Sturgeon's motor, there was no practical commercial market for these motors.

The modern DC motor was invented by accident in 1873, when ZénobeGramme connected the dynamo he had invented to a second similar unit, driving it as a motor. The Gramme machine was the first electric motor that was successful in the industry.

In 1888 Nikola Tesla invented the first practicable AC motor and with it the polyphase power transmission system. Tesla continued his work on the AC motor in the years to follow at the Westinghouse Company.

3.DESCRIPTION OF EQUPMENTS

3.1. SPRING

The automobile chassis is mounted on the axles not direct but through some form of springs. This is done to isolate the vehicle body from the road shocks which may be in the form of bounce, pitch, roll or sway. These tendencies give rise to an uncomfortable ride and also cause additional stress in the automobile frame and body. All the parts which perform the function of isolating the automobile from the road shocks are collectively.

A Springing device must be a compromise between flexibility and stiffness. If it is more rigid, it will not absorb road shocks efficiently and if it is more flexible it will continue to vibrate even after the bump has passed so we must have sufficient damping of the spring to prevent excessive flexing.

RETURN SPRING

A spring is a flexible elastic object used to store mechanical energy. Springs are usually made out of hardened steel. Small springs can be wound from pre-hardened stock, while larger ones. A spring is a mechanical device, which is typically used to store energy and subsequently release it, to absorb shock, or to maintain a force between contacting surfaces. They are made of an elastic material formed into the shape of a helix which returns to its natural length when unloaded this is called return spring. Springs are placed between the road wheels and the vehicle body. When the wheel comes across a bump on the road, it rises and deflects the spring, thereby storing energy therein. On releasing, due to the elasticity of the spring, material, it rebounds thereby expending the stored energy. In this way the spring starts vibrating, with amplitude decreasing gradually on internal friction of the spring material and friction of the suspension joints till vibrations die down.

3.2 D.C GUN:

INTRODUCTION:

In 1918, French inventor Louis Octave Fauchon-Villeplee invented electric cannon which bear a strong resemblance to the linear motor. He filed for a US patent on 1 April 1919, which was issued in July 1922 as patent no. 1,421,435 "Electric Apparatus for Propelling Projectiles". In his device, two parallel busbars are connected by the wings of a projectile, and the whole apparatus surrounded by a magnetic field. By passing current through busbars and projectile, a force is induced which propels the projectile along the bus-bars and into flight.

During World War II the idea was revived by Joachim Hänsler of Germany's Ordnance Office, and an electric anti-aircraft gun was proposed. By late 1944 enough theory had been worked out to allow the Luftwaffe's Flak Command to issue a specification, which demanded a muzzle velocity of 2,000 m/s (6,600 ft/s) and a projectile containing 0.5 kg (1.1 lb) of explosive. The guns were to be mounted in batteries of six firing twelve rounds per minute, and it was to fit existing 12.8 cm FlaK 40 mounts. It was never built. When details were discovered after the war it aroused much interest and a more detailed study was carried out, culminating in a 1947 report which concluded that it was theoretically feasible, but that each gun would need enough power to illuminate half of Chicago.

CONSTRUCTION:

A railgun consists of two parallel metal rails (hence the name) connected to an electrical power supply. When a conductive projectile is inserted between the rails (from the end connected to the power supply), it completes the circuit. Electrons flow from the negative terminal of the power supply up the negative rail, across the projectile, and down the positive rail, back to the power supply.

This current makes the railgun behave similar to an electromagnet, creating a powerful magnetic field in the region of the rails up to the position of the projectile. In accordance with the right-hand rule, the magnetic field circulates around each conductor. Since the current is in opposite direction along each rail, the net magnetic field between the rails (B) is directed vertically. In combination with the current (I) across the projectile, this produces a Lorentz force which accelerates the projectile along the rails. There are also forces acting on the rails attempting to push them apart, but since the rails are firmly mounted, they cannot move. The projectile slides up the rails away from the end with the power supply.

A very large power supply providing, on the order of, one million amperes of current will create a tremendous force on the projectile, accelerating it to a speed of many kilometres per second (km/s). 20 km/s has been achieved with small projectiles explosively injected into the railgun. Although these speeds are theoretically possible, the heat generated from the propulsion of the object is enough to rapidly erode the rails. Such a railgun would require frequent replacement of the rails, or use a heat resistant material that would be conductive enough to produce the same effect.

ELCTRO MAGNATIC GUN DETAILS:

While playing with my can crusher, I noticed that a can placed off center tended to be pushed out of the solenoid. A little searching of the patent literature convinced me that I had inadvertently created a very poor, single stage, coil gun. Presented below is a summary of what I have found so far.

Propellant powered guns are typically limited to muzzle velocities on the order of 2,000 meters per second. This limit is inherent to the use of expanding gas to drive the projectile down a barrel. Barrels simply can't withstand the temperatures and pressures required for higher expansion rates of the propellant combustion products (normally CO_2 and NO_x). One attempt at a gun for higher velocities used differential pistons (a large one, driven by methane/oxygen combustion, connected to a small one for compression of the drive gas) to provide a high pressure of hydrogen gas (hydrogen is the lightest, and hence fastest expanding, of all gasses). While some success was achieved, the apparatus was cumbersome and the velocities were still limited. For some applications, particularly orbital launching, this is insufficient (earth escape velocity is 11,200 m/s).

Two basic types of electromagnetic gun are described in the patent literature, the rail gun and the coil gun. Both use stored energy sources to produce a large magnetic field and a high electric current through a driving armature. The interaction of the current with the magnetic field generates a force which propels the armature (and any projectile connected to it). Beyond that, they differ substantially, and each has practical difficulties which has prevented them from being more than laboratory curiosities.

4.DESIGN AND DRAWING

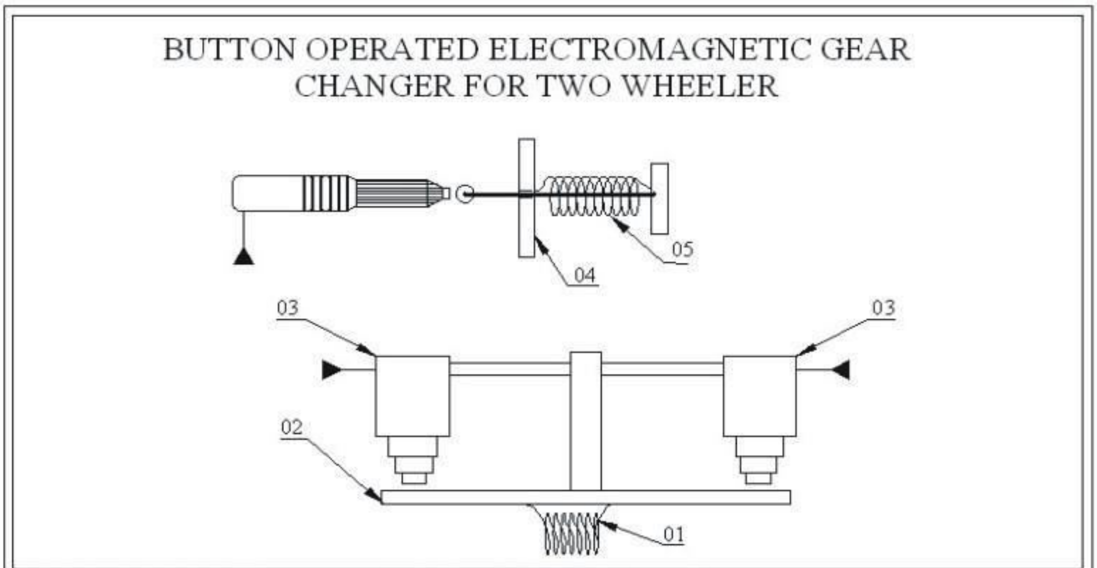
4.1 MACHINE COMPONENTS

The automatic gear changer in two wheeler is consists of the following components to full fill the requirements of complete operation of the machine.

- **Control unit**
- **DC gun**
- **Gear system**

DRAWING

DRAWING FOR BUTTON OPERATED GEAR CHANGER FOR TWO WHEELER



S.NO	PART NAME	S.NO	PART NAME
01	SPRING	04	STOPPER
02	PLATE	05	SPRING TO GEAR BOX
03	ELECTROMAGNETIC SOLENOID	▶—	TO CONTROL UNIT

Figure 1

COST ESTIMATION:

SL NO:	COMPONENTS	COST
1	Electromagnetic switch	
2	DC gun	
3	Material cost	
4	Labour cost	
5	Wastage cost	
	Total cost	

5.WORKING PRINCIPLE

Here we have two dc gun arrangements which are arranged on either side of the vehicle pedal rest for applying the gear. The dc gun is fixed at the end of the flat pedal rest. The plate rest has pivot at the center. The guns are operated with the help of electric power supply and it is controlled by the control unit (nothing but a switch). One of the guns is used to apply the gear and another one for reducing the gears. The gears are applied on the vehicle depending up on the speed of the vehicle. According to the speed the driver can change the vehicle just by pressing the button instead of changing the gear by gear lever.

6. MERITS AND DEMERITS

MERITS

_Quick response is achieved
_Simple in construction
_Easy to maintain and repair
_Cost of the unit is less
_Continuous operation is possible without stopping

DEMERITS

It may increase slight weight to the vehicle.

7.APPLICATIONS

It is applicable in all types of two wheelers which has gear transmission.

8.LIST OF MATERIALS

FACTORS DETERMINING THE CHOICE OF MATERIALS

The various factors which determine the choice of material are discussed below.

1. Properties:

The material selected must poses the necessary properties for the proposed application. The various requirements to be satisfied. Can be weight, surface finish, rigidity, ability to withstand environmental attack from chemicals, service life, reliability etc.

The following four types of principle properties of materials decisively affect their selection

a.Physical

b.Mechanical

c.From manufacturing point of view

d.Chemical

The various physical properties concerned are melting point, thermal Conductivity, specific heat, coefficient of thermal expansion, specific gravity, electrical conductivity, magnetic purposes etc.

The various Mechanical properties Concerned are strength in tensile, Compressive shear, bending, torsional and buckling load, fatigue resistance, impact resistance, eleastic limit, endurance limit, and modulus of elasticity, hardness, wear resistance and sliding properties.

The various properties concerned from the manufacturing point of view are,

_Cast ability

_Weld ability

_Surface properties

_ Shrinkage

_Deep drawing etc.

2. Manufacturing case:

Sometimes the demand for lowest possible manufacturing cost or surface qualities obtainable by the application of suitable coating substances may demand the use of special materials.

3. Quality Required:

This generally affects the manufacturing process and ultimately the material. For example, it would never be desirable to go casting of a less number of components which can be fabricated much more economically by welding or hand forging the steel.

4. Availability of Material:

Some materials may be scarce or in short supply. It then becomes obligatory for the designer to use some other material which though may not be a perfect substitute for the material designed. the delivery of materials and the delivery date of product should also be kept in mind.

5. Space consideration:

Sometimes high strength materials have to be selected because the forces involved are high and space limitations are there.

6. Cost:

As in any other problem, in selection of material the cost of material plays an important part and should not be ignored.

Sometimes factors like scrap utilization, appearance, and non-maintenance of the designed part are involved in the selection of proper materials.

9.COST ESTIMATION

1. LABOUR COST:

Lathe, drilling, welding, grinding, power hacksaw, gas cutting cost

2. OVERGHEAD CHARGES:

The overhead charges are arrived by"manufacturing cost"

Manufaturing Cost =Material Cost +Labour Cost
= 13,000+750
= 13750

Overhead Charges =20%of the manufacturing cost
= 2000

3. TOTAL COST:

Total cost = Material Cost +Labour Cost +Overhead Charges

Total cost for this project = 15750

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10.CONCLUSION

The project carried out by us made an impressing task in the field of automobile department. It is very useful for driver while drive the vehicle at any places without any tension.

This project has also reduced the cost involved in the concern. Project has been designed to perform the entire requirement task which has also been provided.

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