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Automatic Electromagnetic Clutch

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***Abstract*: A clutch is a device used to make and brake contact from the transmission. When it engages, then power is transferred from engine to gear box and when it disengage, power flow is stop, hence it is called free running of engine. There is an innovation done in automobile industry, called electromagnetic clutch, which is recently used by Renault Car Company, which uses the basic principle of electrical energy as well as magnetic forces.**

This project revels the manufacturing of electromagnetic clutch. In place of Engine, shaft is directly attached to variance (variable motor) and clutch disc as well as pressure plate is used, in between them friction material called "Asbestos" used to grip between the pressure plate and clutch plate. This project shows, experimental analysis of Electromagnetic clutch, and at last at which speed clutch engage as well as disengage is measured and when clutch disengage, at that time speed of flywheel is also measured.

***Keywords*: Motor, Electric Wires, EMI System, Switchs, Connecting Shaft, Clutch Plates, Ball Bearings, Adapter**

1. Introduction

The clutch is an important part in the transmission system of automobiles. It transmits power from the engine to gear box at various speeds. No shock is caused during this transmission of power

The function of the clutch is to temporarily disconnect the engine from the gear box unit. When the gear has to be changed from the first to the second, it should be done after disconnecting the engine from the gear box. If this is not done, the gear teeth might break. the clutch is thus helpful when starting, shifting gears and idling.

2. Project aim and Objective

The clutch works on the principles of friction. when two friction surfaces are brought in contact with each other and pressed they are united due to the friction between them. If now one is revolved, the other will also revolve. The friction between the two surfaces depends upon the area of the surfaces, pressure applied upon them and co-efficient of friction of the surface materials. The two surfaces can be separated and brought into contact when required. The driving member is kept rotating. When the driven member is brought in contact with the driving member, it also starts rotating. When the driven member is separated from the driving member it does not revolve. This is the principle on which a clutch operates.

A. Mechanical design

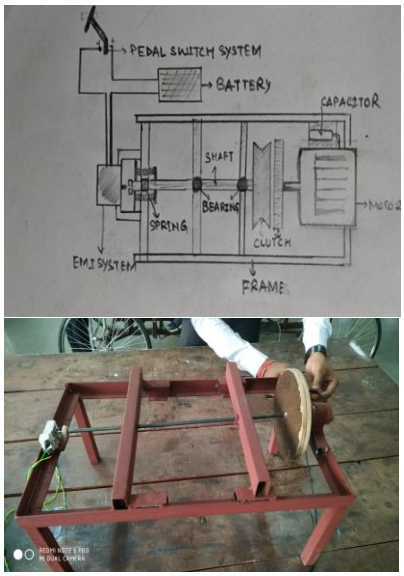

Fig. 1. Drafting

B. Mechanical parts details

1) Motor

An electric motor is an electrical machine that converts electrical energy into mechanical energy. Most electric motors operate through the interaction between the motor's magnetic field and electric current in a wire winding to generate force in the form of rotation of a shaft.


Fig. 2. Motor

2) Clutch plates


Fig. 3. Flywheel

A flywheel is a mechanical device specifically designed to efficiently store rotational energy. Flywheels resist changes in rotational speed by their moment of inertia.

3) Connecting shaft

A connecting shaft is a mechanical component for transmitting torque and rotation, usually used to connect other components of a drive train that cannot be connected directly because of distance or the need to allow for relative movement between them.

Fig. 4. Connecting shaft

4) Ball bearings

A ball bearing is a type of rolling-element bearing that uses balls to maintain the separation between the bearing races. The purpose of a ball bearing is to reduce rotational friction and support radial and axial loads. It achieves this by using at least three races to contain the balls and transmit the loads through the balls.

Fig. 5. Ball bearings

C. Electrical design

1) Electric wire

Electrical wiring is an electrical installation of cabling and associated devices such as switches, distribution boards, sockets, and light fittings in a structure.

Fig. 6. Electric wire

2) EMI system

Electromagnetic or magnetic induction is the production of an electromotive force (i.e., voltage) across an electrical conductor in a changing magnetic field.

3) Adapter

An adapter or adaptor is a device that converts attributes of one device or system to those of an otherwise incompatible device or system.

Fig. 7. Adapter

Our automatic electro-magnetic clutch is use to reduce the human effort by removing the clutch pedal from the automobile. By generating the electromagnetic waves, we can use the clutch to engage or disengage the power from the engine shaft. The electromagnetic wave is produced by supplying the electric to the EMI System.

3. Conclusion

This automatic electro-magnetic clutch is produced to reduce the human effort for shifting the gears for power transmission. This automatic electromagnetic clutch is also helps in increasing the efficiency of the automobile.

References

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