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Restoration of energy from brake through elliptical scroll spring

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Abstract - *To get the best output of automobile, the optimum balance between performance and fuel economy is more important. In the present condition the mechanism is to be used which is generally increase fuel consumption and decrease the performance of automobile vehicle. In depth observation of the vehicle large amount of energy is lost during braking and large amount of fuel is consumed to reclaim the initial state, due to which lower fuel efficiency to obtain the same performance. Current use of Kinetic Energy Restoration System is only use for sports vehicles only because of the higher cost of this system. They are also temporary in nature as power can be store only during a small time period and use of superior parts leads to high cost, which results on concentration on performance only and neglecting the fuel economy. The major storing element in this system is a scroll spring that will store energy by compression and torsion. A combination of internal gears and spur gears will be use in order to make the energy release uniformly. The system can be used to improve the fuel efficiency by using braking action to provide instant acceleration when required by the driver. This technology makes the restoration of kinetic energy system more flexible and economical allowing for specific application.*

Key Words: Energy restoration, Braking system, Kinetic energy, Scroll spring.

1. INTRODUCTION

The fuel economy and high performance are the two most important demands for the modern automobile buyers and manufacturers. The awareness of air quality has been increasingly on the emission from vehicle which has critically affected the performance of vehicles as in order to increase the fuel efficiency, performance is reduced. To harness the maximum energy lost during braking a vehicle, a lot of Research and Development has been done. Alternative to increasing the fuel economy is the use of Regenerative braking system. Mechanical KERS is the assembly of parts which stores some of the kinetic energy of a vehicle under deceleration, deposit this energy in storing element and then discharge this deposited energy back into the drive train of the vehicle, adding a power boost to that vehicle. For the motorist, it is like having two power sources at his disposal, one of which is the power directly coming from the engine while another is the stored kinetic energy. Kinetic Energy Recovery System (KERS) stores energy only when the vehicle is under braking and returns it during vehicle accelerates. During braking, most of the kinetic energy of the vehicle is wasted by converting into heat energy or sometimes sound energy that is released into the environment. Vehicles equipped with KERS are able to harness some this otherwise wasted kinetic energy and also assist vehicle in braking. By using a fitting mechanism, this stored energy is converted back into kinetic energy giving

2. PROBLEM IDENTIFICATION

In current situation energy restoration by using flywheel is not more efficient.

Flywheel is not able to stored energy for longer time.

In current energy restoration system is not able to boost the Speed of automobile vehicle.

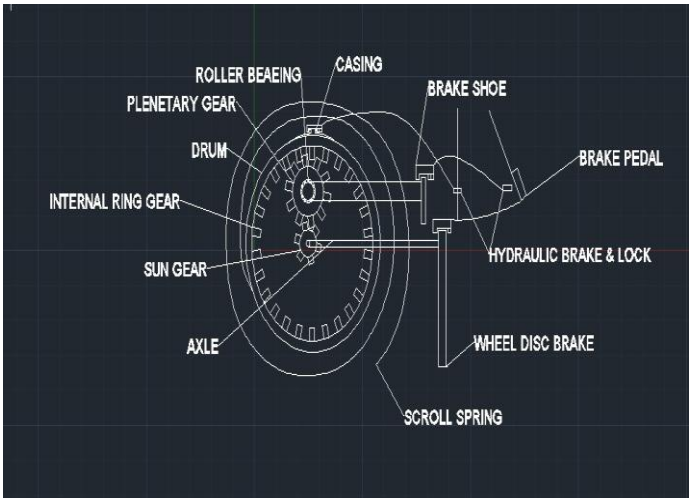
3. WORKING PRINCIPLE

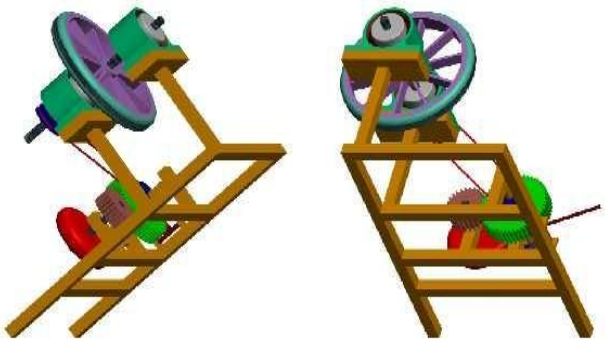
In this mechanism the sun gears are attached to the axle of wheel by using key. This sun gear mesh with planetary gear which is in mesh with internal ring gear. Braking disc is connected to planetary gear with help of gudgeon pin. Bearing is mounted on gudgeon pin where planetary gear rotates over on it. Drum will mount on internal ring gear. Scroll spring is attached on drum with help of stud and bolt. There are two Hydraulic systems used in restoration of kinetic energy system, one is used to stop the motion of planetary gear and other one is used to lock the drum at stationary position with help of braking system. This mechanism is fitted inside the wheel rim. During normal motion of vehicle, both the planet gear and axle rotates about the energy restoration system .Now the motion is transmit to the ring gear and ring gear starts rotating. As the drum and ring gear are join together, the drum also starts rotating in the same direction like ring gear. Internal end of the spring is connecting with the drum by using bolts and stud. When the drum rotates spring also starts winding.The winding of spring results in compression of spring and in this way the energy is stored into the scroll spring. In this way the scroll spring plays a vital role in restoration of kinetic energy system as main energy storing element. After energy store in scroll spring we have require stopping the drum at that position due to this requirement we have use hydraulic brake to lock the casing. When this casing opened by hydraulic brake the drum starts rotating in reverse direction with help of scroll spring energy. This rotation of the spring is transferred to the axle shaft through the

planetary gear assembly. In this way restoration of kinetic energy system utilizes the energy. If this energy is not used, the energy will be loosen during braking in the form of heat energy and decreases the fuel efficiency of the vehicle. This mechanism would work without affecting the fuel economy.

- The dimensions of the spring

  - Internal diameter = 185mm
  - External diameter = 300mm
  - Length of strip = 4850mm
  - Width of strip = 40mm
  - Thickness of strip = 1mm





4. SCOPE

To decrease the fuel consumption.

To increase the efficiency of vehicles

5. CONCLUSIONS

Based on research, we ensure the various possible solution for our problem as we are using spiral spring, it will save fuel and increase efficiency of vehicle. This project helps in saving money by reducing overall cost

We studied other KERS mechanisms and made improved mechanism.

We find the solution by some of calculation based on standards

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