

Gyro-Gear Transmission System

Our ref no: 2135

Technology Overview

The Gyro-Gear Transmission System is a flywheel energy storage system with a novel, low cost and reliable means of providing infinitely variable speed adjustment between the prime-mover, energy storage flywheels and the road wheels, ensuring smooth and efficient transfer of energy to and between these three key parts.

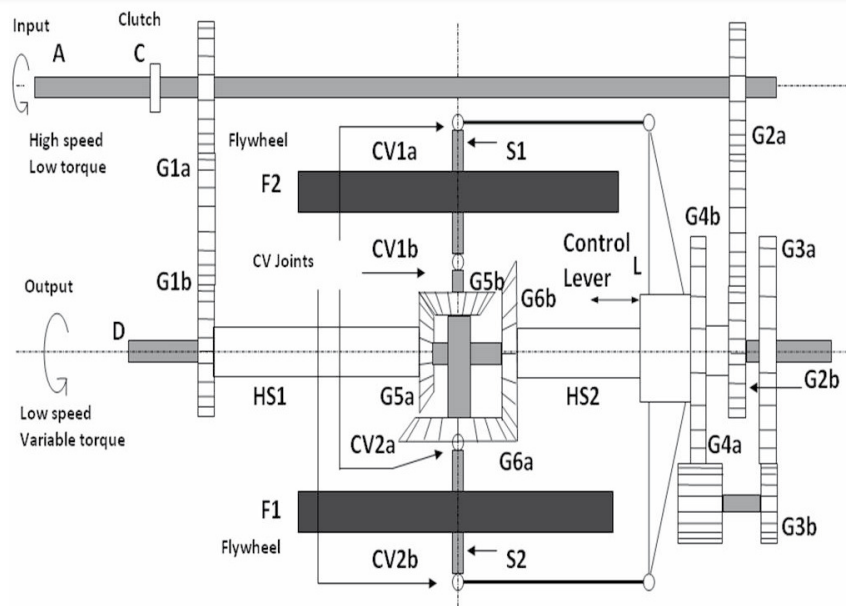
It uses gyroscopic precessional force to adjust the speed of the flywheels to match the speed of the other parts of the system. It is therefore possible to have a complete mechanical storage and transmission system in one unit.

Technical Features

The prime mover drives the input shaft (A) and can be disengaged from the system through the clutch (C) either when the flywheels are storing energy from the road wheels during braking or when the flywheels are powering the system and propelling the vehicle. The drive shaft to the wheels (D), receives power either directly from the prime mover through the main drive gears G1 and G2 or through the energy storage system via gears G3 (a&b) and G4 (a&b).

The two flywheels (F1&F2) spin about their own shafts (S1&S2) which are driven through gears G5 (a&b) and G6 (a&b) by the two half shafts (H1&H2) which are connected to gears G1b and G4b respectively. The control lever (L) is connected to and driven by gear G4 and so rotates at the same speed as the drive shaft. The lever is also attached to the flywheel shafts, consequently the flywheels are not only spinning about their own shafts but together are rotating around the drive shaft.

The unique feature of this system is that the control lever can move axially in relation to the drive shaft and because of the constant velocity joints (CV1&CV2), when it moves it will change the angle of axis of the flywheel shafts and induce a gyroscopic precessional force. The precessional force provides a drive torque to the drive shaft so long as there is sufficient spin in the flywheels. The system is not recovering kinetic energy directly from the spinning



flywheels but from the induced precessional force created by manipulating the spin axis.

Benefits

As a flywheel energy storage system, Gyro-Gear has all the energy saving benefits of other flywheel systems i.e. it could potentially lower energy consumption by over 30% for stop-start transport applications. However, Gyro-Gear is more efficient than current systems. It is a simple and compact unit which is lower cost, lower weight and inherently more reliable. It eliminates the need for a separate variable speed transmission system.

Applications

Gyro-Gear could be a replacement for gear boxes in industrial applications and also for any continuously variable drive system. It has potential application in rail, buses, automotive and niche applications such as cranes and motor sports. It is also envisaged that the technology could be used to create an environmentally friendly vehicle with sports car performance.

Development Stage

A patent has been filed and an initial demonstrator has proven the concept. Work is continuing to develop a mathematical model to prove the efficiency, power and performance characteristics for different applications. Companies interested in the technology, or who would like further details, are invited to contact Imperial Innovations.

For further information on this technology please contact:

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Imperial College London

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About Imperial Innovations

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The company's integrated approach encompasses the identification of ideas, protection of intellectual property, development and licensing of technology and formation, incubation and investment in technology businesses. A wide range of technologies are commercialised within the areas of healthcare, energy, environment and emerging technology trends.

Based at Imperial College London, the company has established equity holdings in 89 technology businesses and is managing 156 commercial agreements as of 31 July 2008. Imperial Innovations also commercialises technologies originating from outside Imperial College.

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