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Design and Fabrication of Magnetic Gear

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Abstract - *Today's world desires speed on every and each field. thus quick and fast operating is that the most priority . currently days for achieving quick , numerous machines and equipment's area unit factory-made by human kind . The engineer inconstantly conformed to the challenges of transfer innovative ideas and style in to reality. New machines and techniques have being developing incessantly to manufacture numerous merchandise at cheaper rates with top quality. thus Magnetic gear is extremely trend to use a transmission of power from one part to a different part victimisation the magnetic flux energy, thus no participating, disengage and backlash of drugs isn't gift. thus magnetic gear is contactless and friction is a smaller amount, thus generation of warmth is additionally less. In magnetic gear to realize low-speed ,high-torsion, direct-drive operation. The speed is manage by the employment of gears and gearboxes. The magnetic meshing of drugs overcomes the constraints of ancient wheelwork system like vibrations, noise, and friction thanks to contact. The potency of ninety nine or bigger are often achieved at full GHB load conditions. The attractive force of attraction brings the magnetic meshing of the gear teeth. there's no physical contact between the gear teeth. By the employment of such higher than system, the wear and tear and tear of the gear system area unit reduced to an excellent extent. the warmth generated within the gears whereas operating is nearly zero during this technique. in contrast to ancient wheelwork system, the method of sending power is sleek and silent. Magnetic wheelwork system are often incorporated in numerous automobile sector for transmission of power to realize bigger and most potency. this sort of setup needs terribly minimum maintenance. Permanent magnets area unit accustomed turn out the force field and attractive force that helps within the transmission of energy while not contact*

1. INTRODUCTION

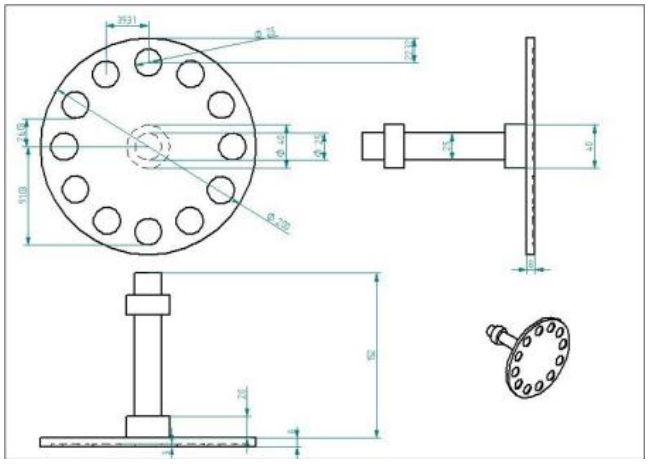
The objective of this project is to exchange ancient gears that area unit abuzz, need frequent maintenance and lubrication, and suffer from friction losses. The magnetic gear is contactless and quiet operating, and it needs no lubrication. additionally, it slips once overladen whereas the standard gear could break down once overladen. The magnetic gear transmission is employed for ancient gear transmission with facilitate of the magnet. A magnet produces a force field and attractive force This force acts on another magnet and pulls them along or pushes them apart is termed attract and ripple development of magnets, thus different placed magnet ripple and attracts different build them to rotate. And driver wheel is rotate by hand victimisation hand wheel or by employing a motor. during this project we have a tendency to victimisation support bearing for the adjustment of shaft that the shaft is freely rotate in support bearing. For value reduction purpose we have a tendency to use wood for base and additionally wood sensible and damping property and good stiffness. Gears and gearboxes area unit extensively used for speed modification and torsion transmission in numerous industrial and automobile applications. it's accepted that the standard gear incorporates a high torsion density, however suffers from some inherent issues like contact friction, noise, and heat, whereas vibration , heat interaction and dependableness area unit of nice concern. In contact, the magnetic gear offers vital blessings over the standard gear reduced acoustic noise, minimize vibration, free from maintenance, improved dependableness, inherent overload protection, and physical isolation between the input and output shafts. However, for a protracted time, magnetic gear have received comparatively very little attention, in all probability thanks to the low torsion density and relative complexness of the magnetic circuits. A magnetic gear uses permanent magnets to transmit power and torque Associate in torsion between an input and output shaft while not mechanical contact. Magnetic gears can do expeditiously bigger than 99% at full load and with abundant and higher half load efficiencies than a conventional gear. For higher power applications on a magnetic gear are going to be simple and easier than a conventional gear. reckoning on the house accessible a magnetic gear is also the sole sequential technology. during this project we have a tendency to area unit victimisation straight forward wave principle of magnet to rotate gear ,

the victimisation materials area unit straightforward artificial magnets and a 2 pitch circle of gears, there no cutting of teeth is needed , and one board to demonstrate , it's terribly straightforward and straightforward. Magnetic gear that primarily may be a combination of 2 engineering topics, specifically mechanic and magnetic. Magnetic Associate in analysis area unit unremarkably performed by folks with an electromechanically or physics background and gears area unit unremarkably developed and analyzed by folks with a mechanical background.

2. LITERATURE REVIEW

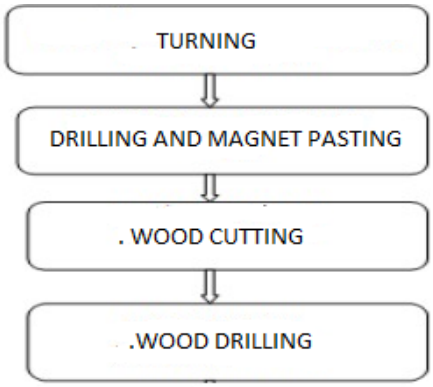
Transmitted torsion Analysis of a Magnetic gear with circular Magnets" that Magnetic gears transmit torsion by noncontact magnets instead of meshed mechanical gear teeth. In distinction to ancient mechanical gear, non-contact magnetic gear mechanisms possess distinctive options of low energy loss, overload protection ability, no want of lubricants, and tolerance of arrangement and vibration isolation between adjacent mechanical elements. The analysis of transmitted torsion may be a needed task once evaluating the performance of the magnetic gear. the 2 dimensional finite-element analysis (FEA) is additional utilized in computing the magnetic fields and transmitted torques of external-type magnetic gear setups . "Contactless Mechanical Components: Gears, torsion Limiters and Bearings" that contactless mechanical elements are mechanical sets for conversion of torque/speed, whose gears and moving elements don't bit one another, however rather they supply movement with magnets and magnetic materials that exert force from an explicit distance. Magnet-mechanical transmission devices have many benefits over ancient mechanisms: no friction between turn components (no power losses and heat generation by friction therefore increase of efficiency), no lubrication is needed (oil-free mechanisms and no lubrication auxiliary systems), reduced maintenance (no material therefore no want of car care), wider operational temperature (no material evaporation and freezing), overload protection. In several mechanical elements gear is vital half , wear have interaction |and have interaction |and interact} of drugs is downside just one occasion gear doesn't engage properly and additionally large noise and vibration happens whereas participating , main issue is style of drugs is additionally difficult , therefore we have a tendency to our employing a magnetic principle to enhance our gears . A magnetic gear uses permanent magnets to transmit power and torsion between an input and output shaft while not mechanical contact. Magnetic gears can do the potency larger than 99% at full load and with a lot of higher than half load potency than a mechanical gear. For higher power and torsion ratings a magnetic gear are going to be smaller, lighter and lower value than a mechanical gear. reckoning on the area out there a magnetic gear is also the sole liable technology

3. DESIGN AND SPECIFICATION



Diameter of driver wheel	200mm
Thickness of driver wheel	8mm
Diameter of 12 holes	25mm
Depth of 12 holes	3mm
Diameter of driven wheel	60mm
Thickness of driven wheel	30mm
Diameter of shaft	25mm
Length of shaft	200mm

4. FABRICATION PROCESS



5. EXPERIMENTAL SETUP AND WORKING

We have used wooden block for base, wood as better damping property and less cost, magnets are placed on the top surface of big gear and magnets placed on its peripheral on pinion, magnets north and south poles should be evenly and alternatively placed to a required size. Pillow block consists of ball bearing which is used to support shafts and rotate gears. Shaft is TIG welded to a disk, and the pillow block is bolted to wood as shown in the above figure, the bar welded to a disk is placed inside a pillow block and tighten by screw provided in pillow block, hence the construction of experiment is ready. When a driver is rotated (smaller disk) with certain speed by manually or any external devices the driven gear or disk (larger disk) is rotated with rippling and attraction phenomenon between the gears and torque is transmitted, driven speed is reduce with increased torque, Due to alternative placed magnets each magnets alternative pushes and pulls each other hence the disks tends to rotate by the rippling and attraction phenomenon of magnets.

6. CONCLUSIONS

Our system with success demonstrates the advantages of contactless power transmission like, higher transmission potency, reduced power loss, no friction because it is contactless and thus no wear of elements then larger lifetime of system. over all there's no noise and vibrations like contact gear system. This project is safe, reliable and notably economical to control. They work while not wear or contact, and nearly maintenance- free, operate with low bearing friction and beneath conditions of traditional use, virtually unlimited operating life. they're notably helpful once it's necessary to make sure a minimum gap for physical separation between the drive and driven aspect. A magnetic gear uses permanent magnets to transmit force Associate in Nursingd power between an input and output shaft while not mechanical contact. force densities comparable mechanical gears Associate in Nursingd magnetic gear are often achieved with an potency of ninety nine at full load and with a lot of high half load efficiencies than a mechanical gear. For higher power ratings a magnetic gear are going to be smaller, lighter and lower value and a lot of potency than a mechanical gear. Since there's no mechanical contact between the moving components there's no wear and lubrication isn't need

7. FURURE OF SCOPE

Since our project is used for limited torque transmission, so the application is less , so we need to improve the magnetic principles for high torque application we must introduce a electromagnetic principle, so that if we increase the voltage the EMF also increase hence the magnetic power also increases, so that torque transmission also increase ,based on Loading and speed the EMF can be controlled by introducing the sensor and micro controller, which controls the EMF of electromagnet , so limitation of our project can be overcome by using the electromagnetic principle , so these are the future extension of our project .

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