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"Pneumatic Gear Shifter"

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ABSTRACT

In all the recent vehicles the engine has developed to a great extend almost in all the cases by using engine power the air can be compressed for the applications like pneumatic brakes,pneumatic suspension,supercharging,etc.as the compressed air is available during the working of engine by utilizing the same for different application the overall efficiency can be improved.The Pneumatic gear shifter is the technology which works on the compessed air for shifting of gear in gear box for power transmission.Instead of manual shifting is uses a pneumatic actuator or called as short Stroke actuator which is directly attached to the gear shifter which shift the gear by sliding action when the DCV is operated.This system only needs a short stroke actuator,a DCV and the supply line.The pneumatic gear shifter shifts the gears much smoother as that of the mechanical shifting mechanism

Key Words: Pnematics, Compressed air, DCV, Supply line, etc.

1. Introduction

In the recent years the development in automobile sector is well known to everyone. Researchers are continuously finding the solution for customer requirement and improve the product efficiency also to consider the fuel used which is going to be vanished .To increase efficiency it is proposed that as the frictional resistance is reduces the efficiency can be increased as the more power is consumed to overcome the frictional resistance. Therefore by taking gearbox we have tried to limit the frictional force by changing gear shifting mechanism from manual shifting to automatic shifting which works on pneumatic .The pneumatic system is selected as the compressed air can easily be generated by utilizing engine power and it is required in recent vehicles for the application such as pneumatic braking system, turbo charging, air suspension etc. therefore by utilizing the same energy i.e. pneumatic energy the gear can be shifted during the engine working which shifts the gear comparatively smooth as that of mechanical system. The pneumatic gear shifter has the pneumatic actuator which directly connected with the shifter mechanism of gear box which after sliding shifts the gear. At another side it is provided with pneumatic tubing connections by which the compressed air is supplied for its working. The actuator receives the signal from DCV which is a direction control valve which

supplies the compressed air in both the direction i.e. when it is required to shift the gears in forward as well as reversed direction. The DCV is directly connected to the pressure line coming out through the compressor.Fluid power system is a power transmission system in which the transmission of power takes place through a fluid medium. Such a system avoids the mechanical linkages such as gears, belts, ropes, chains etc. to a great extent of a conventional power transmission system. The transmission of power by fluid power system is most convenient and highly efficient. Due to this, the present conventional transmission systems are being replaced and changed over to fluid power based systems.

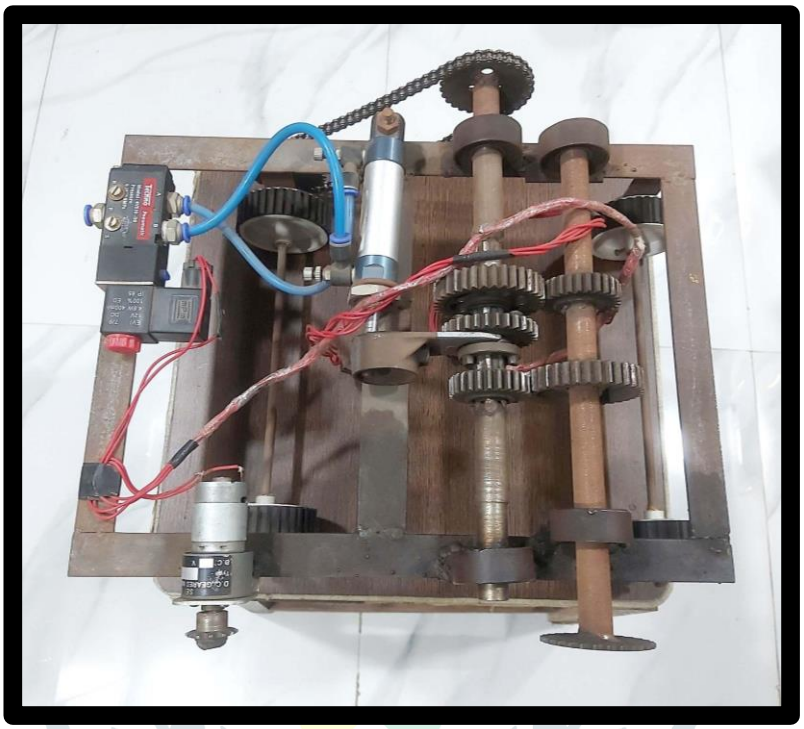
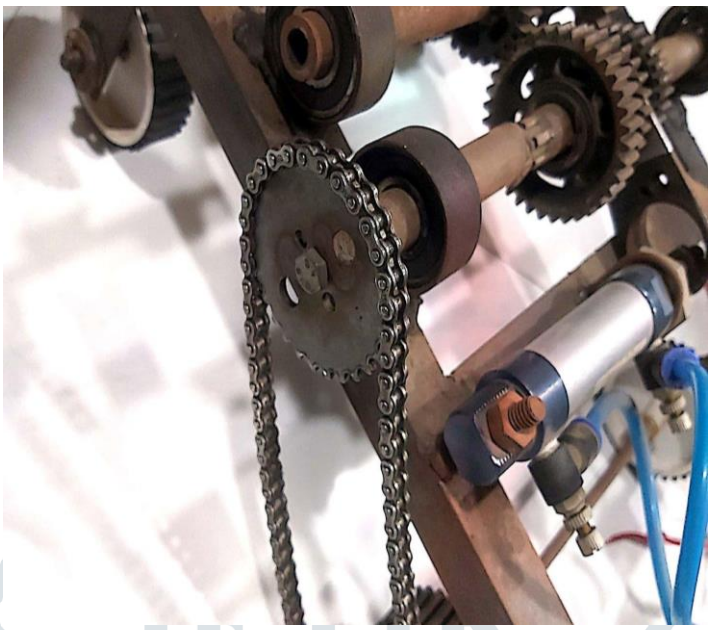


Fig.01: Bean Sheller Machine

2. Working Of Mechanism:

Pneumatic gear shifter is basically run on the compressed air for shifting of gears. Initially the supply is made connected to the DC motor. As the single phase AC is available then there is requirement to convert that AC current into DC current. Also the available AC voltage is too high it must be lower to the desired level. To serve these functions first an AC transformer is used to reduce the voltage from 230V to 12V it is step down type transformer. And to convert the 12V AC into 12V DC a rectifier circuit is used which is a bridge rectifier. Then the converted DC current is supplied to the DC motor which has 750 rpm and generated a torque up to 4 kg. Then the rotational motion is transferred to the driving shaft through a timing chain and sprocket mechanism. As the driving and driven sprocket of timing chain is of same size the speed of driving and driven shaft remains same. The driving shaft rotates at 750 rpm and it also rotates the attached gear. When the shifter is not meshed to any of the gear the gears rotates freely without rotating the output shaft. When the DCV is operated the compressed air passes from DCV to actuator and actuator extends. During the actuation of the

actuator it slides the shifter gear and allow the meshing of shifter gear to the smaller gear. as the gear meshes the power is transmitted from driving



3. Literature Review:

A manual transmission, also known as a manual gearbox, stick shift, n- speed manual (where n is its number of forward gear ratios), standard, MT, or a stick (for vehicles with hand- lever shifters), is a type of transmission used in motor vehicle applications. It uses a driver- operated clutch engaged and disengaged by a foot pedal (automobile) or hand lever (motorcycle), for regulating torque transfer from the engine to the transmission and a gear selector operated by hand (automobile) or by foot (motorcycle). A conventional, 5

speed manual transmission is often the standard equipment in a base- model car, while more expensive manual vehicles are usually equipped with a 6- speed transmission instead other options include automatic transmissions such as a traditional automatic (hydraulic planetary) transmission (often a manumatic), a semi- automatic transmission, or a continuously variable transmission (CVT). The number of forward gear ratios is often expressed for automatic transmissions as well Manual transmissions often feature a driveroperated clutch and a movable gear stick. Most automobile manual transmissions allow the driver to select any forward gear ratio ("gear") at any time, but some, such as those commonly mounted on motorcycles and some types of racing cars, only allow the driver to select the next- higher or next- lower gear. This type of transmission is sometimes called a sequential manual transmission

4. Advantages:

- Manual work for shifting of gears eliminated
- Used for automatic transmission
- Less number of linkages required

- Simple construction
- Can be located at distance as the compressed air can be transfer using tubes
- Maintenance free application

5. Conclusion:

While concluding this project work, we feel quite contended in having completed the project assignment well on time. We had enormous practical experience on the manufacturing schedules of the working project model. We are therefore, happy to state that the inculcation of mechanical aptitude proved to be a very useful purpose.

Undoubtedly the joint venture has had all the merits of interest and zeal shown by all of us the credit goes to the healthy co- ordination of our batch colleague in bringing out a resourceful fulfillment of our assignment described by the university. Although the design criterion imposed a challenging problems which however welcome by us due to availability of good reference books. The selection of choice of raw materials helped us in machining of the various components to very close tolerances and thereby minimizing the level of wear and tear.

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