

Design and Fabrication of Pneumatic Self Starter

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Abstract- An automatic rotary distributor for compressed air starting of a multicylinder internal combustion will receiving compressed air on one side while being in sliding tight pressure and some electrical power form the engine battery. Normally it need to Bring the engine to cranking r.p.m. (200rpm) so the engine can draw fuel and air and ignite that fuel and air.so with the power of pneumatic and electrical power the it can able to able to start the engine even when the battery is low (12V). Before the advent of the starter motor, engines were started by human-powered techniques which engaged the front of the crankshaft, pulling a cord that was wound around an open-face pulley. The pneumatic starter can be able to crank the engine at sufficient speed for fuel combustion to begin normal firing of the cylinders and keep the engine running

Keywords: pneumatic, battery, cylinder, magnetic cylinder, power generator, low battery

I.INTRODUCTION

Both Otto cycle and Diesel cycle internal-combustion engines require the pistons to be moving before the ignition phase of the cycle. This means that the engine must be set in motion by an external force before it can power itself. Originally, a hand crank was used to start engines, but it was inconvenient and rather hard work to crank the engine up to speed. It was also highly dangerous. Even though cranks had an overrun mechanism to prevent it, when the engine started, a crank could begin to spin along with the crankshaft. The operator had to pull away immediately, or else risk a broken wrist, or worse. Moreover, as engines evolved, they became larger and compression ratios increased, making hand cranking an increasingly difficult matter. The most common ways of starting a combustion engine are with the DC motors, which are coupled to the engine flywheel. But here we use pneumatic power to start the Engines. Before the advent of the starter motor, engines were started by human-powered techniques which engaged the front of the crankshaft, pulling a cord that was wound around an open-face pulley.

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II. EXPERIMENTAL PROCEDURE

Objective: Without disturbing the ongoing process, power production is not possible. In our concern it's may possible. The power is generated by the DC motor. Thorough the power of the DC motor the power is generated. Universally all the automobile are using the electrical motor which cranked up to the engine. When the elecical motor run it will rotate the flywheel which in turn moves the piston and then the ignition system will start.

Existing system: In existing system they use DC motor to start the engine. Usually there are three types of starter are used universally. The types are electrical starter, hydraulic starter and non-motor. The electric starter motor or starting motor is the most common type used on gasoline engines and small diesel engines. The modern starter motor is either a permanent-magnet or a series-parallel wound direct current electric motor with a starter solenoid mounted on it. When current from the starting battery is applied to the solenoid, usually through a key-operated switch, the solenoid engages a lever that pushes out the drive pinion on the starter driveshaft and meshes the pinion with the starter ring gear on the flywheel of the engine. The modern starter motor is a series-wound direct current electric motor with a solenoid switch (similar to a relay) mounted on it.

Drawbacks: The electrical motor requires 24V power to start the engine. When the power goes beyond the 24V the electrical motor cannot able to start the engine. The motor is not efficient enough to start the engine. But with this pneumatic self-starter can able to start the engine even below 12V of power from the battery.

Proposed system: The pneumatic self-starter is to start the engine during when the batter is low (i.e. 12V). The pneumatic self-starter will obtain the air from the storage tank which is available in the automobile.

Operation: The air from the storage tank is fed to the magnetic cylinder. The air is filter with the use of appropriate equipment's. Then the filtered air is admitted to the pressure regulator. Though the pressure regulator will regulate the air then the regulated air is fed to the 5/2 solenoid valve. Then the solenoid valve will allow the air to the upper part of the cylinder so that the cylinder will move to the down of the cylinder. Then the solenoid valve will send the air to the lower part of the cylinder so that the cylinder will move the upper part of the cylinder. This process is repeated again and again so that the cylinder will move up and down. When this process is repeated the linear motion is obtained. Though the linear motion is converted is the rotary motion with the help of piston cylinder arrangement.

III. RESULTS AND DISCUSSION

The experiment was conducted to observe the performance of the system at different speeds. Though when the battery is low condition it can able to start the engine with pneumatic cylinder. With the help to pneumatic cylinder it can able to start the engine with the low battery. When the battery level goes beyond the 24 v motor it cannot able to start the engine. In case of emergency we can use pneumatic starter to start the engine. The output of the pneumatic starter the power is admitted to the starter motor so when the power flow over the starter motor it will rotate the flywheel so that the engine will start running .

Future Enhancement

In order to attain the maximum voltage in the motor we are use some hydraulic power to start the engine. And this pneumatic power can be used only in the heavy duty vehicle and for future enhancement it can also be used in two wheeler also to start the engine. If the storage is not available we can also get the pneumatic power from the compressor too.

Fabrication

The principle of construction is kept very simple. We uses magnetic cylinder to convert the linear motion to the rotary motion.

The connections are given to the magnetic cylinder and the reed switches are provided in the magnetic cylinder. The reed switch will sense the cylinder position. The reed switch will need some power so the power is obtained from the battery which is available in the automobile.

The 5/2 solenoid valve are used in the pneumatic starter to distribute the air from the storage tank. Then the pressure regulator is used in the pneumatic starter the pressure regulator wills regulates the flow of air from the storage tank. The air is obtained from the storage tank which is available in the automobiles.

Usually to start the engine it requires 23v of power to start the engine. The pneumatic starter can obtain the air from the storage tank then those airs are regulated with the help of the pressure regulator. Then the regulated air are feed to magnetic cylinder through the 5/2 solenoid valve. On design we use piston cylinder arrangement which is in merge with the magnetic cylinder. This piston cylinder arrangement will turn the linear motion to rotary motion.

IV. CONCLUSION

Normally it required 23v of power to start the engine. But with the power of the pneumatic power we can able to start the engine at 12V. The Pneumatic power is easily available in the storage tank. And this storage tank is only available in heavy duty vehicle. So only the heavy duty vehicles only can able to use the pneumatic self-starter. This starter will help the engine to start the engine during the low battery power.

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