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SOLAR OPERATED FOUR-WAY HACKSAW MACHINE

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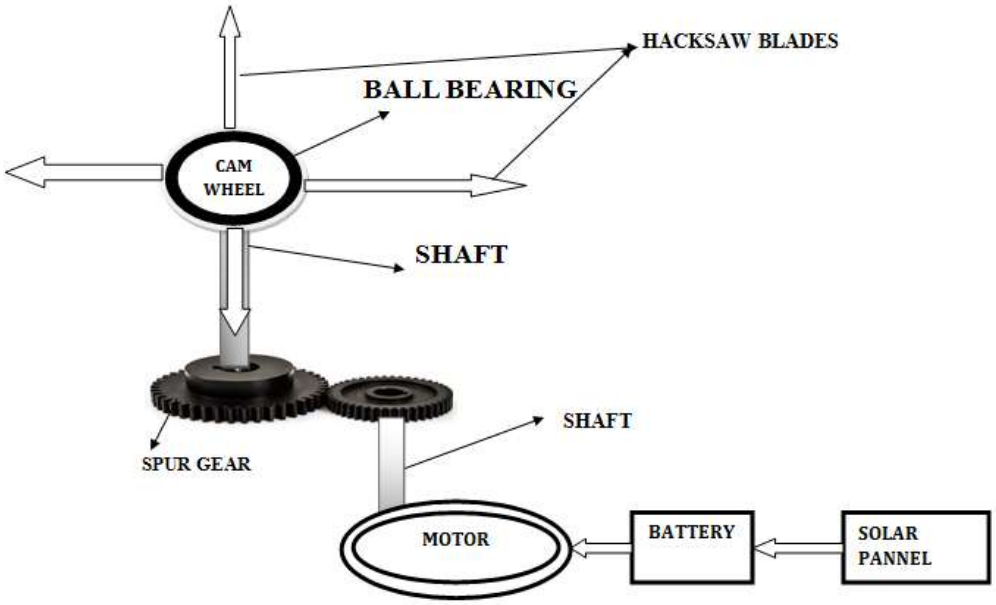
Abstract - *A Four way or multi-way hacksaw cutting machine is designed to cut different materials at different position i.e., four-way position by use of solar Pannel. A solar is an eco-friendly product. The Multi-way hacksaw is used to cut the PVC pipes, small metal pieces. Actually a single hacksaw machine is used to cut a single material at a time, so to resolve this problem a multi-way hacksaw is used, where at a time four work materials cutting process will be available due to this process time consumption will be reduced and also as labour cost. The machine consists of 12v dc motor, battery, solar Pannel, spur gear, shaft, connecting rods, work holding vice, bearing, Cam and four way hacksaw blades. The machine converts the rotary motion of the motor to reciprocating motion of hacksaw blade.*

Key words: D.C. Motor, Solar Pannel, Battery, Spur gear, Cam.

1. INTRODUCTION

Most of the electrical operated hacksaw machine operates by Electricity, where this Multi-way hacksaw machine runs through a solar energy by use of a solar Pannel. Multi-way hacksaw cutting machine runs with an 12v dc motor, this 12v dc motor is connected to spur gear, the spur gear connects the shaft via connected to an bearing this bearing connects the cam and this cam connects the linkages of the hacksaw blades, by this the rotary motion of the cam is converted to reciprocating motion of the hacksaw blades. This machine will basically do multi-purpose work at a time.

2. BLOCK DIAGRAM



3. COMPONENTS AND DESCRIPTION

- DC motor.
- Battery.
- Bearing.
- Cam mechanism.
- Connecting rod.
- Holding vice

3.1 D.C. MOTOR

An electric motor is a machine which converts electrical energy to mechanical energy. As when the motor starts the cam rotates due to rotation of this cam the connecting rod produces a linear motion in the guide-ways.

3.2 BATTERY

In isolated systems away from the grid, batteries are used for storage of excess solar energy converted into electrical energy. The lead acid cell type is a secondary cell or storage cell, which can be recharged. The charge and discharge cycle can be repeated many times to restore the output voltage.

3.3 BEARING

The bearings are pressed smoothly to fit into the shafts because if hammered the bearing may develop cracks. Ball and roller bearings are used widely in instruments and machines in order to minimize friction and power loss. So in this project we are carried out with an ball and roller bearing which is connected to the cam.

3.4 CAM MECHANISM

A cam is a rotating or sliding piece in a mechanical linkage used especially in transforming rotary motion into linear motion or vice versa. A common example is the camshaft of an automobile, which takes the rotary motion of the engine and translates it into the reciprocating motion necessary to operate the intake and exhaust valves of the cylinders. Similarly in this project the cam connects the connects four hacksaw blades as the motor rotates the cam also rotates the rotary motion the cam is converted into linear motion the blades.

3.5 CONNECTING ROD

Connecting rods are used to connect the eccentric cam and the hack-saw frame.

3.4 HOLDING VICE

Holding vice are used to hold work-pieces**.**

4. CALCULATION

With the given power and speed of D.C. motor, we will calculate the torque given out by the motor

$$P=\frac{2*\pi*N*T}{60}$$

Where,

Power, P = 40 watts

Speed, N = 60 rpm

Torque, T =?

$$40=\frac{2*\pi*60*T}{60}$$

$$T=\frac{144000}{376}$$

T= 382.97 Nm/sec.

5. CONCLUSION

From above information we conclude that model of four way hacksaw is helpful to overcome the problems of conventional hacksaw with high efficiency and it's easy to operate and simple in construction. By increasing the motor power and dimensions of eccentric cam the size of material to be cut can be increased. By using limit switches or sensors, Automatic feeding mechanism for material can be introduced in future.

6. REFERENCES

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