

# Study of Sun Position Tracking Method Based On Path of Sun Using Combine Linear And Rotary Motion Mechanism

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## Abstract

Present paper shows the effective utilization of solar energy. Solar energy can be converted into electricity by using PV cell. The efficiency off PV Cells lowers in fixed tilt solar panel. And its efficiency depends on direction off sun rays. to recover the efficiency dual axis sun tracking system use, But disadvantage of this system is, it requires solar mapping which increases cost of system. Also this system I s very bulky, require more space and cannot transfer from one place to another. It can be used in a area where solar mapping is done. And less effective in other area. The proposed sun position tracking mechanism works faster and tracks the position of sun in less time and increases the output from solar panel.

**Keywords:** Solar tracker, maximum output, solar PV, sun tracking.

## INTRODUCTION

Development of any country is based on the energy. In the world India is ranked third in production and consumption of electricity. Primary conventional energy sources like fossil fuels are mostly used to generate electricity. Solar Energy is evergreen resources to generate electricity. Solar energy is renewable energy which available in plentiful quantity but the main problem is how to convert this energy into electricity and how to utilize this energy. This energy can be converted by using photo voltaic cell. The Solar Panel consists of photovoltaic cell which converts solar energy into electric energy. Energy sources like fossil fuels are dangerous to environment and most likely destroy in near future. The coal resources will exhaust from the earth in upcoming 250 years. Then the most important task is how to fulfill this demand in future?

### Importance of Solar Energy

Eventually non conventional energy sources will exhaust so have to rely on natural conventional energy sources. Solar energy wind energy Tidal energy Geo

thermal energy etc are the main available sources of non conventional energy sources .Solar energy have more advantage compare to other natural energy sources Solar energy is harmless and does not produce any kind of pollution like production of NOx SO2 hydrocarbon emissions etc.

### Utilization of Solar Energy

Solar energy is available throughout the year in a large quantity. To utilize this energy we use Solar panels. Solar energy appliances are used increasingly since the depilation of ozone layer became the serious issue. Solar energy is available in large quantity so we have to take advantage of this situation. This paper focus on optimum use of solar energy in a day by using a mechanism which provide combined rotary and liner motion.

## SUN TRACKING METHODS

### Fixed Tilt Solar Panel

In this method solar panel is tilted at fixed angle. This solar panel does not produce more energy from morning to noon. After

the noon the output from the panel increases due to high intensity of radiations.. The efficiency of panel is 50 %.

**Problem Of Fixed Tilt Solar Panel**

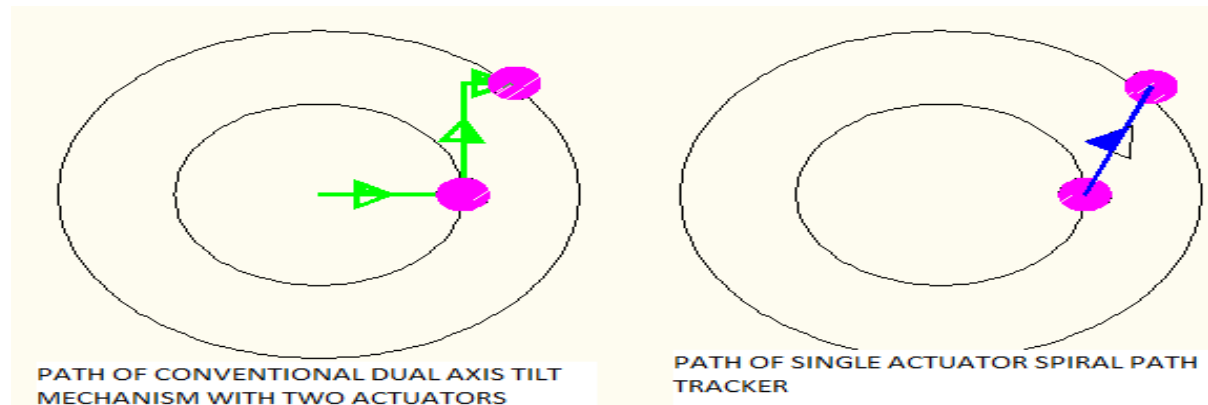
When the sun travels from east to west direction, the radiations from sun are not projected perpendicularly on solar panel. Because of this the efficiency off solar panel decreases and we get less output from solar panel.

**Solution for this problem- Combined Linear and Rotary Motion Sun Tracking Mechanism (Spiral Path)**

Electricity has become one of the primary needs of our daily lives but the energy

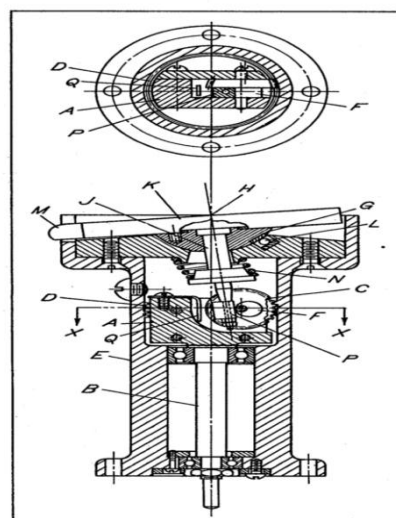
sources to generate electricity have been used extensively. So researchers were required to find an alternative power source of energy which results to exploration of solar energy. Solar energy is renewable and pollution free. And it can be used to generate electric power using solar panels. The panels can be used in a stationary or movable form which is used in a solar tracking system. In stationary form, panels are fixed and faced in particular direction throughout the day hence their efficiency is low. Whereas in combined tracking system the panel is moved through 360 degrees hence its efficiency is high as compared to other solar tracking systems.

**PROPOSED WORK**



*Figure 1: Wrist joint*

**Working Mechanism**



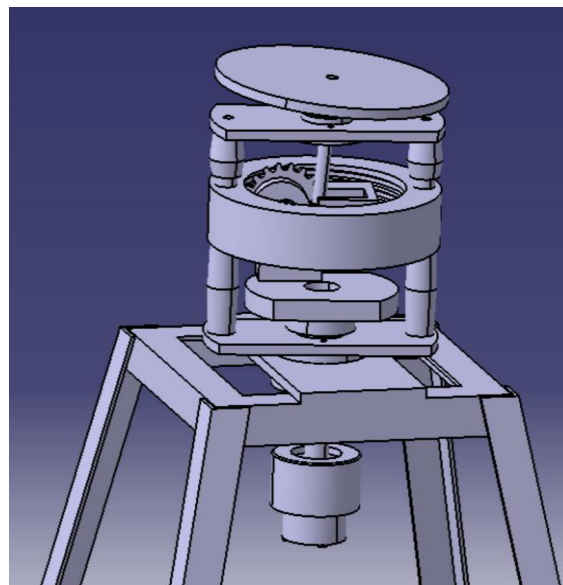
*Figure 2: Combined linear and rotary motion mechanism*

### Construction & Working

In this paper combined linear & rotary motion are described. Frequent need arise for high spiral scanner in radar, television and other system also for the reception of electromagnetic waves. Scanner is held in adaptor and operated by motor. The mirror is tilted with constant change in angle with respect to vertical axis, passing through its centre. Tilt Direction changes continuously with an angle of 360 degrees. Scanner can scan the motion of any object with in 360 degrees. Scanner has to scan in a cone angle of 12 degrees. The necessity is that the instrument should be uncomplicated & easy to build. The main axle is designed such that the shaft revolves at high speed and moves with lower end of axle. From vertical zero position to farthest cone angle position and return to initial position. This is one operating cycle. The main shaft is balanced and integrated with carrier. The helical gear is hinged with carrier and meshes with internal worm thread in housing. Cam & Gear are mounted on the

same shaft and revolved along with it. The tilting and conical motion can be achieved by using spherical bearing or element which is fixed to adaptor. The arrangement is made in order to prevent the revolution of adaptor, spherical element main shaft with a carrier. Spherical Section is hold by spring in its seat follower on the axle shaft of carrier rotates freely around it. The follower is situated between gear and carrier. The gear, cam and follower operate as main unit with main shaft which rotates at high speed. Spherical element with adaptor to produce conical motion. Simultaneously worm thread and helical gear revolve around its own axis thus the centrifugal force act on a follower against the cam. As a gear and cam also revolve with respect to gear axis. The cone angle continuously varies directed by shape of cam which generates required spiral motion. Flat spring is used control the motion of the tilt shaft. When follower reaches centre point, the same cycle repeats.

### CAD Model



*Figure 3: Assembly of solar tracking mechanism*

### SCOPE OF Mechanism

1. Solar Panel for domestic lighting
2. Solar panel for Street lighting
3. Solar panel for traffic signals
4. Solar panel for commercial solar power

- plants
5. Solar panel for Power solar vehicles etc Cars/Low commercial Vehicles/Defense vehicles/ Recreational vehicles (golf cars)

## CONCLUSION

From this paper we conclude that combined linear and rotary motion mechanism is more effective than other sun tracking system and gives more output in form of electricity and increases efficiency of solar panel.

## REFEERENCE

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