

HIGHER TECHNICAL INSTITUTE

MECHANICAL ENGINEERING COURSE

DIPLOMA PROJECT

**DESIGN AND CONSTRUCTION OF A SOLAR
TRACKING SYSTEM**

M / 931

KONTOVOURKIS PETROS

JUNE 2001

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DESIGN AND CONSTRUCTION OF A SOLAR TRACKING SYSTEM

by

Petros Kontovourkis

Project Report

Submitted to

the Department of Mechanical Engineering

of the Higher Technical Institute

Nicosia Cyprus

in partial fulfillment of the requirements

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TECHNICAL ENGINEER

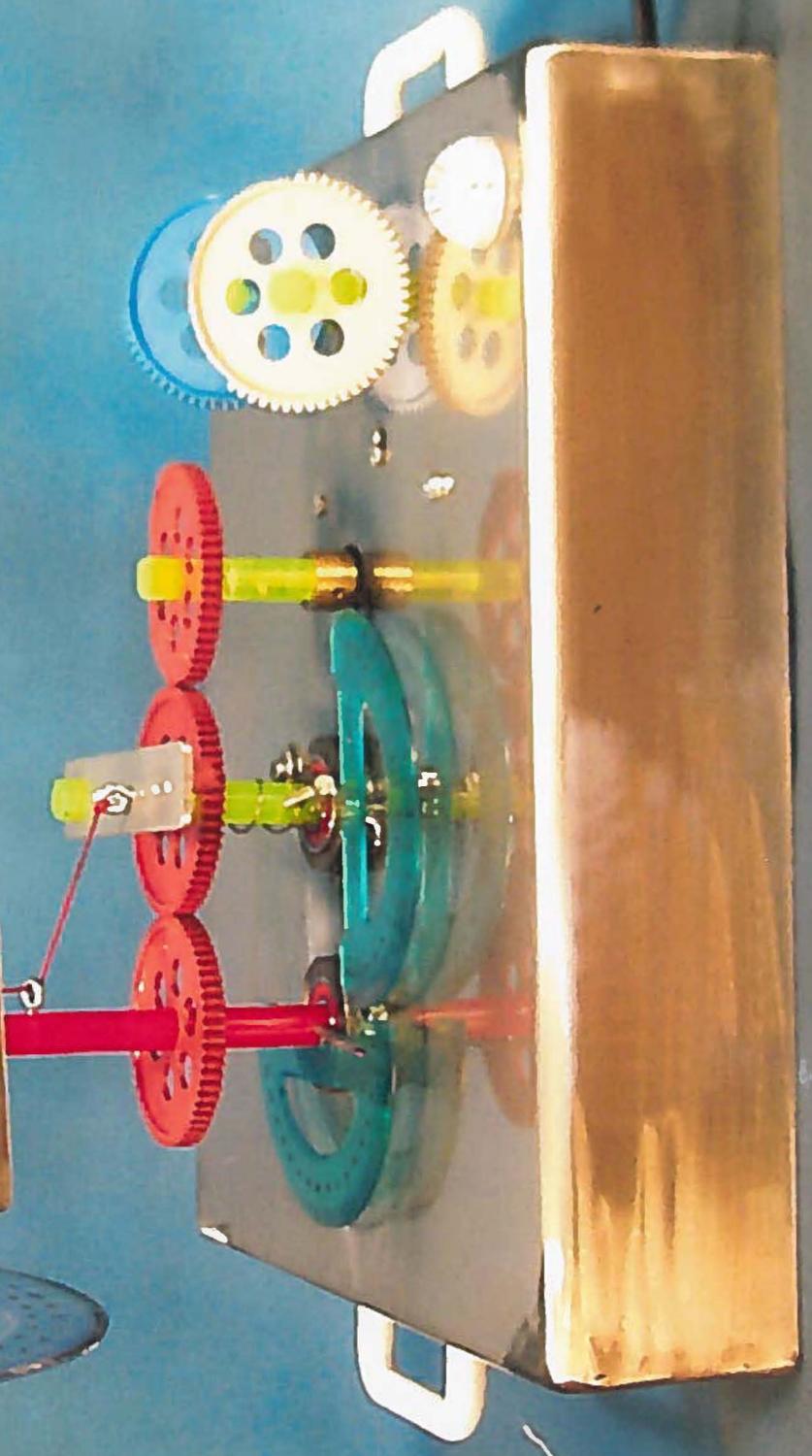
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Design and Construction of a Solar Tracking System

KONTOVOURKIS PETROS

SUMMARY

This project deals with the techniques and basic principles associated with the better collection of solar energy by using a simple solar tracking system.

Influenced by the fact that in Cyprus, the sun is shines at least ten months of the year for long and short periods every day, I intend to present a study of how the sun can be used as an energy source, which will help us to provide a solution to a future energy crisis.

This project divided into two parts, theoretical and practical:

The theory recalls historical problems of energy and describes the anticipated needs of the future as present resources diminish. The sun as an alternative potential energy source is examined i.e. collection problems arising and possible solutions are discussed. A number of different tracking systems are listed. The idea of tracking is introduced and its advantages are described.

In part II a simple tracking system was designed, constructed and tested as outlined in part I.

Until now, in Cyprus, little serious consideration has been given to solar tracking systems and the collection of energy. I hope and wish that in the future more emphasis will be placed on this study and that we will see this design giving results.

INTRODUCTION

In recent years, the public has become increasingly concerned about the rapid depletion and escalating cost of fossil fuels. There is also some fear about the possible environmental and safety risks associated with fossil fuel and nuclear power. These concerns have focused worldwide attention on the potential of harnessing the sun's power in new and varied forms to meet society's growing energy needs. Although the sun has been a major energy source through the ages, technological advances in several fields of science and engineering now make it possible to accelerate the use of solar energy requirements.

So with the advent of energy crisis in 1973-74, it was the collection of the sun that received the attention of the engineers and scientists. This was done due to capability of the collectors of accepting direct and diffuse radiation from the sun and the 'advantage' of not requiring tracking the sun so this development of technologies over the years permitted it to reach efficiencies adequate for many low temperatures.

But when it was realized that the sun tracking method is much more efficient against the fixed position many advanced countries have developed many kinds of solar tracking systems for collection of solar energy for heating and cooling or storage of electricity etc. for domestic or industrial use.

However the use of solar tracking systems is limited due to the high initial and maintenance cost. So for every solar application an economic analysis must be carried out which depends on the solar radiation amount in order to find out what is better to be used, a tracking system or a fixed.

Finally the development of solar energy applications does not mean the beginning of a new economic world: they have to win their place in the overall energy market.

The reader will find it interesting and very educational as he progresses through these pages. Information's about the sun motion yearly and modern ideas about the sun tracking systems are part of this project.

In concluding this introduction I hope that more effective use of solar energy will be made in the future.