

# Manually Operated Four Bar Linkage Gripping System

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**Abstract-** The four bar linkage gripping system must be lightweight and must have the ability to grasp objects of any size or shape stably. In addition, sufficient gripping force, a low cost, and a friendly shape are necessary. To satisfy the above requirements, this research designs a new robot gripper. We use a four-bar linkage under actuated system for shape adaptability and to reduce the weight. In a simulation, the four-bar linkage is designed to eliminate the rollback ejection phenomenon while also maximizing the utilization of a parallel grasping. While other studies place emphasis on preventing rollback ejection phenomenon, in this research we stress the maximum utilization of both parallel and power grasping using a compliance jaw and a double four-bar linkage design. With the parallel four-bar linkage system, the gripper can perform both parallel grasping and power grasping, allowing it to grip a diverse range of objects. Moreover, the compliant jaw enhances the stability of its grasp, and its worm gear enables the gripper grasp to be stable while also reducing the gripper's weight. With a force sensor, it can manage sensitive force control. In this way, we designed a robot gripper suitable for rapid service robots.

## I. INTRODUCTION

Manually operated Four bar linkage gripping system is the one which is used to pick up an object and place it in the desired location. It will provide movement in horizontal and vertical direction.

The basic function of Manually operated Four bar linkage gripping system is done by its joints, Joints are analogous to human joints and are used to join the two consecutive link to each other, they can be rotary joint. A simple Manually operated Four bar linkage gripping system consists of links on a moving base, connected together with rotary joint. A rotary joint is a one which provides rotation motion.

### 1.1 Basic Design Concept –

#### FIRST PHASE

1. From the small scale industries point of view, an idea is generated to create a lifter machine which will reduce the

human efforts, cost and will save the time to transfer the material.

2. After thinking of idea now we looked for the parts by the help of which our project will made of. Following are the parts which are used in the project.

#### SECOND PHASE –

- Measurement
- Cutting
- Filing
- Welding
- Heat treatment
- Drilling
- Assembly
- Painting

#### 1.2 Introduction to concept

Our project is to make an easy mechanism arrangement for the shifting of material in small scale industries on the basis of various parameters such as cost, strength, reliability etc .with the help of four bar linkage arrangement along with an electrical gripper.

The combination of four bar linkage and electrical gripper will reduce the complexity of the work which is to be done and will provide comfort to the operator as he has to just pick the material and shift that material to desired location by sitting at one place with the help of the handles provided.

## II. METHODOLOGY

From the small scale industries point of view, an idea is generated to create a lifter machine which will reduce the human efforts, cost and will save the time to transfer the material. After thinking of idea now we looked for the parts by the help of which our project will made of. Following are the parts which are used in the project-Links, Rotating chair, Gripper, Handles. Measuring the length of all the links according to the requirement is done..On the basis of above measurements, cutting of links are done, cutting tool are used for cutting process.. Filing operations can be used on a wide

range of materials as a finishing operation. Filing helps achieve work piece function by removing some excess material and deburring the surface. Sandpaper may be used as a filing tool for other materials, such as glass. To remove the sharp edges from the links, filing action is done on all links. To connect the one link with the rotating chair i.e. to make a fix joint between the two, arc welding is done on them. It is a technique used during heat treating to harden or soften certain areas of a iron rod It can involve heating the metal evenly to a red-hot temperature and then cooling it at different rates, turning part of the object into very hard marten site while the rest cools slower and becomes softer pearlite. Drilling is a cutting process that uses a drill bit to cut a hole of circular cross-section in solid materials. The drill bit is a rotary cutting tool, often multipoint. The bit is pressed against the workpiece and rotated at rates from hundreds to thousands of revolutions per minute. In this system drilling process is done on the links. By mechanically moving the parts to the assembly work and moving the semi-finished assembly from work station to work station, a finished product can be assembled faster and with less labor than by having workers carry parts to a stationary piece for assembly. Painting is the final step in the process, it is indeed the most enjoyable and skillful part of the job these activities need to be undertaken prior to applying paint to ensure the best possible finish and gain the maximum life for the final paint film.



### III. CALCULATION

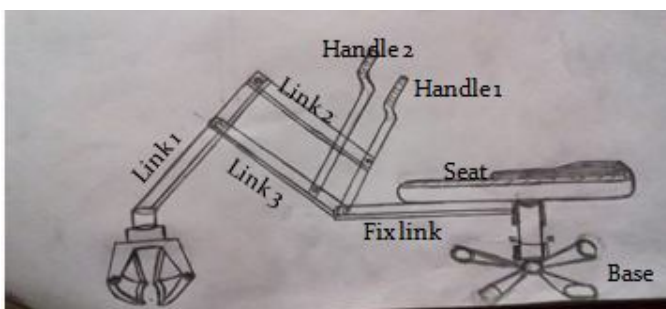


Fig.

- Distance b/w base and seat = 41cm
- Dimension of seat = 42x42
- Thickness of seat = 7cm
- Total length of seat(bottom to top) = 52 cm

### IV. CONCLUSIONS

This four bar linkage gripping system is basically used for shifting and carrying the material (including heavy material) from one position to different position in small scale as well as in large scale industry. It also reduces the cost and also helps in cost cutting. It also reduces the employee or worker time and effort.

\*Basically it moves the material by revolving the chair \*

### ACKNOWLEDGEMENT

We would like to express our sincere gratitude towards the Mechanical Department of Swami Vivekanand College of Engineering for providing us the opportunity to express our knowledge and we are also thankful to our guide Prof. Vishal Wankhede, Department of Mechanical Engineering for his valuable guidance and constant inspiration during the course of this project.

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