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## BOX TRANSFER MACHINE

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### ABSTRACT

The Box transporting machine is a new skill that we have learned to make a Box transporting machine. At the same time, we learn to use right tools and materials when doing work at Box transporting machine. Box transporting machine is also giving us more skills and preparation when we work outside later. When we see a result from the work that we have done together, we are very grateful when we have finish our work in a sharp time that have given by our lecturer. The talent that our lecturers have given to us is brought us to new experience about Box transporting machine. These practical also give us advantage when we work together with our team and we also can learn many information through share knowledge together.

*Keywords: Box transporting, four bar chain mechanism, box conveyor*

## 1. INTRODUCTION

There has been a serious demand for intermittent movement of packages in the industries right from the start. Though the continuous movement is more or less important in the same field the sporadic motion has become essential. The objective of our project is to produce a mechanism that delivers this stop and move motion using mechanical linkage. The advantage of our system over the conveyors system is that the system has a time delay between moving packages and this delay can be used to introduce any alterations in the package or move the packages for any other purpose and likewise. While in conveyors system such actions cannot be performed unless programmed module is used to produce intermittent stopping of the belt which basically is costly. The prototype design requires electric motor, shafts and the frame and platform on which the packages are moved is fabricated. All the links are being made of Aluminum which reduces the weight of the whole system including the head which has a direct contact with the boxes being moved. The system is expected to move as packages as 2-3 kg's approximately.

## 2. LITERATURE REVIEW

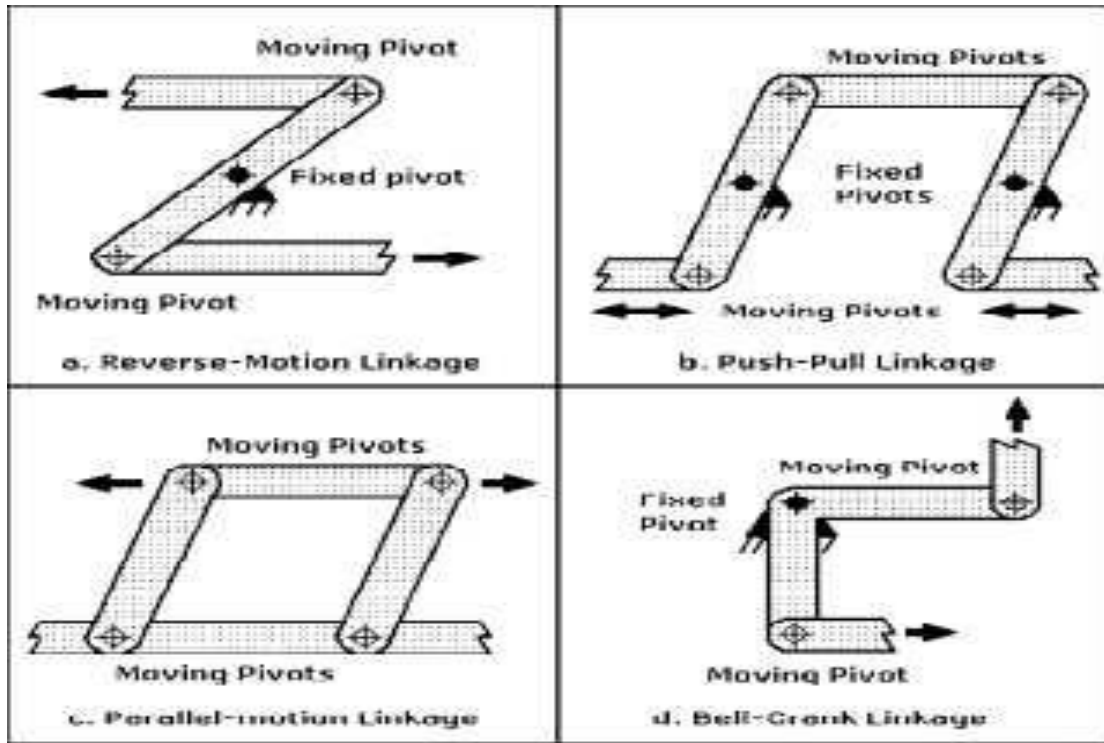
### 2.1 LINKAGE MECHANISM

A linkage is a mechanism formed by connecting two or more levers together. Linkages can be designed to change the direction of a force or make two or more objectives move at the same time, many different fasteners are used to connect linkages together get allow them to move freely such as pins, end threaded bolt with nuts, and loosely fitted rivets. There are two general classes of linkages: simple planner linkages and more complex specialized linkages; both are capable of performing task such as describing straight lines or curves and executing motions at different speeds.

### 2.2 SIMPLE PLANNER LINKAGES

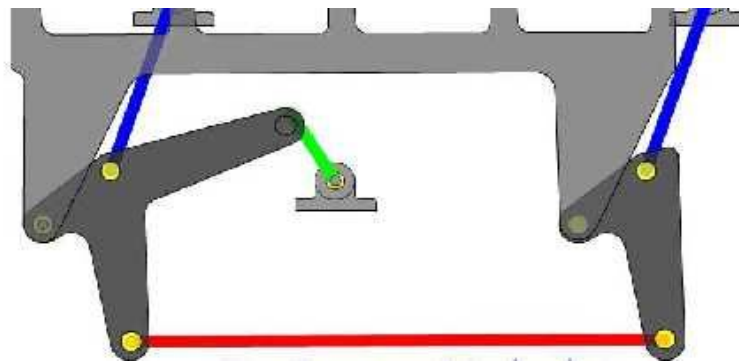
Four different simple planner linkages shown in fig. are identified by function:

Reverse motion linkage shown in figure- a. can make objects or force move in opposite direction; this can be done by using the input link movement, but it will act in the opposite direction. However, if the fixed pivot is not centered output link movement. By selecting the position of fixed pivot, the linkage can be designed to produce specific mechanical advantages. This linkage can also be rotated through 360 degrees, work correctly. Technically classed as a four bar linkage, Drawing pantograph that permit original drawing to be manually copied without tracing or photocopying are also adaptations of this linkages; in its simplest form it can also keep tool trays in a horizontal position when the toolbox covers are opened. Bell-crank linkage, fig-d. can change the direction of objects or force by 90 degrees. This linkage range door-bells before electric clappers were invented. More recently this mechanism has been adapted for bicycles brakes. This was done by pinning two bell cranks but 90 degrees in opposite directions together to form a tongs.



**FIG- SIMPLE PLANNER LINKAGES**

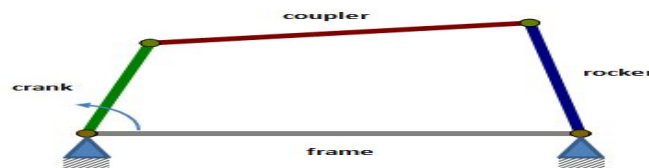
**2.3 CRANK-ROCKER MECHANISM FOR BOX TRANSPORT MECHANISM**



**FIG:-CRANK ROCKER MECHANISM**

The simplest closed-loop linkage is the four bar linkage which has four members, three moving links, one fixed link and four pin joints. A linkage that has at least one fixed link is a mechanism. This mechanism has four moving links. Two of the links are pinned to the frame. The function of a link mechanism is to produce oscillating or reciprocating motion from the rotation of crank or vice versa be used to convert.

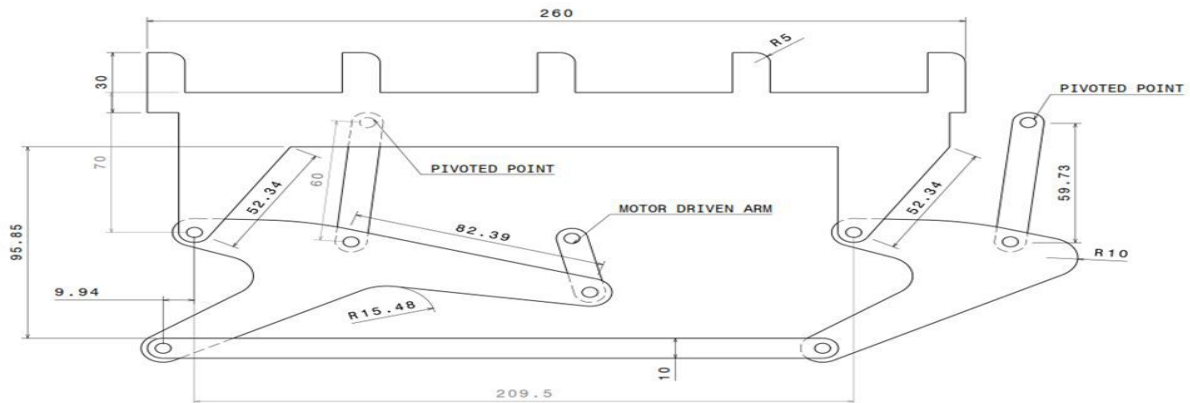
**3. PROCESS/METHODOLOGY**



**Fig:- FOUR BAR LINKAGE**

A four bar linkage, also called a four-bar, is the simplest movable closed chain linkage. It consists of four bodies, called bars or links, connected in a loop by four joints. Generally, the joints are configured so the links move in parallel planes, and the assembly is called a planar four-bar linkage. If the linkage has four hinged joints with axes angled to intersect in a single point, then the assembly is called a spherical four-bar linkage. Bennett's linkage is a spatial four bar linkage with hinged joints that have their axes angled in a particular way that makes the system movable.

#### 4. CONSTRUCTIONAL DETAILS



**Fig:-Box Transportation**

#### 4.1 CONSTRUCTION OF FOUR BAR LINKAGES

In the range of planer mechanisms, the simplest group of lower pair mechanisms is four bar linkages. A four bar linkages comprises four bar shaped links and four turning pair as shown in constructional fig.



**FIG:- CONSTRUCTION**

The link opposite the frame is called the coupler link, and the links which are hinged to the frame are called side links. A link which is free to rotate through 360 degree with respect to a second link will be said to revolve relative to the second link (for all four bars to becomes simultaneously aligned, such a state is called a change point)

Some important concepts in link mechanisms are:

- |    |   |                                   |
|----|---|-----------------------------------|
| 1. | relative to the frame is called a Crank | Crank: A side link which revolves |
| 2. | revolve is called a Rocker              | Rocker: Any link which does not   |

3. Crank-rocker mechanism: In a four bar, If the shorter side link revolve and the other one rocks
4. Double crank mechanism: In a four bar linkage, If both of the side links revolve, it is called double –crank mechanism
5. Double-rocker mechanism: In a four bar linkage, If both the side links rock, it is called as double rocker mechanism.

## 5. MODIFICATIONS

1. using solar panel we able to run this motor we get more efficiency
2. We are modify it to remove helium and use aluminum plate

## 6. CONCLUSION

This box transfer mechanism plays a major role in industries, the process of transporting or shifting of products from one place to another was to be maintained by conveyors only. So we just successfully altered this with a box transfer mechanism using the kinematic links and a motor. We had just implemented our basic mechanical knowledge and designing skills for designing and fabricating this project successfully.

## REFERENCES

[1] “A Review on Kinematic and Dynamic Analysis of Mechanism” by Shrikant R. Patel, D. S. Patel, B. D. Patel  
Research Scholar, Associate Professor, Assistant Professor

[2] “Dynamic modeling and identification of a slider-crank mechanism” by Jih-Lian Haa , Rong-Fong Fungb, Kun-Yung Chenb , Shao-Chien Hsienb

[3] “Kinematics and kinetic analysis of the slider-crank mechanism in otto linear four cylinder Z24 engine”  
Mohammad Ranjbarkohan, Mansour Rasekh , Abdol Hamid Hoseini , Kamran Kheiralipour and Mohammad Reza Asadi