

# Implementation of Crank And Rocker Mechanism In Box Transfer Mechanism

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## Abstract:

A great many manufacturers of fancy wrapped or covered cardboard boxes used for packaging candies, cakes and other confections, cosmetics and other articles are equipped computer-aided technologies, to control industrial machinery and processes, reducing the need for human intervention. There has been a serious demand for intermittent movement of packages in the industries right from the start. The objective of this study is to design a mechanism that delivers this stop and move motion using the mechanical linkages. The aim of the project work is to design and fabricate a box moving mechanism that makes much easier to move with the so called quad staying machines by means of which a box blank is folded or set-up into box like form.

## Keywords

cardboard boxes, human intervention, mechanical linkages, design and fabricate, moving mechanism.

## 1. Introduction

The box moving or shifting set up has a simple mechanism, operated with crank and links arrangement. As by the electric motor rotary motion is converted into the To and Fro motion of the linkages, it takes very simple. The rotary motion is converted in to linear motion by the crank and mechanical linkages arrangement. The conveyor system is either continuous movement or if the time delay is to be produced there will be definite requirement of software programming which will be costly. So a basic module of moving packages is designed with time delay which can be used to do alterations if required in the package or move the package for any other purpose.

This invention relates to improvements in transfer and conveying devices, and it relates particularly to devices for transferring set-up cardboard boxes from a box folding or forming

machine to the operator of a semi-automatic box wrapping machine. A great many manufacturers of fancy wrapped or covered cardboard boxes used for packaging candies, cakes and other confections, cosmetics and other articles are equipped computer-aided technologies [CAD, CAM]), to control industrial machinery and processes, reducing the need for human intervention. In the scope of industrialization, automation is a step beyond mechanization. Whereas mechanization provided human operators with machinery to assist them with the muscular requirements of work, automation greatly reduces the need for human sensory and mental requirements as well. Processes and systems can also be automated.

## 2. Literature Review

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 objects move at the same time. Many different fasteners are used to connect linkages together yet allow them to move freely such as pins, end-threaded bolts with nuts, and loosely fitted rivets. There are two general classes of linkages: simple planar linkages and more complex specialized linkages; both are capable of performing tasks such as describing straight lines or curves and executing motions at differing speeds. The names of the linkage mechanisms given here are widely but not universally accepted in all textbooks and references.

## 3. Design Calculations

$$\begin{aligned} \text{Let, } N &= 35 \text{ rpm} \\ P &= 40 \text{ Watt} \\ T &= \frac{P \times 60}{2\pi N} \\ &= \frac{12 \times 60}{2\pi \times 15} \\ &= 10.91 \text{ N-m} \end{aligned}$$

**Angular velocity**

$$\begin{aligned} \omega_{OA} &= \frac{2\pi N}{60} \\ &= \frac{2\pi \times 35}{60} \\ &= 3.66 \text{ rad/sec.} \end{aligned}$$

**Velocity of Crank**

$$\begin{aligned} V_{OA} &= \omega_{OA} \times OA \\ &= 3.66 \times 110 \times 10^{-3} \\ &= 0.402 \text{ m/s.} \end{aligned}$$

**4. Fabrication**

Sr. no.	Component name	Fabrication technique
1	Mechanical linkage	Cutting and welding and drilling
2	Wooden frame	Carpentry
3	Motor	Selected
4	Battery	Selected

**5. Work Plan**

**STAGE 1: Collecting the Materials**

The required materials such as metal frame, flats, nut and bolts, washers, clamps, etc. are collected.

**STAGE 2: Fabrication of Components**

The following components are fabricated for the box shifting machine.

- **Wiper motor**  
It is used run the whole linkages.
- **Bolt and Nut**  
It is used to connect the linkages and used to fix linkages on the frame.
- **Wooden box Frame**  
It is used hold whole parts of this machine. It is made by using rectangular wood.
- **Linkages**  
These linkages are made by using metal strips done by cutting operation.

**STAGE 3: Process for Fabrication**

- **Welding**  
In welding process, the electric arc is used to melt the two metals and joint them permanently. Electrode is used to produce electric arc .The gap between electrodes and metal is 2mm. If welding is overlapped, it affects the quality of metal joint. It is used to inter connect the columns.
- **Metal Cutting**

The square pipe cut for our required dimension by using metal cutter. The square pipe acts a column of box shifting machine. The metal pieces are act as linkages. Metal cutter cuts all material to required dimension.

- **Drilling**

Drilling is used to screwing the screw through the drilling. To tight the linkages, the screw is screwing through the drilling and helps to fix the linkages.

**STAGE 4: Assembling the Components**

All the components are assembled in a correct manner. Then it is rechecked and sent for the painting process.

**6. Conclusion**

In this box shifting mechanism has design using conventional method of design various process such as welding, drilling, cutting, etc. use for fabrication of box shifting mechanism . crank and rocker mechanism and found successfully and intermittent motion . by using box transfer mechanism we can reduce the travelling time from one station to another station.

**7. References**

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