

“Chain Actuated Intermittent Work-Part Transport System ”

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Abstract: 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 simple four-bar mechanism. The advantage of our system over the conveyor 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 package for any other purpose and likewise. While in conveyor 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 of which 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 heavy packages as 2 -----3kgs approximately.

Index Terms—intermittent movement,sporadic motion

INTRODUCTION

1.1.1 FOUR BAR LINK MECHANISMS

One of the simplest examples of a constrained linkage is the four-link mechanism. A variety of useful mechanisms can be formed from a four-link mechanism through slight variations, such as changing the character of the pairs, proportions of links, etc. Furthermore, many complex link mechanisms are combinations of two or more such mechanisms. The majority of four-link mechanisms fall into one of the following two classes:

1. The four-bar linkage mechanism, and
2. The slider-crank mechanism.

Definitions

In the range of planar mechanisms, the simplest group of lower pair mechanisms are four bar linkages. A four bar linkage comprises four bar-shaped links and four turning pairs as shown in figure 1.



Figure-1

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 (not necessarily a frame). If it is possible for all four bars to become simultaneously aligned, such a state is called a change point.

Some important concepts in link mechanisms are:

- 1.Crank:** A side link which revolves relative to the frame is called a crank.
- 2.Rocker:** Any link which does not revolve is called a rocker.
- 3.Crank-rocker mechanism:** In a four bar linkage, if the shorter side link revolves and the other one rocks (i.e., oscillates), it is called a crank-rocker mechanism.
- 4.Double-crank mechanism:** In a four bar linkage, if both of the side links revolve, it is called a double-crank mechanism.
- 5.Double-rocker mechanism:** In a four bar linkage, if both of the side links rock, it is called a double-rocker mechanism.

1.2OBJECTIVE

The aim of this project is to fabricate the box moving mechanism, which can make easier to move boxes from one section to the other while processing in the factories.

1.3 CHAIN ACTUATED TRANSPORT SYSTEM

Chain drive is a way of transmitting mechanical power from one place to another. It is often used to convey power to the wheels of a vehicle, particularly bicycles and motorcycles. It

is also used in a wide variety of machines besides vehicles. Most often, the power is conveyed by a roller chain, known as the drive chain or transmission chain, passing over a sprocket gear, with the teeth of the gear meshing with the holes in the links of the chain. The gear is turned, and this pulls the chain putting mechanical force into the system as shown in figure-2.

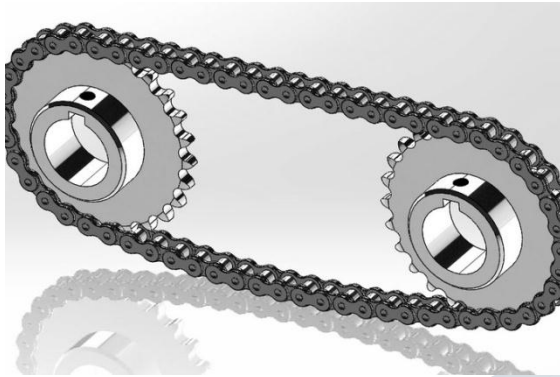


Figure-2

1.4 BENEFITS OF CHAIN ACTUATED TRANSPORT SYSTEM

- As no slip takes place during chain drive, hence perfect velocity ratio is obtained.
- Since the chains are made of metal, therefore they occupy less space in width than a belt or rope drive.
- It may be used for both long as well as short distances.
- It gives a high transmission efficiency (upto 98 percent).
- It gives less load on the shafts.
- It transmits more power than belts.
- It permits high speed ratio of 8 to 10 in one step.
- It can be operated under adverse temperature and atmospheric conditions.

1.5 FABRICATION METHODOLOGY

- The MS material L-angle frame is cut according to the dimensions and is welded to make it rigid.
- Here the driver gear system of the cycle is used as links and is welded to the rigid frame.
- Here the gear system bearings and the pedal attachment act as the turning pairs as required.
- The wooden plank is attached to the pedal system as a connecting link using nut and bolt.
- Here the chain is used to transfer the power from driving to driven links efficiently.

- The frame and the pushing agent is constructed according to the requirement.



Figure-3

1.6 ADVANTAGES

- Simple to construct
- Low speed motor is sufficient
- Easy maintenance
- skilled operator is not required
- Noise of operation is reduced
- Both forward and backward motion can be achieved in the same system.

1.7 APPLICATION

As far as growth is concerned the material handling and conveyor system makers are getting utmost exposure in the industries like automotive, pharmaceutical, packaging and different production plants. The portable conveyors are likewise growing fast in the construction sector and by the year 2014 the purchase rate for conveyor systems in North America, Europe and Asia is likely to grow even further. Mostly purchased conveyor equipments are Line shaft roller conveyor, chain conveyors and conveyor belts at packaging factories and industrial plants where usually product finishing and monitoring are carried. Commercial and civil sectors are increasingly implementing conveyors at airports, shopping malls, etc. The increasing construction of malls and airports around world shows positive scope and growth for manufacturers of conveyor belts.

Used in manufacturing industries where adding the items, closing, sealing and labeling operations are carried out in equal interval of time.

1.8 CONCLUSION

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

1.9 REFERENCES

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