A DETAIL STUDY, DESIGN AND MANUFACTURING OF BOX SHIFTING MACHINE

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Abstract

Always there has been demand for intermittent movement of packages in the industries from the last few years.The objective of the project is to produce a mechanism that delivers this stop and move motion using mechanical linkages. The advantage of the 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. Basically conveyor system 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.

Key words*- shifting machine, linkage, package, conveyor, box*

INTRODUCTION

The need of moving the manufactured components of any industrial plant is one of the basic needs that need to be fulfilled in order to ensure the efficiency of the plant as a whole. The box shifting machine is a simple machine, as it operated with a crank and links arrangement. As by the electric motor rotary motion is converted into the to and fro motion of the linkages, the linear motion is obtained by conversion of rotary motion by the use of cranks and mechanical linkages. If we take the fact that same work can be done by thread mill of other mechanisms which are used in large scale industries and factories but small scale industries will not be able to afford them so this box transport mechanism comes in handy. In the case of thread mill mechanism as it always in continues in motion so when a human involvement is introduced to it sometimes causes time delays which causes an effect on production process this problem can be solved by using box transport mechanism. So, a basic module of moving packages is designed using CAD/CAM with a time delay which can be used to do alterations if required in the package or moves the package or production line. This invention relates to improvements in transfer and conveyer belt devices, and it relates particularly to devices for transferring cardboard boxes and other items. It can be used by many small-scale industries and in-house industries where conveyor system is not accessible.

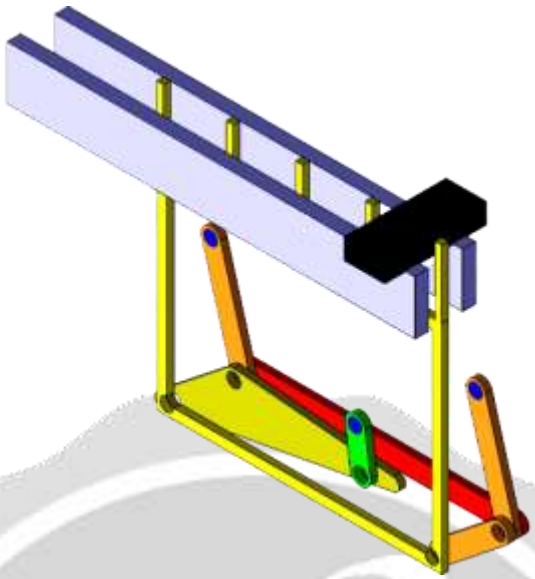

Figure 1: Basic design of box shifting machine

linkage mechanism

A linkage mechanism is 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.

Automation

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. Automation plays an increasingly important role in the world economy and in daily experience. Engineers strive to combine automated devices with mathematical and organizational tools to create complex systems for a rapidly expanding range of applications and human activities.

Course of action

Prepare the drawing for the box transport mechanism using any modeling software. Find out the optimum dimensions for the bed of box transport machine from the CAD model. Take the iron angles and cut them to required dimensions using steel plate cutter by procuring the appropriate size of M.s sheet, and utilizing the CAD database prepare a design for the links, frame, etc. After preparing a CAD model sync the design parameters with a numerically controlled plasma arc cutting machine. Perform the machining operation on a lathe and prepare a shaft according to the required design. Take the iron angles and drill holes using drilling machine according to the dimensions of CAD database. Arrange all the components required to build the model at a convenient point and start associating it. Construct the model according to the dimensions of CAD model by assembling it using fasteners. Fix the motor at an appropriate location and connect the shaft to extrude it to required length. After fixing the motor, fix one side of crank to motor and another one to base link. Take the hanger link and fasten it to base link and affix it to pillow block on a top. Attach the frame to the base link and fasten it using bolts and nuts. Two other hanger links was also attached to the shafts. Perform the same procedure of fixing as mentioned above on the adjoining side as well. After link and frame is allied using fasteners install chain and sprocket on the motor shaft and on the adjoining shaft accompanied on the pillow block. Lock the chain and sprocket using the cotter pin for efficient movement of mechanism. Power is given to the motor to operate the box transport mechanism and results are noted down.

The main component used in this machine are wiper motor, 12V battery, metal connecting links, wooden frame, metal crank, nut and bolts, power source, bearings. Following operation tools were used Plate cutter, Welding machine, Lathe machine, Drilling machine, Electric motor, Iron Angles, Measuring tape and Vices.

Box shifting machine Project

This Box Shifting Machine Project task utilizes system for moving stuffed merchandise one by one among which some action can be conveyed like examination, shutting, naming and so forth among the travel and will move the products one by one by the bar linkages. This entire box shifting mechanism project is comprised of gentle steel material. Numerous connections are used to move the case forward, the fundamental connection is associated with the engine which changes over the turning movement into liner, which responds movement for the shifter joins. Thus, this project can be used in many industrial purposes, the box shifting mechanism has a time delay between moving packages and this delay can be used to introduce any alterations in the package or help in moving the package for any other purpose. We can use this mechanism in medical production fields, bottle filling process and many more.

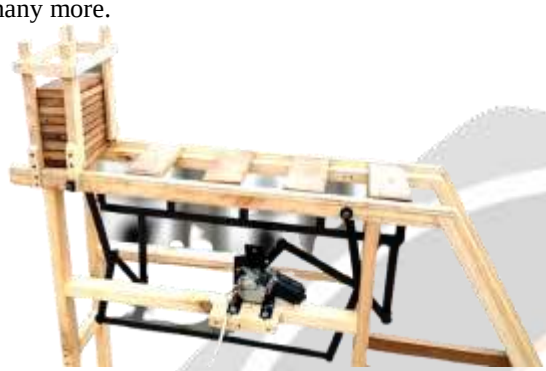

Figure 2: Box Shifting Machine

Applications

It can be used to replace thread mill mechanism in industries. Transferring the boxes from one place to another in the sections of assembly lines and packing lines etc in the industry. Heavy tools and parts can easily be transport to one workstation to another workstation. Creating an unsophisticated and simple balance line in the assembly line. Wildly used in box folding or forming machine to the operator of a semi-automatic box wrapping machine Real life home applications Sewing machine etc. Agricultural applications seed sowing machines. Heavy applications container liftings.

Future scope

According to us this easy and simple to use prototype design will revolutionize the concept of box transfer mechanism. As it is easy to use and fabricate small scale industries will be able to utilize this product for the betterment in the plant management. As transporting boxes from the assembly line will get more manageable industries could easily increase their production rate and so their revenue. Further advancements and modifications can be done as per the requirements as well as scale of the use

CONCLUSIONS

The box shifting machine plays a major role in many small scale industries, the process of moving products from one place to another was to be maintained by conveyors only, by using this project have another a another kinetic mechanism which can be constructed and maintained easily and with less money.

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