

Oscillating Link Conveyor

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Abstract- Conveyor System is used to transport the material or object automatically from one point to another point having less effort in material handling in industries. A Conveyor system is a common method of Mechanical handling equipment that moves material from one location to another. Conveyor is specially used in application involving the transportation of heavy or bulky materials. Conveyor system allows quick and efficient transportation for a wide variety of materials, which make them very popular in material handling and packaging industries. During material handling in industries conveyor system is worked in continually flow. They cannot stop in its way. The Different operation cannot be carried out on it because of time duration and also speed so we have to purchase a machine for particular operation like Pressing, Embossing, and Inspection etc.

Our Project is focuses on to reduce the factory cost by some special arrangement of link mechanism in conveyor. There is Oscillating movement in our project by use of four bar chain mechanism concept. With the help of this mechanism we can stop the material or object during its path so that we can carry out the operations like pressing, embossing, inspection etc., and because of this the material can be handled during operation so we take better space utilization.

Keywords- Four bar link mechanism- Oscillating movement- Link mechanism- Conveyor.

I. INTRODUCTION

A conveyor system is a common piece of mechanical handling equipment that moves materials from one location to another. Conveyors are especially useful in applications involving the transportation of heavy or bulky materials. Conveyor systems allow quick and efficient transportation for a wide variety of materials, which make them very popular in the material handling and packaging industries. Many kinds of conveying systems are available, and are used according to the various needs of different industries. There are chain conveyors (floor and overhead) as well. Chain conveyors consist of enclosed tracks, I-Beam, towline, power & free, and hand pushed trolleys. Conveyor systems are used widespread across a range of industries due to the numerous benefits. Conveyors are able to safely transport materials from one level to another, which when done by human labor would be

strenuous and expensive. They can be installed almost anywhere, and are much safer than using a forklift or other machine to move materials. They can move loads of all shapes, sizes and weights. Also, many have advanced safety features that help prevent accidents. There are a variety of options available for running conveying systems, including the hydraulic, mechanical and fully automated systems, which are equipped to fit individual needs.

Conveyor systems are commonly used in many industries, including the automotive, agricultural, computer, electronic, food processing, aerospace, pharmaceutical, chemical, bottling and canning, print finishing and packaging. Although a wide variety of materials can be conveyed, some of the most common include food items such as beans and nuts, bottles and cans, automotive components, scrap metal, pills and powders, wood and furniture and grain and animal feed. Many factors are important in the accurate selection of a conveyor system. It is important to know how the conveyor system will be used beforehand. Some individual areas that are helpful to consider are the required conveyor operations, such as transportation, accumulation and sorting, the material sizes, weights and shapes and where the loading and pickup points need to be.

II. IDENTIFICATION

- In industries the conveyors only used for material transporting & Packaging Department.
- During Material Handling the conveyor cannot stop.
- The Different operation cannot be carried out on it because of time duration and also speed, so we have to purchase a machine for particular operation like Pressing, Embossing etc.

III. CONCEPT GENERATION

Based on Product Design Specification concepts are generated using mind mapping tool.

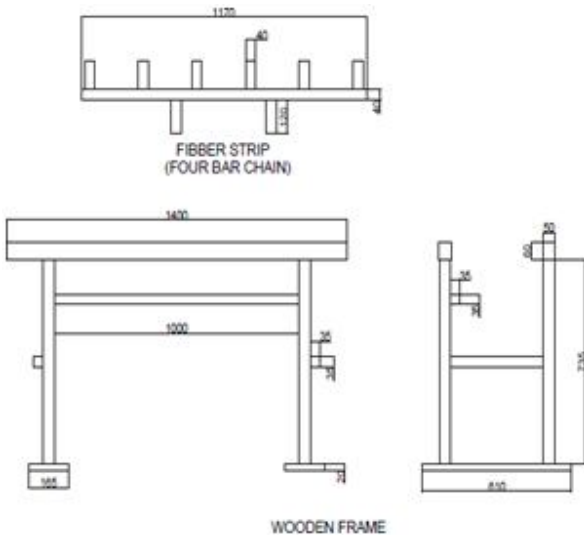
MIND MAPPING

Mind mapping technique is used to visualize various ideas. So this classification considered all the aspects for the concept design.

CONCEPT

The main criteria considered for this on to reduce the factory cost by some special arrangement of link mechanism in conveyor. There is Oscillating movement in our project, With the help of this mechanism we can stop the material or object during its path so that we can carry out the operation.

III. DIMENTIONAL VIEW OF BASIC DESIGN



(FIG- 1.BASIC DESIGN)

IV. DESIGN CALCULATION FOR MOTOR

$P = F \cdot V$

Where,

P= Power hp or watt 1hp = 746 watt

F= Force in N or KN

COMPONENTUSED

- FiberStrips.
- Motor
- WoodenFrame
- Nuts &Bolts
- Switch &Wire

1. FIBERSTRIPS



(FIG- 2.FIBER STRIPS)

The fibber is a light weight material compare to another material. The fibber is an easily available and it is strong than other light weight hard material. Fibber is made from resin material, fibber is made by, resin layers and adhesive, so it is shaped is different sizes and shapes.

2. MOTOR

100 RPM Side Shaft 37mm Diameter Compact DC Gear Motor is suitable for small robots / automation systems. It has sturdy construction with gear box built to handle stall torque produced by the motor. Drive shaft is supported from both sides with metal bushes. Motor runs smoothly from 4V to 12V and gives 100 RPM at 12V. Motor has 6mm diameter, 22mm length drive shaft with D shape for excellent coupling. (FIG- 1.BASIC DESIGN)

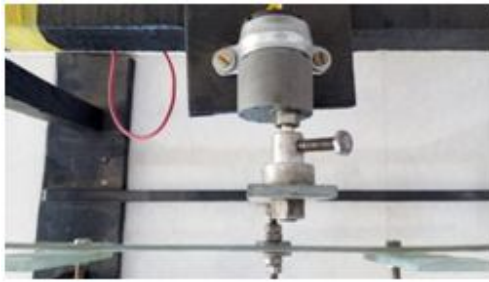


FIG- 3.MOTOR

SPECIFICATIONS

- RPM: 100 at12V
- Voltage: 4V to12V
- Stall torque: 10Kg-cm at stall current of1.3Amp.
- Shaft diameter:6mm
- Shaft length:22mm
- Gear assembly:Spur
- Motor weight:143gms

3. BUSH



(FIG- 4 BUSH)

The bush is used to connect spindle shaft to fiber strip. In our project the bush is made from aluminum round bar.

4. WOODENFRAME



(FIG- 5 WOODEN FRAME)

The wooden frame is a body of our project. the wooden frame is a easily assemble in our needed shape and it is provide a support for all component, and also the work piece or object is supported and guided by wooden frame, so the frame is very important member of our project. It consist a square shape and length, but in many area wooden frame consist an I-shape or T-shape etc.

5. NUTS ANDBOLTS

A nut is a type of fastener with a threaded hole. Nuts are almost always used opposite a mating bolt to fasten a stack of parts together. The two partners are kept together by a combination of their threads' friction, a slight stretch of the bolt, and compression of the parts. In applications where vibration or rotation may work a nut loose, various locking mechanisms may be employed: Adhesives, safety pins or lock wire, nylon inserts, or slightly oval-shaped threads. The most common shape is hexagonal, for similar reasons as the bolt head - 6 sides give a good granularity of angles for a tool to approach from (good in tight spots), but more (and smaller) corners would be vulnerable to being rounded off. It takes only 1/6th of a rotation to obtain the next side of the hexagon

and grip is optimal. However polygons with more than 6 sides do not.

6. SWITCH ANDWIRES

For communication of battery to the motor we used wire and switch when we on the switch the system is on and when we off the switch system is ideal.

V. FOUR BAR CHAIN MECHANISM

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.

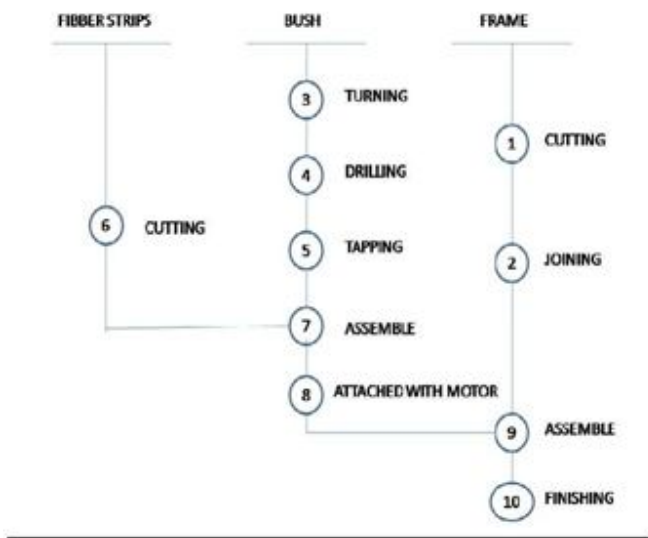
If the linkage has four hinged joints with axes angled to intersect in a single point, then the links move on concentricspheres and the assembly is called a spherical four-bar linkage. Bennett's linkage is a spatial four-bar linkage with hinged joints that have their axes angled in a particular way that makes the system movable.

VI. COMPONENT SPECIFICATION

(TABLE-1. SPECIFICATIONS)

Part Name	Length	Width	Thickness	Quantity
Fibber strip	1170mm	40mm	5mm	1
Fibber strip	110mm	40mm	5mm	6
Fibber strip	120mm	40mm	5mm	2
Bush	300mm	250mm		2
Wood	7350mm	50mm	50mm	4
Wood	1400mm	50mm	50mm	2
Wood	1400mm	35mm	35mm	1
Wood	300mm	35mm	35mm	2
Wood	610mm	165mm	20mm	2

VII. OUTLINE PROCESS CHART



(FIG- 6.OUTLINE PROCESS CHART)

WORK STUDY – SWOT ANALYSIS

STRENGTH:

- Low working cost
- all weather friendly
- batter space utilization
- reduce nonproductive time
- New concept
- less RPM motor is needed
- Only used in mass production
- dependent on electricity
- Demand in developed countries
- No need special machine
- No need special machine to manufacture it
- less skilled worker operate it
- Frame structure needed strong
- friction is high
- balancing of strips

APPLICATIONS

1. packaging department
2. material handling
3. stamping process
4. embossing process
5. inspection
6. Spray coating etc.

ADVANTAGES

1. Reduce Factory Cost
2. No need special purpose machine for operation.
3. Operation during material handling.
4. Better Space Utilization.
5. Easy to manufacture, no specialized machinery is required.
6. Easy to operate, so less skilled operator can be operate this machine.
7. Used to make FMS.
8. Less Time Consumption.

LIMITATION

1. This is use for only in mass production.
2. Once time only one type of material can transfer.
3. Highly dependent on electricity.
4. For more load fibber strips are bend.

ACTUAL PROTOTYPE



(FIG- 7.ACTUAL PROTOTYPE)

VIII. CONCLUSION

From above we can conclude that oscillating link conveyor is feasible. And this can change the concept of material handling in industries. In the world of today’s era we needed high productivity And Manufacturing capabilities. companies are needed economically suitable machines and systems to achieve high productivity.

To achieve high productivity they are needed automatic machines for maintain the quality of product. The special machines are so big in size very costly. With our project the oscillating link conveyor they can make FMS and also better space utilization in company with less cost.

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