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360 Degree Conveyor System

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ABSTRACT-

The 360-degree conveyor system is a state-of-the-art way to efficiently move products or things in a circular path that permits smooth movement in any direction. The key features and benefits of the 360-degree conveyor system are outlined in this abstract.

The 360-degree conveyor system offers a flexible and adaptable solution for numerous industries, including manufacturing, shipping, and warehousing. It consists of a circular conveyor belt or track that allows objects to be moved smoothly and continuously in a full loop without needing to reverse or move them. It is a crucial choice for modern production and logistics environments since it offers significant benefits across a wide range of sectors.

Key words – Motor, 360 Degree rotation, switch board, coupling, conveyor.

I. INTRODUCTION

A typical piece of mechanical handling machinery that transports materials from one place to another is a 360-degree conveyor system. Conveyors are very useful in applications where heavy or massive items need to be moved. A typical mechanical handling device that transports items from one place to another is a 360-degree conveyor system. Conveyors are particularly handy for conveying large or heavy things. Conveyor systems are quite common in the material handling and packaging industries because they enable the swift and effective transportation of a variety of commodities. Depending on the requirements of various sectors, a variety of conveying system types can be used. There are chain conveyors, screw conveyors, belt conveyors, and telescopic conveyors.

II. LITERATURE SURVEY

The following information is based on a thought analysis of the works of many authors and is revealed in this section of the literature study.

[1] Section under "STRUCTURAL AND DISCRETE ELEMENT ANALYSIS OF COAL MINE CONVEYOR SYSTEM".

In this article, we will investigate the relationships between the intended conveyor system for a coal miner's operation speed and the actual strains it faces. The paper's main objective is to show how the running speeds of the conveyor system have a substantial impact on the loads acting on the system and structure. The CAD model for the conveyor system was made.

[2] Comparative research on the most cost-effective belt conveyors for handling bulk materials, 21–24 August 2017.

Gabriel Fedorko examined the force ratios in the traditional belt conveyor belt in this study article. The most expensive component of the conveyor is the belt, and while it runs, the friction between the driving drum and the conveyor belt causes more power to be used, which raises the cost of the system. To solve this issue, he symmetrically dispersed the stress using analysis.

[3] Aniket Kherade, Amar Kolekar, Omkar Kumbhar, and Avinash Nadivale. The IJARSE published "A Review of Automatic Conveyor System" in March 2018.

This study report talks about the various automatic conveyor systems. In order to compare the automatic, semi-automatic, and manual material handling systems.

Objectives-

The objectives are

- Develop a simple model that can be transformed into a bigger project and also to understand the concepts involved in how a 360-degree conveyor system works and create a straightforward model that demonstrates how the system functions within the anticipated timeline and with the given resources

- However, we'll design the conveyor belt such that it has a 360-degree rotation and an up-and-down mechanism with a prototype.
- Design & development of 360° and up-down mechanism.
- Manufacturing of finalized design.
 - **360 Degree Conveyor System**

Overall Details about Main Parts:

[1] **DC motor** - An electrical device that transforms electrical energy into mechanical energy is an electric motor.

3 DC Motor are used for 3 different directions i.e., X direction, Y direction and Z direction.

For X direction the motor of 30rpm is used.

For Y direction the motor of 100 rpm is used

For Z direction the motor of 60 rpm is used



FIG – 3.1

[2] **Conveyor roller**- Conveyor roller is used to support and give direction to the leather belt.

Conveyor roller is made up of ABS material from 3D printing technology.



Fig – 3.2

[3] **Coupling** - A coupling is a mechanical component that joins two shafts at their ends, allowing rotational motion and torque to be transmitted between them. It is used to connect shaft to the motor.



Fig – 3.3

[4] **Bearing** – Deep groove ball bearing is used. Its specification is as 6301 deep groove ball bearing with inner diameter 8mm and outer diameter 15 mm.

And there are many other supporting accessories as of motor holder, nut bolts, screw, rods, wires, shaft, switch board.

It works in 3 directions

X direction rotation in circular motion (clock wise - anticlockwise)

Z direction vertically (up - down motion)

Y direction rolling of conveyor linearly in (left- right direction)

Working of X direction

As we press the switch the motor starts due to the power supply provided through the wires. The motor is held by the motor holder and motor holder is attached to the structure of rods on which conveyor system is mounted. Therefore, as the motor rotates the structure on which conveyor system is mounted attached by the linkage of motor holder rotates in circular motion completing 360-degree revolution. The motor of 30 rpm is used for the rotational moment.

Clockwise direction – As we press DPDT switch on switch board, the motor rotates in the clockwise direction due to which conveyor completes 360-degree rotation.

Anti clockwise – When we press switch motor shaft rotates in anticlockwise direction due to which conveyor system completes 360-degree rotation.

Working of Z direction

When we press the switch for the Z direction for up and down movement of conveyor for transferring the material. When the switch is pressed the motor for Z direction rotates the motor is connected to the structure by motor holder. To provide up and down movement of conveyor coupling is attached between shaft and the motor. As the coupling is used to transmit power from motor to shaft effectively. The motor of 60 rpm is used to sustain up and down movement of conveyor. It has medium load carrying capacity.

Upward direction

When we press switch for upward movement the motor rotates clockwise due to the power supply. As the motor shaft rotates it transmit power to the shaft through coupling which lifts the conveyor maximum up to 45 degrees.

Downward direction

When we press switch for downward movement the motor shaft rotates anticlockwise and transmit power to shaft due to which conveyor comes down vertically at any angle required.

Working of Y direction

Y direction is for conveyor belt changing the direction horizontally for transferring material in left right direction. The motor of 100 rpm is used for the purpose of inclination and rolling of conveyors.

For right direction

As we press switch for the right direction the motor rotates in clockwise direction due to power supply. As the motor connected to the conveyor roller also rolls and succeeds the conveyor belt in the right direction.

For left direction

When the switch is pressed for the left direction, the motor rotates anti clockwise and pulls the conveyor belt attached by the linkage of roller towards left direction.



Fig – 3.4

IV. CONCLUSION

The 360-degree conveyor system offers a wide range of advantages and prospects for use in a variety of industries, to sum up.

It is a flexible solution for improving efficiency, automation, and overall logistics operations because of its capacity to move objects in any direction, rotate products, and optimise material flow.

The automated warehouse, manufacturing, e-commerce, order fulfilment, food processing, airport baggage handling, retail and distribution centres, intralogistics, automated parking systems, event and entertainment business, and more are just a few areas where the system shows a lot of potential.

The possibilities of the conveyor system can be improved yet further by combining with robotics, artificial intelligence, and other cutting-edge technology.

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