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Research Article

MATERIAL HANDLING EQUIPMENT

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ABSTRACT

This paper gives idea about weight operated material handling device. Material handling is main operation in industry. Material handling involves transfer of jobs from one machine station to another storage and packaging. Weight operated material handling device has large load carrying capacity, less or no maintenance. This device has more reliability. This paper develops the problem of different types of material handling equipment in a typical material handling system. Spring operated material handling equipment has large load carrying capacity, easy maintenance and high reliability of operation. Material handling equipment is the media of transportation of material from one point to another in a commercial point or space. This material handling equipment paper is not only based on for material handling, it is not required external power i.e., electrical, it totally operate and depends on weight of material or job. Industrial material handling device are operate on electrical power but this device does not required electricity, it is operate on weight of job.

INTRODUCTION

Basically material handling equipment is used to the picking an object from one location and travel to it and place at another location without much power of man wasting. Material handling equipment is generally separated into four main categories: storage and handling equipment, engineered systems, industrial trucks, and bulk material handling. According to industrial review the power which has been utilized for production out of which 32 to 35% of power is only utilized for material handling during the production which is unnecessarily wasted and hence the total cost of final product will increases. So if we want to decrease the total cost as well as the unnecessary power consumption either we have to reduce material handling or try for alternative handling. As the first option has several limitations we are trying for alternative handling system so are stepping towards a concept of potential energy of material to be handled as every material has its potential energy in the form of its weight.

Material handling system is one of the basic components that complement the whole manufacturing operation. Material handling system basically refers to any equipment, activities and procedures related to the moving, storing, controlling and protecting of materials flow in a manufacturing system. It provides the manufacturing system with smooth material flow Without excess inline and outline inventory. The material handling system is categorized as non value added (NVA) activities which implying that the less material handling involved is the better. However it is impossible to totally eliminate the material handling activities in any manufacturing operation. Hence an efficient and effective material handling system is always the ultimate objective by many companies. Material handling operations involve raw material movements, subassemblies; work in process (WIP), tools, finished products, and other support materials from one point to another in the plant. Basically material handling equipment is used to the picking an object from one place and travel to it and place at another location without much power of man wasting.

A material handling equipment is separated into four main parts:-

1. Storage and Handling Equipment.
2. Engineered Systems.
3. Industrial Trucks.
4. Bulk Material Handling.

According to industrial review the power or electricity which has been utilized for production out of which 32 to 35% of power is only utilized for material handling during the product ion which is unnecessarily wasted and hence the total value of final product will increases. So if we want to decrease the total

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value as well as the unnecessary electricity consumption either we have to reduce material handling or try for alternative handling like that this concept.

METHODOLOGY

Step 1:- Identification of problem: In day-to-day life electrical energy have evolved as one of the most basic needs of human being. We know that for the material handling we need to more human effort and need of more electrical energy. Today we required material handling equipment should be cheap and challenge to safe. To reduce material handling cost so we choose material handling equipment for our project work.

Step 2:- Literature Survey: Various studies have been made in different industries to indicate that the cost of handling alone accounts for about 20-25% for the total manufacturing cost.

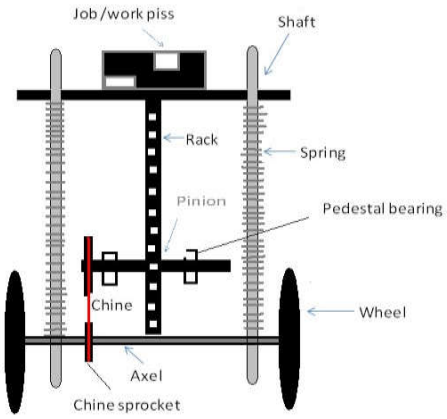
Step 3:- Design of Mechanical Part: This phase involves the design of various elements such as spring, shaft & gear.

Step 4:- Software Modeling: Detailed drawing using AUTO-cad software, creo software ANSYS software. Designed part is drawing using AUTO-cad.

Step 5:- Fabrication: All the designed elements are manufactured in the workshop such as frame, shaft as per design and also select the part as per specification for e.g. rack and pinion, support rod chain and sprocket etc. Upper frame, lower frame, cross bar are manufacturing in workshop

Step 6:- Assembly: All the manufactured and selected parts are assembled together.

Construction



1. ***Base Plate: -*** These plates are mounted on frame with help of two supporters. On this plate we are mounting the wt.
2. ***Rack-***After weight mounting rack is operated down ward direction,
3. ***Pinion:-***after rack operated down ward direction pinion get rotary motion here we get rotary motion..
4. ***Spur Gear-*** spur gear is rotating machine part which is used to change speed and torque of the system. Set of spur gear is used to change the speed of the device.
5. ***Wheels-*** wheels are used to allow rolling motion of the device.
6. ***Main Frame*** – main frame is supporting structure. Which support whole assembly which is mounted on wheel axle.
7. ***Chain& Sprocket Mechanism:-*** these mechanism is connected 1st shaft to wheel shaft using chain sprocket. Chain and sprocket is transmitting medium of rotary motion. This allows transmission of motion between gear boxes to wheel axle of the device.
8. ***Spring-:-*** compression coil spring is used to retract the upper table of the device.

Working

At the initial stage the base plate is at upper most position. The vehicle is at first station from where the object is to be carried. As soon as when an object is placed on the upper plate properly as the upper plate is sliding in nature it starts to travel downward. As the rack is attached to the upper plate it also moves down ward which further rotates to pinion. The pinion and sprocket of chain drive is mounted on the same shaft that is why the sprocket is also rotate at the same speed of pinion. Further motion is transmitted to wheel with the help of chain and sprocket drive. Likewise the vehicle is transports object from one place to another place.

The return motion of the vehicle is achieved by the help of Cross bar tension spring mechanism. When an object is picked up from the upper plate it try to move upward because of tension spring mechanism. The same mechanism will operate in reverse direction i.e., the Rack will move in up word direction that is why the pinion were rotate in opposite direction that motion is further transferred to the wheels with the help of chain drive hence the wheel is rotates in opposite direction and the vehicle comes to its original position.

Advantages

- Unobstructed movement.
- Flexibility.
- No power is required.
- Lower investment.
- Labor cost is minimum.
- Maintenance is easy.
- A system is easy to interface with other system.

Applications

- Storage and Distribution System.
- Assembly line operation.
- Flexible Manufacturing Systems.
- Miscellaneous Application.

CONCLUSION

- It works on the self-weight of job or object which has to be transfer from one machine station to other machine station without consumption of any type of fuel or electricity.
- Hence this equipment is best suitable alternative for existing material handling equipment.

By the use of this type of equipment we reduce the energy consumption which also helpful for overall cost reduction. The most important thing we conserving our energy sources which are much useful in future growth and development.

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