International Journal of Advance Research in Science and Engineering
Volume No.07, Special Issue No.07, March 2018
www.ijarse.com
IJARSE
ISSN: 2319-8354

Weight operated material handling device

KalpeshBorse[1], JasmeenShaikh[2], GayatriPawar[3],Mr. M.K.Holkar[4]

[1,2,3,4]*Department Of Mechanical Engineering, Guru Gobind Singh Polytechnic, Nashik, (India)*

ABSTRACT

Material handling equipment is the media of transportation of material from one location to another in a commercial space. Weight operated material handling equipment has huge load carrying capacity, large covering area simplified design, easy maintenance and high reliability of operation. This paper is mainly based on for material handling, it not required external power i.e., electricity. On account of this, a machine and its physical description is covered here.

Keywords: Less Cost, Less Maintains, Material Handling, No Power Required.

I.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.

II.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.

Stock & Lambert told Materials handling makes production flow possible, whereas Groover highlights that despite its importance, materials handling is a topic that frequently is treated superficially by the companies and Chopra & Meindl told it gives dynamism to static elements such as materials, products, equipment's, layout and human resources. All the following thoughts are expressed in the year 2001.

III.METHOLOGY

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 material handling we need more human effort and need of more electrical energy. Today we required material handling equipment which should be cheap and challenge to safe. To reduce material handling cost we choose material handling equipment for our project work.

Step 2:- Design of Mechanical Part: This phase involves the design of various elements such as spring, shaft & gear.

Step 3:- Software Modelling: Detailed drawing using AUTO-CAD software, CREO. Designed part is drawing using AUTO-CAD.

Step 4:- 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, are manufacturing in workshop.

Step 5:- Assembly: All the manufactured and selected parts are assembled together.

IV.CONSTRUCTION

- Following are the part names:

a) Base plate
b) Main frame
c) Rack & pinion mechanism
d) Supporting rod.
e) Chain & sprocket drive
f) Helical tension spring.
g) Shaft.
h) Wheels.
i) Bearing

M.Drawing of equipment

The main frame is joined by the process of welding.

- After that the Rack is connected to upper plate with the help of welding.
- It is aligned by the corner ruling plate.
- Then Rack is guided by the supporting rod with the help of bush.
- Pinion is mounted on the shaft which is horizontal.
- On the same shaft of pinion a chain & sprocket drive is also mounted which further transmit motion to wheel.
- After assembling the Rack & pinion the next step is to mount a return mechanism.
- Ball bearing are fitted for ease in sliding and for minimum friction between rails and bar end.
- On the bars helical tension spring are mounted.

V.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 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.

VI.ADVANTAGES

- Reduction in damage of material during storage and movement
- Reduction in human efforts while material handling.
- Elimination of electricity.
- Increase efficiency and salability of plant
- It saves the time during material handling.
- Capital cost is low.

VII.DISADVANTAGES

- Travelling distance limited by length of rack.
- For limited weight there is limited travelling of device.
- If damaged then there will be increase in down time.

VIII.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.

IX.FUTURE SCOPE

We can provide braking system and turning arrangement for better efficiency of device.

X.ACKNOWLEDGMENT

It is our utmost duty and desire to express acknowledgment to the various torch bearers, who have rendered valuable guidance during the preparation of our project. First of all, we extend our deepest gratitude to our revered Prof. M. K. Holkar for guiding us at every step in the project. He has most honestly guided us throughout; never living us unanswered for any of our doubts. It was his constant persuasion, encouragement, inspiration, and able guidance that helped us in completing our project successfully.

REFERENCES

[1.] http://www.mechanicalengineeringblog.com/tag/material-handling-advantages-and-disadvantages/

[2.] https://www.cmh-inc.com/advantages-disadvantages-automated-material-handling-systems/

[3.] https://www.slideshare.net/mehulomgupta/material-handling-industry

[4.] Workshop technology (volume- 1) by HazraChoudhari.

[5.] Workshop technology (volume-2) by HazraChoudhari