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Weight Operated Material Handling Device

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ABSTRACT: In the field of technology, everyday a new technique is launched. It has its own characteristics due to which we have to adopt it. Today is the world of new technology which we have to take in practice. Material handling equipment is one of the areas of development. This Material Handling Equipment is widely used in mechanical field. No matter what you're moving online, the material handling machine can help to make the job earlier, more efficient and reduce the margin for error, saving your business thousands of rupees each year. In the industrial assembly processes, the "WEIGHT OPERATED MATERIAL HANDLING DEVICE" has the unique capabilities to carry away the load which is loaded on it at one work station to the another work station on the same floor, at a definite distance. It does not require may kind of power supply as it works on its own weight of the load.

I. INTRODUCTION

Effective sequence and scheduling of the material handling times may not match with machine processing times. The solution of this scheduling problem may be computationally infeasible in a machine which serves the material handling requirement within a manufacturing cell. In the past, the focus in the field of material handling machine has been precised but now a days, controllability of machine is increasing. But it is gaining importance one in the research community. This has led to a new set of goals for this new kind of machine. Of course, one of the important goals remains the development of usual artifacts but it is no longer the major one, more important is on increased understanding.

The above stated problem can be solved using the MECHANICAL CRANE. These MECHANICAL CRANE's primarily focus on safety, as the height is less of lifted load is less from the ground level. This machine helps in reducing the processing time at the workplace. This is used to move, disengage parts or tools from a location or to transfer parts from one location to another location compared to overhead machine.

II. OBJECTIVES

- To Make Self-weight acting material handling MACHINES Which are working on the weight of the material to be carried.
- They do not require any kind of fuel or electric current for travelling from one place to another place.
- More over it should be portable & easy to handle, from one place to another place.
- We are tried to make such devise which minimizes monotonous & fatigue work on the shop floor, on straight path.

III. LITERATURE SURVEY

Carlos E. Villanueva Cano Sadek A. Alfaro et al. [1] studied that Object-oriented modeling provides a new point of view to focus a flexible manufacturing system using organized model similar to the Flexible Manufacturing

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Cell (FMC) presented in this paper which composed by Flexible Manufacture Modules (FMMs) and an automated guided vehicle (AGV). The implemented FMC working with revolution specimens, with predetermined measures length, are composed mainly by the following FMMs: CNC, micrometer, robot, storage system and a mobile robot that works as an AGV. The AGV, as central part in this paper, is also composed by ultrasonic, infrared and tactile sensors, which, through properly implemented and organized algorithms permit an optimum navigation. The mobile robot navigation is based mainly by a Vision System which consists in the CCD camera recognition of lines and landmarks properly arranged in the FMC. The supervision and material handling are the main function of AGV inside of the FMC. In order to the mobile robot acquire a similar behaviour of a Material-Handling System should develop operation characteristics similar to it (capacity, load, discharge, point of load, point of discharge, busy time, etc.), behaviours that relates navigation functions (recognition by vision and sensors, selection of velocities, times, etc.) and AGV functions (position, direction, turns, etc).

Vivek Kumar, R. N MallRajneesh& Kumar Singh et al. given one of the essential workings of the manufacturing system is its Material Handling Systems. I would like to first learn the diverse types of material handling systems that are at present in utilize. Then, we shall pick a common type of Material Handling system, a forklift truck, and look the same in formation of how to go in relation to design a forklift system for a factory. Numerical equation will developed to the process of vehicle-based material handling system. Equipment used in such includes industrial truck, automated.

R. A. Gujar et al. [2] presents the paper on Design of the shaft at fatigue loading & various formulas. In this paper, shaft employed in an inertia .Considering the system, forces ,torque acting on a shaft is used to calculate the stresses induced. Stress analysis also carried out by using FEA and the result are comparing with the calculated values. Shaft is having varying cross section due this concentration is occurred at the stepped , keyways, shoulder, sharp corners etc. caused fatigue failure of shaft. So calculated stress concentration factor is calculated.

NTN Bearing unit (Handbook) contains The NTN bearing unit is a combination of a radial ball bearing, seal, and a housing of high-grade cast iron or pressed steel, which comes in various shapes. The outer surface of the bearing and the internal surface of the housing are spherical, so that the unit is self aligning. The inside construction of the ball bearing for the unit is such that steel balls and retainers of the same type as in series 62 and 63 of the NTN deep groove ball bearing are used. A duplex seal consisting of a combination of an oil proof synthetic rubber seal and a slinger, unique to NTN, is provided on both sides.

IV. PROPOSE SYSTEM

Since, core part of our project is Rack & pinion hence at first development stage we decided to Design rack & pinion then Helical spring & bearing selection. A Rack and pinion gear system is composed of two gears. The normal helical gear is the pinion gear and the straight helical gear is the rack. The rack has teeth cut into it and they mesh the teeth of the pinion gear. Rack and pinion gear provides a greater feedback and steering sensation.

A Good deal of time and effort is often expended in moving material one place to another this handling is costly and adds nothing to the value of product. During manual handling of material, there are many chances to occur accident, which waste the time as well as money of the manufacturing firm or industry. Therefore in order to move material by most appropriate method and equipment at the lowest possible cost and regard safety the material-handling device are introduced.

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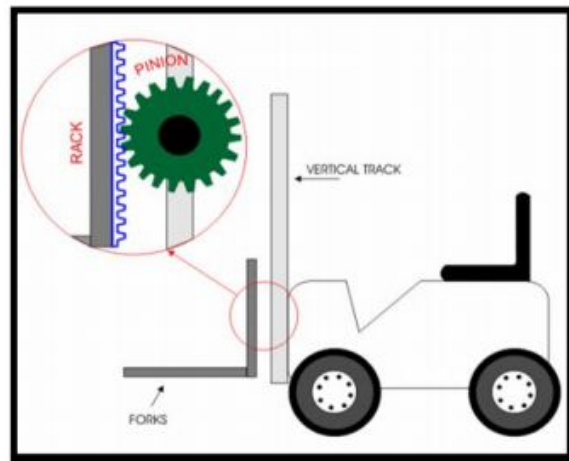


Fig. 1 System diagram

In order to propel dead weight type automatic guided vehicle, we have treated rack and pinion mechanism to conventional AGVs. In order to acquire self-propelled motion to the material handling conventional AGVs by utilizing rack and pinion motion transfer. In this type of mechanism, we have used rack and pinion type gear. Rack and pinion type gear is connected to platform, two springs are connected to opposite sides of the platform so it will act as power-saving units. When dead weight is kept in the platform, the platform moves in the downward direction so there exists a chain drive, it is subjected to lower portion (front or rear axle of the vehicle). When gravitational force is applied on the platform and then the platform moves in the downward direction. When weight is removed from the platform, the vehicle moves in the backward direction without application of external force.

V. OBSERVATION

- Link to an adjacent work station
- Position loads around or under obstruction
- Application requires consistent, effortless movement in a work cell
- Ball bearing provide for unsurpassed ease of movement

VI. ADVANTAGES

- It is easy to lift the load without any accidents.
- Labor cost decreases because it doesn't require a labor for operating it
- Cost is less as compared to other machines
- Dead weight operated
- Self-actuating
- Gravitational force Assisting Mechanism.
- Use of battery, Processor, Computer program is avoided
- No need of external energy
- Better Mechanical advantage
- Simple in construction

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VII. DISADVANTAGES

- Working efficiency is less because of mechanical components, compared to hydraulic system.
- Wear of gear is possible.

VIII. CONCLUSION

At this stage we can predict that our project will provide good break through to repetitive monotonous material handling. Also we need to concentrate on gear box design in order to get more propelling distance.

IX. FUTURE SCOPE

The machine is constructed for main objective of minimizing the energy consumption & increasing the flexibility in the premises of small scale industries. There are many areas for improvement & modification. Some of the improvements that can be implemented are as follows:

- This machine is fully mechanically operated so the functioning of machine can be advanced by using combination of mechanical & electronic component.
- Motions can be made accurate by using limit switches.
- If gear locking mechanism is used desired distance can be achieved though the distance is less than design one.
- By using gear reduction technique maximum distance can be covered by same load.
- Rail tracks can be made in use to give desired direction to machine.
- By varying the stiffness of the spring loads can also be varied.

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