

“FABRICATION OF VERTICAL MATERIAL HANDLING EQUIPMENT”

Manan Mehta¹, Roshan Patel², Vishal Patel³, Smit Patel⁴

Department of Mechanical Engineering, Babaria Institute of Technology, Vadodara, India

Abstract - Our project is simply definition of the VERTICAL LADDER for the material handling. We were inspired by the merry go round in the ESSEL WORLD, Bombay and we finally decided to implicate the merry go round concept in the vertical format for the new invention in the real world. Our project will have 10 drawers operated by the chain and sprocket arrangement technology. We chose only chain and sprocket arrangement in our project because chain is an only single arrangement which gives zero error in the synchronization. The power required to move the chain and sprocket arrangement will be provided by 12 Volt DC supply using the DC motor. When electrical supply is available the project will run on the regular supply 220 Volt and in absence of the electric supply or during the breakdown it will work on the rechargeable battery attached.

Key Words: Vertical alignment, Drawer system, Chain and sprocket, Chain Drive, Rechargeable Battery, Electrical Supply, Solar Power usage.

1. INTRODUCTION

In this project work selection we surveyed many online sites (namely google.com, sciencedirect.com etc...), practical study in technical books and we had practical visit to the industries like Apollo Tyres, Shopping Malls like 7seas mall, and hotels like Rajputana Hotel. After practically visiting all the needed places and counseling with the concern person of the industry they told us about their problem of DRAWER. This was because of the bulky variety products and time needed in drawing them. They needed some new arrangements for the accumulation of these bulky and variety of the products and also optimum time management for drawing them. We try to solve the up listing problem of ACCUMULATION and TIME MANAGEMENT through our project.

1.1 Application

- ✓ Small scale and light industries
- ✓ Hospitals
- ✓ Banks
- ✓ Hotels
- ✓ Household like kitchens and store rooms

1.2 Advantages

- ✓ Minimum floor space required in industry
- ✓ Maximum time and money saving concept
- ✓ Pollution free and less noisy system
- ✓ Battery supported when electricity shut down. So 24 hours working.

2. METHODOLOGY AND SETUP

This project is based on Vertical Split Type Drawer system. It simply works like Vertical Drawer conveyor system. In project, Frame is fabricated by M.S. (Mild Steel) angle and Drawer made by Silicon Acrylic Material. This project comprises of ten drawer facility and involves up & down working by chain sprocket assembly. Potential Power is provided by DC Motor and DC source like Input Supply supported on AC/DC source. Considering the recent technological development on increasing usage of renewable energy sources, this project have additional implement by solar panel for renewable source. Also provide rotation by using ball bearings (6506) at upper and bottom driver shaft and use of gear box for slip less operation.

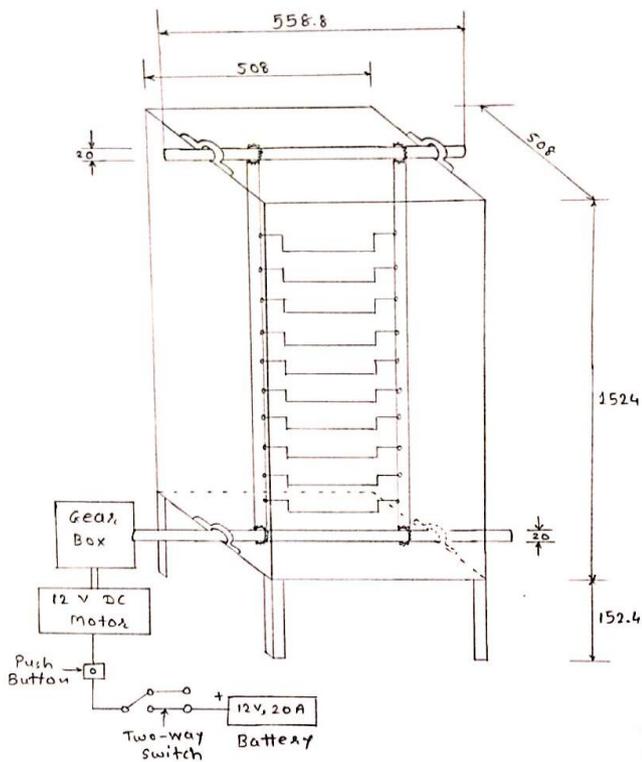


Fig -1: Detailed line diagram of our project (in mm)

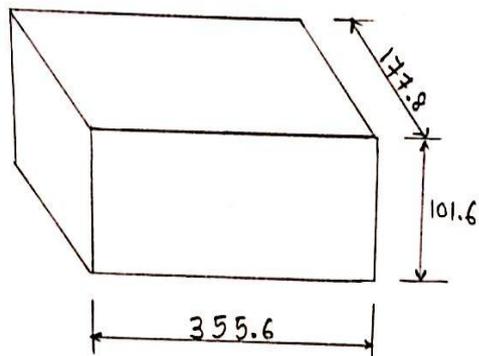


Fig -2: Sketch of Drawer (in mm)

2.1 Disagreements

Plastic Storage Cart with Drawers:



Fig -3: Plastic Storage Cart with Drawers

Accessibility only up to limited height.

Time consumption is more for higher vertical height of cart.

Effect of temperature on plastic and limited load capacity.

Filing cabinet having vertically extensible drawers:

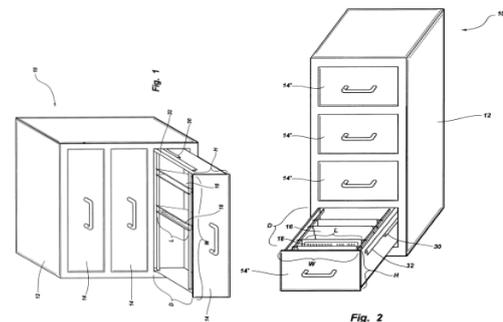


Fig -4: Filing cabinet with vertical extensible drawers

The location of desired files require much time.

File may be wear and tear resulting from the slip down of folders.

Vertical Lift Conveyor using belt drive:

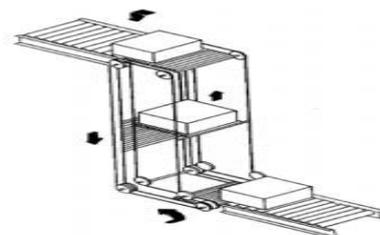


Fig -5: vertical lift conveyor with belt drive

Loss of much useful floor space as result of the presence of necessary support for belt conveyor.

Because of cycle time required for input and output as well as lifting and lowering movements, such a conveyor is only used for smaller capacities.

3. CONCLUSIONS

This project is AC/DC supported operating system with rechargeable battery so when electricity shut down then also machine operates by solar panel through which battery can be charged with renewable source and money saving concepts. Vertical attachment is provided so maximum facility used with time saving concept also.

ACKNOWLEDGEMENT

It is indeed a great pleasure and proud privilege for the group members to present the final year project. The purpose of the project was to showcase the talent among the students studying in final year of Mechanical Engineering to solve the industrial problems and experience the working environment of the industry. The group members pay their profound gratefulness and express their indebtedness to the academic guide Mr. Vyomesh R. Buch for their support and guidance to successfully complete the project within the time duration. Lastly, we would thank God and our parents for their support without which it would not be possible to complete our project.

REFERENCES

- [1] http://www.ise.ncsu.edu/kay/Material_Handling_Equipment.pdf
- [2] R.S. Khurmi, J.K. Gupta. Theory of Machines.14th ed. New Delhi: Eurasia Publishing House (Pvt.) Limited, 2005
- [3] V.B. Bhandari. Design of Machine Elements.3rd ed.New Delhi: McGraw Hill Education (India) Private Limited, 2010
- [4] The Vertical Transportation Handbook. 3rd ed. John Wiley & Sons, INC.

BIOGRAPHIES

GUIDE: VYOMESH R BUCH
Assistant Professor,
BABARIA INSTITUTE OF TECHNOLOGY



Manan Mehta is currently pursuing his bachelor's in Mechanical Engineering from Babaria Institute of Technology, Gujarat, India. His areas of interest lie in machine design and modifications and corresponding study.



Roshan Patel is currently pursuing his bachelor's in Mechanical Engineering from Babaria Institute of Technology, Gujarat, India. His areas of interest lie in Production and modifications and corresponding study.



Vishal Patel is currently pursuing his bachelor's in Mechanical Engineering from Babaria Institute of Technology, Gujarat, India. His areas of interest lie in Thermal and RAC and corresponding study.



Smit Patel is currently pursuing his bachelor's in Mechanical Engineering from Babaria Institute of Technology, Gujarat, India. His areas of interest lie in Industrial Safety and Management Engineering and corresponding study.