

# MATERIAL HANDLING

Material Handling involves piling ,loading, unloading and transporting parts or raw materials from one place to another place in the plant. It also involves handling of finished products from stores to shop ,one shop to another shop , one machine to another machine.

It is handling of raw materials , semi finished good, and finished products mechanically or manually through the production areas as well as the storing areas.

## Factors to be considered in materials handling problems:

- Nature of materials and products to be handled.
- Production process
- Equipment
- Construction of building
- Existing material handling equipment
- Production planning and control
- Packing of finished products
- Economical factor

- Nature of materials and products to be handled.

The state of raw materials i.e. solid ,liquid ,gaseous ,its size, shape, weight and quantity governs the type of material handling equipment.
- Production process

Production process, sequence of operations, quantities of materials decides the designs of material handling systems.
- Equipment

Equipment should be selected such that it should be able to handle the maximum output.
- Construction of building

Types of building, strength of floors , door locations , and size, ceiling height, roof strength , stair columns are considered in material handling determination.

- Existing material handling equipment  
The effectiveness of existing material is evaluated , and if found necessary, some additional equipment are provided or necessary changes are made in existing equipment.
- Packing of finished products  
The finished products are packed in wooden box, cardboard ,cartoon etc. the packing of these products should be of suitable size , so that they can be handled conveniently.

- **Economical factor**

For economic analysis ,cost of handling equipment ,operating costs ,repair and maintenance cost ,taxes and insurance are considered for selection of prospective equipment. An economical material handling equipment is one whose cost of handling per unit weight for a particular movement is minimum.

**Economy in material handling can be achieved by-**

- ✓ Employing gravity feed movement
- ✓ Minimizing distance of travel
- ✓ Using such System in which the product from machines directly falls over the material handling equipment .
- ✓ A proper inspection, repair and maintenance.

# Functions and Principles of Material Handling System

- To minimize the material handling as far as possible by
  - Process changes
  - Layout changes
  - Increased size of unit handled
  - Using proper equipment
- Reduction in time: can be achieved by
  - Reducing waiting time by proper scheduling
  - Using proper labour in organized way
  - Reducing loading and unloading time by using proper mechanical equipment
  - By proper routing or through selection of shortest routes.

- Use of Gravity Principle
- Safety : Safe , Standard , efficient , effective flexible material equipment should be used.
- Use the containers , pellets(makeshift bed) , drums etc. to reduce the cost of handling a damage of material in transit.
- The standby facility should be made
- Repair maintenance and proper checking at regular interval should be made.
- The material handling services should not interfere with the production line.
- There should be flexibility in necessary changes of the system.

# Material Handling Equipment

These are used for transporting and handling the material in industries .

Function of Material Handling Equipment:

1. To reduce the total handling time
2. To promote easier , safer and cleaner handling
3. To eliminate the idle times of workers and machines
4. Faster movement of materials
5. To decrease fatigue of the workers



# Types of Material Handling Devices

## ❖ Lifting and lowering devices

- Block and Tackle
- Hand and power winches
- Hoists
- Elevators
- Pillar crane
- Overhead crane

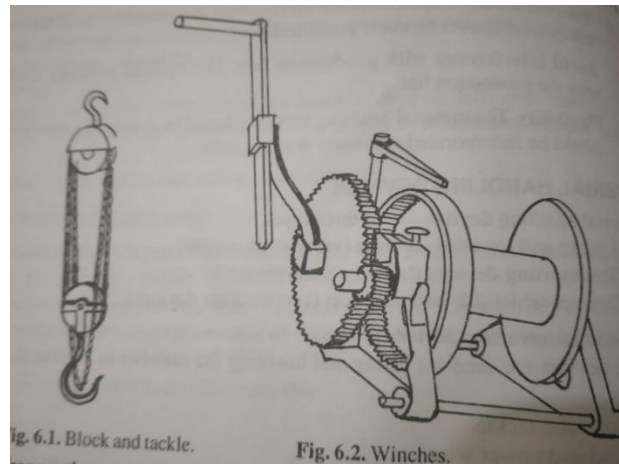
## ❖ Transporting devices

- Wheel barrows
- Hand and power trucks
- Industrial narrow railways
- Tractors and trailers
- Pipe lines
- Pumps
- Aerial tram ways

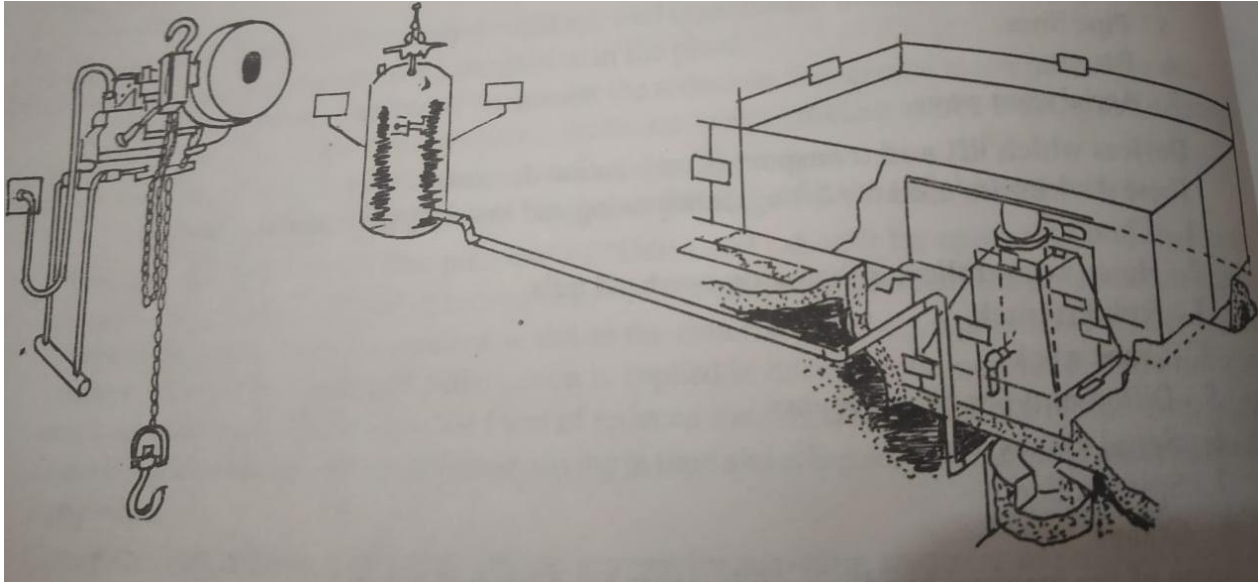
## ❖ Combination devices

- Chutes
- Hoists with trolleys running on overhead rails
- Fork lift trucks
- Crane trucks
- Different types of conveyors
- Spiral chutes
- Spiral rollers
- Cranes

## BLOCK AND TACKLE AND WINCHES



# Power Hoist and Elevators



# Pillar Crane and Overhead Bridge Crane

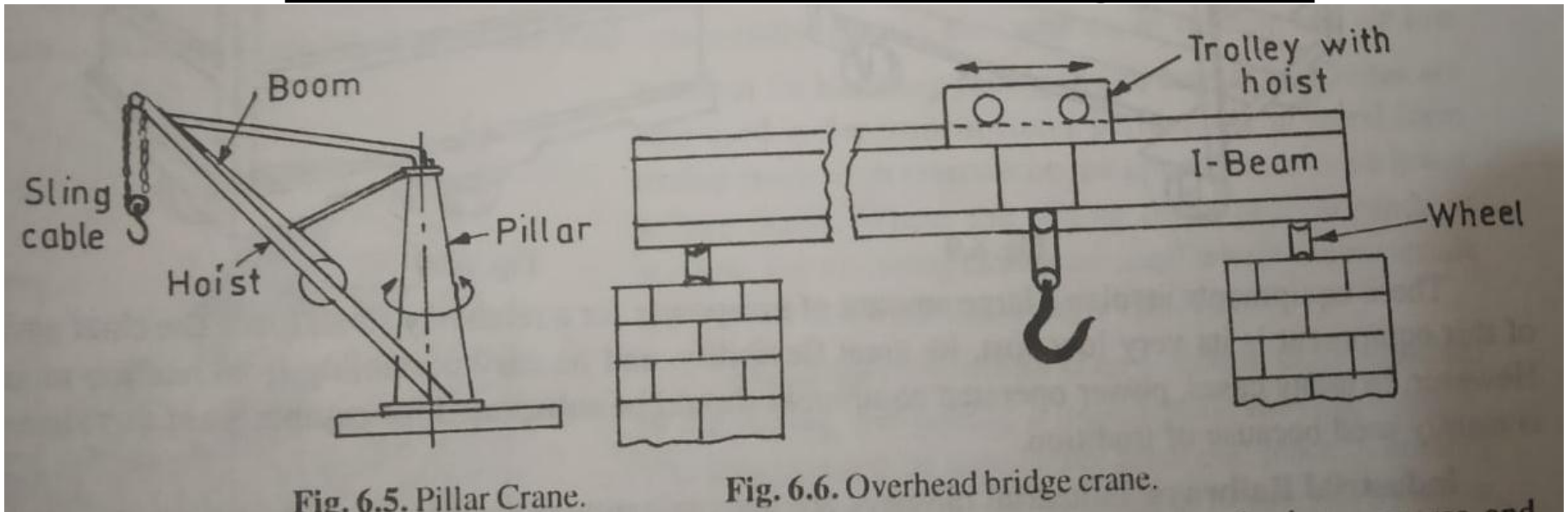


Fig. 6.5. Pillar Crane.

Fig. 6.6. Overhead bridge crane.

# Jib Crane and Gantry Crane

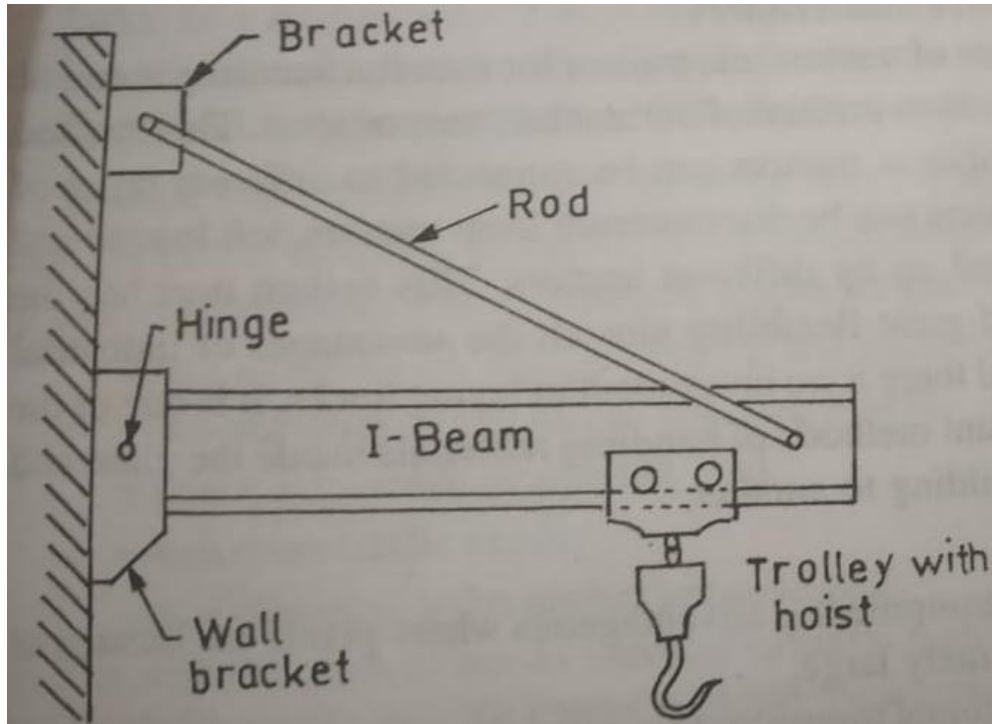


Fig. 6.7. Jib Crane.

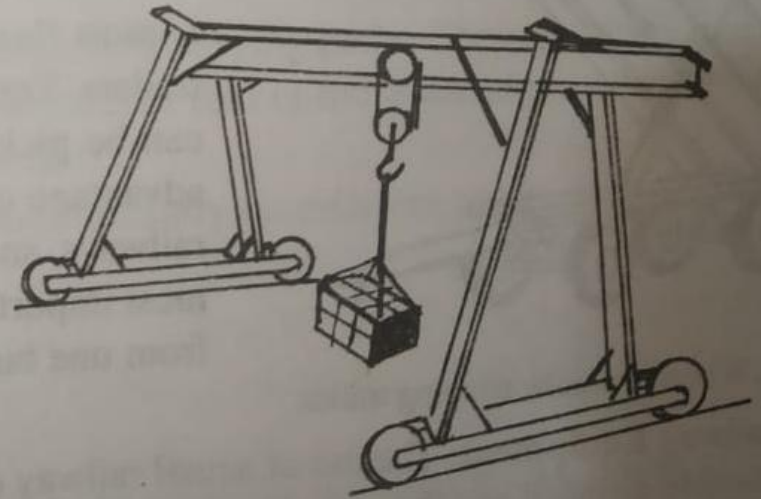


Fig. 6.8. Gantry Crane.

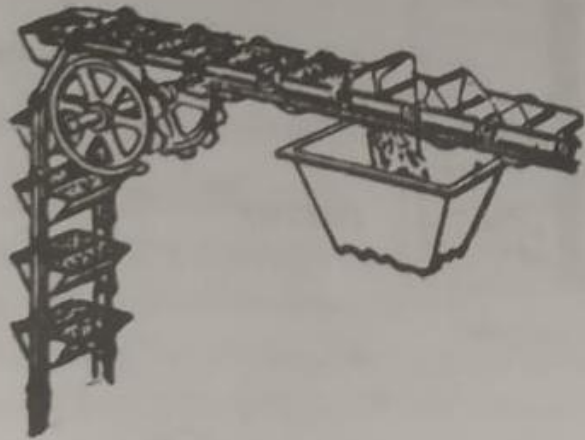


Fig. 25.29. Pivoted bucket conveyor.

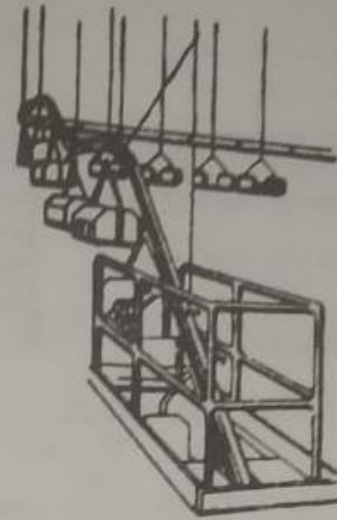


Fig. 25.30. Trolley conveyor.



Fig. 25.31. Spiral chute.

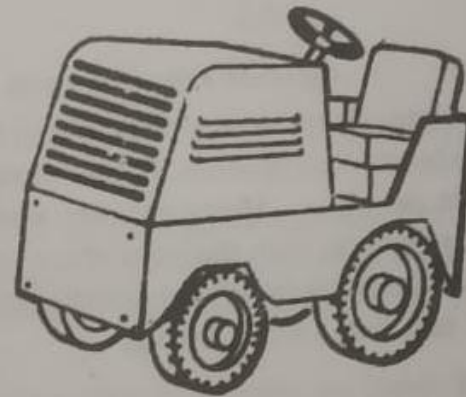


Fig. 25.32. Industrial tractor.

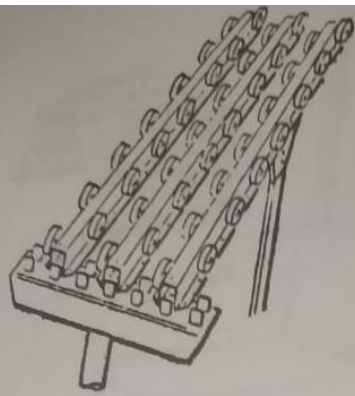


Fig. 25.24. Wheel conveyor.

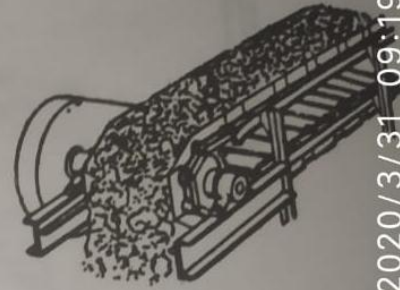


Fig. 25.25. Apron conveyor.

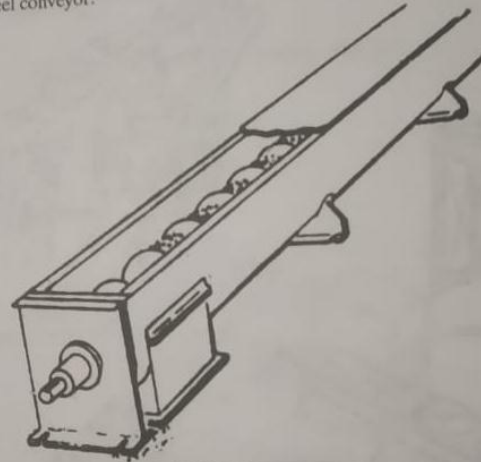


Fig. 25.26. Screw conveyor.



Fig. 25.27. Pusher bar conveyor.

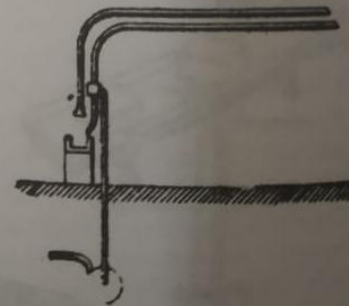


Fig. 25.28. Pneumatic conveyor.

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# Spiral Chutes

