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## *Preface*

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As a part of the mechanical engineering course ME-481, Textile Technology, students enrolled for this course are required to visit a textile industry in order to gather some practical knowledge about what was learnt in the theoretical classes. This year the visit was held in *Rahmat Textile Mills, Gazipur*. This report starts by an overview of Textile industry in Bangladesh. Then it provides general information about Rahmat Textile Mill, including its capacity, production rate, raw materials used, manpower involved etc., as well as some technical informations, which includes processes used for production, machineries used for production, simple schematic description of those machines, power management of the factory etc. Other than these, there were many mechanical plants, for example: air conditioning plant, involved in assistance of the total production process. Information regarding those are tried to be given here. Some pictures taken during the visit is also included in the report for the shake of clarity. It is impossible to depict the whole details of the processes used in the factory, as the tour was only for one day duration. In spite of some limitations, highest possible effort has been utilized, to provide a neat depiction of the total production process. Thanks must go to the course teacher *M. Zakir Hossain*, Lecturer, Mechanical Engineering Department, BUET, for his continuous effort and passion towards the developement of textile practice in BUET.

# *The Current Position of the Textile Industry in Bangladesh*

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Textiles have been an extremely important part of Bangladesh's economy for a very long time for a number of reasons. The textile industry is concerned with meeting the demand for clothing, which is a basic necessity of life. It is an industry that is more labor intensive than any other in Bangladesh, and thus plays a critical role in providing employment for people. Currently, the textile industry accounts for 45% of all industrial employment in the country and contributes 5% of the total national income.

Today, the textile industry of Bangladesh can be divided into the three main categories: the public sector, handloom sector, and the organized private sector. Each of these sectors has its advantages and disadvantages. Currently, the organized private sector dominates, and is also expanding at the fastest rate.

## Public Sector

The public sector is that portion of the industry controlled by organizations that are part of the government. The factories in the public sector enjoy certain privileges such as government funding. However, in Bangladesh, factories in the public sector are not well supervised. There are frequent changes in officers, and many of these officials do not have a personal interest in the factory for which they are responsible. In addition, the equipment in this sector is not well maintained, as much of the money allocated for this purpose is not spent as planned, but is wasted through corruption and poor accounting.

## Handloom Sector

The rural group of textile producers includes operators of handlooms and a number of organizations which employ rural women, such as BRAC, or the Bangladesh Rural Advancement Committee. The Handloom industry provides employment for a large segment of the population of Bangladesh. The industry also supplies a large portion of the fabric required by the local market. Factories in this sector are usually well looked after by the owners and are quite productive, considering the equipment available. However, the inferiority of their machinery, mostly due to their narrow width, means that the fabric production is slow, and usually falls short of the quality needed for export.

## Private Sector

The most productive of the three categories is the private sector. This, as the term suggests, is made up of those factories owned by companies or entrepreneurs. Since the owners of such factories are directly affected by their performance, they take an active part in planning, decision making, and management. Most of these factories also have machinery that is superior to those in the two other sectors because the owners are well aware of the connection between their equipment and their profits.

## The 2005 Challenge

In the year 2005, some of the international policies regarding the export of textiles and garments will change, which may present the Bangladeshi textile industry the greatest challenges it has had to face so far. There is much speculation at present about the situation of the RMG (Ready Made Garment) exporters in the post-MFA (Multi-Fiber Arrangements) period, when the World Trade Organization, or WTO, instead of GATT (General Agreement on Tariff and Trade) will control the sector. Under the WTO all quotas will be removed, resulting in a free market worldwide.

Bangladesh's garment and textile manufacturers will have to face steep competition from countries such as India, Pakistan, China, and Thailand, from whom the country now imports fabric to meet the demands of its RMG sector. When the WTO free market is established, all these countries will be able to expand their RMG exports, now limited by quotas. As a result, these countries will be able to utilize more of their locally produced yarn and fabrics internally, resulting in the rise of prices for these in the export market, putting pressure on the industries of countries such as Bangladesh.

# Factory Layout

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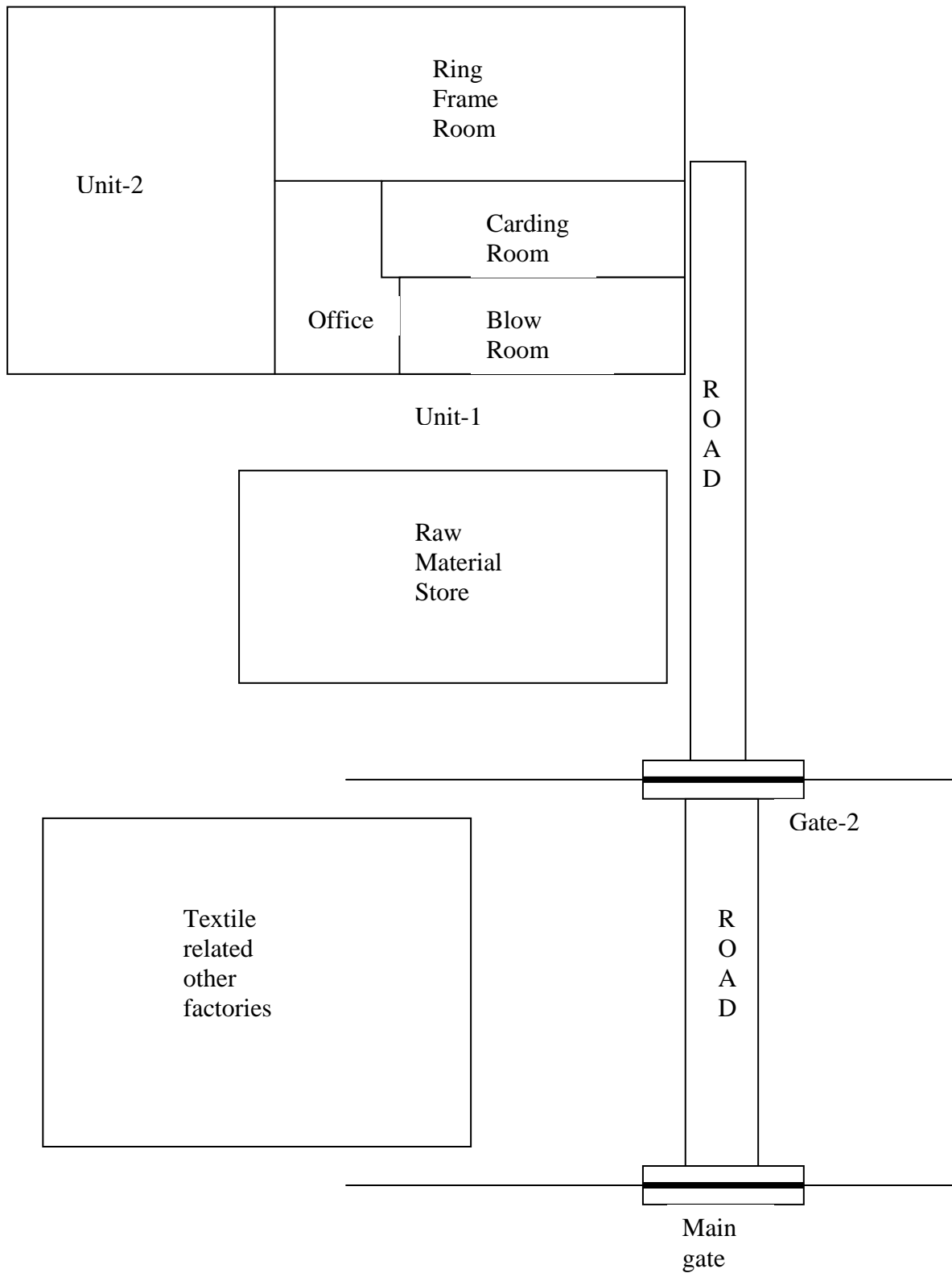


Fig: FACTORY LAYOUT

# Process Layout

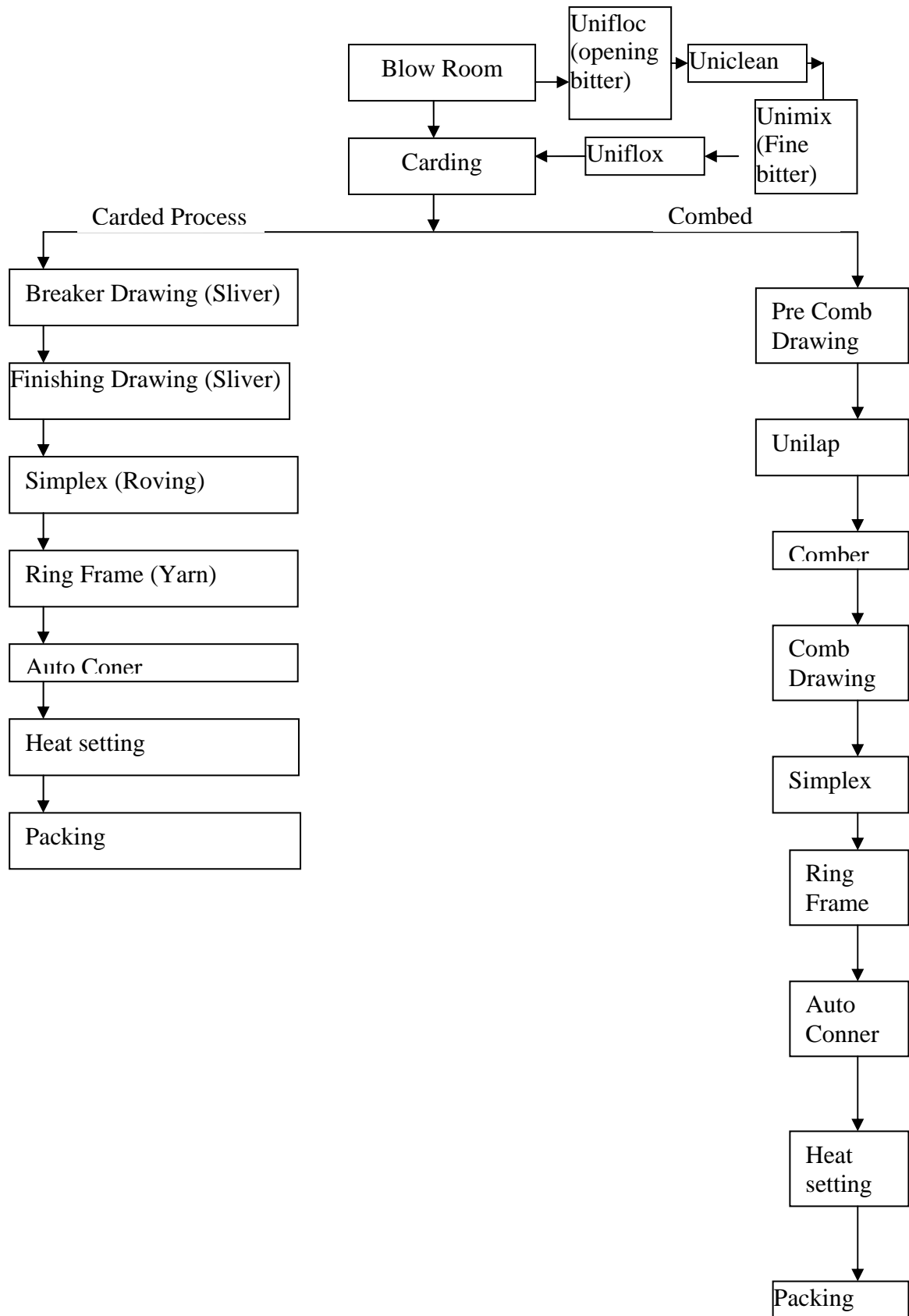


Fig: Process followed by the industry for manufacturing Yarn

# *Technical Overview*

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## Number of units:

There are two units:

1. Local unit
2. Export unit.

## Machines Used:

- a) Blow room:
  1. RIETER UNIFLOC A11  
Suction velocity: 14 m/min.
  2. RIETER UNIFLEX B60  
With 6 chambers and suit fit are given.
- b) Carding room:
  1. Carding machine: RIETER C-51  
Production rate: 60 kg/hour.
  2. Breaker drawing Machine: RIETER SB-D10  
Capacity: 700 m/min.
- c) Simplex Machine:

TOYOTA FL100  
Flyer revolution: 1050 rpm  
Delivery Speed: 21.9 m/min
- d) Ring Frame:

JINGWEI  
Japan.
- e) Auto Conner:

Specification: Type: RM, 12 bar, 61 A, 50 Hz  
Made in: Germany
- f) Yarn Conditioning Plant:

Specification: Capacity: 1200 Kg/hr  
Country of origin: India.

## Sources of bale:

Bales used by the industry are imported from Holland, Russia, USA.

## Power:

As the power source gas generators are used.  
No. of gas generators: 4  
Capacity: 950kw each.  
3 shift duty.  
No co-generation is implemented.

## Humidity:

The humidity maintained at various parts of the factory are as follows.

Blow room and carding room: 54% to 55%

Ring room: 55% to 56%

## Total Production of the factory:

The total production of the factory is about 1050 Kg/day. The efficiency of various processes are:

Carding : 96% to 97%

Drawing : 85%

Ring : 94% to 95%

Finishing : 82%

## Air Conditioning Plant:

Not much information regarding this plant was obtained. No chillers are used here.

## Quality Control Management:

Here in this industry the Quality Control is managed in every step of the production process. The speciality of its management is that in every stage of production every lot is being checked. Even in case of purchasing bales of cotton every bale is being checked.

## Description of different Processes:

### BLOW ROOM:

There are four machines for blending, opening, and cleaning.

### **UNIFLOC:**

- The compressed mass of raw fiber is removed from the bales.
- Fine particles of metals are detected in the metal detector.
- Opening is necessary to lessen hard lumps of fiber & disentangle them
- Blending is necessary so as to obtain uniformity of the fiber.

### UNICLEAN:

- Removes trash such as dirt, leaves, burs & any remaining seeds
- Prepare the fiber for spinning into yarn

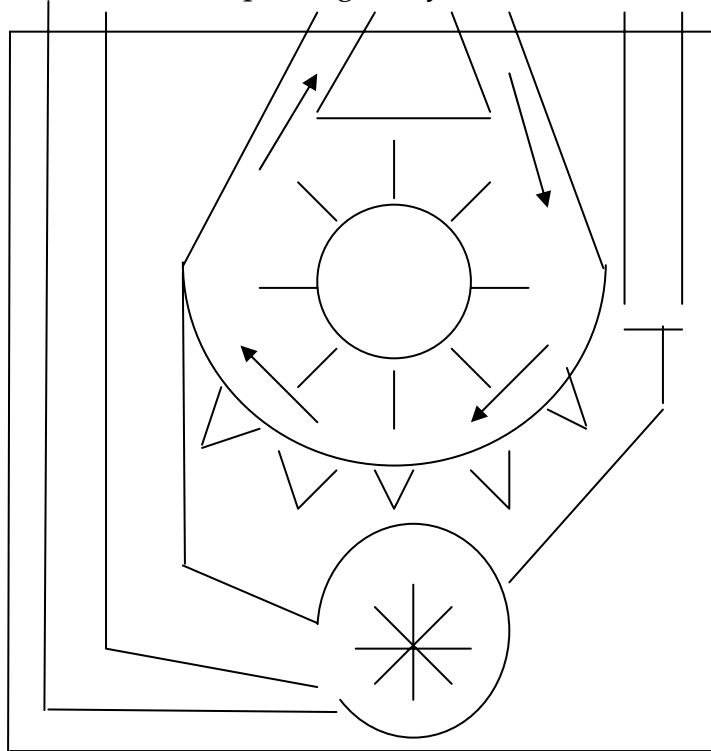


Fig: Cleaning process

### UNIMIX:

- Fibers of different staple length are mixed here.
- Mixing is mainly done to reduce the cost.
- Fibers come in six lanes then mixed by betting.

### UNIFLEX:

- Fine betting is done
- Waste product are separated
- Waste id not used but sold

### CARDING:

- Initial process of arranging the fiber in a parallel fashion is known as carding, and is done on a carding machine.
- The lap is passed through a beater section and drawn on a rapidly revolving cylinder covered with very fine hooks or wire brushes.
- A moving belt of wire brushes slowly moves concentrically above this cylinder.
- As the cylinder rotates, the cotton is pulled by the cylinder through the small gap under the brushes.
- The teasing action removes the remaining trash, disentangles the fibers, and arranges them in a relatively parallel manner in the form of a thin web.
- This web is drawn through a funnel-shaped device that molds it into a round rope like mass called card sliver.

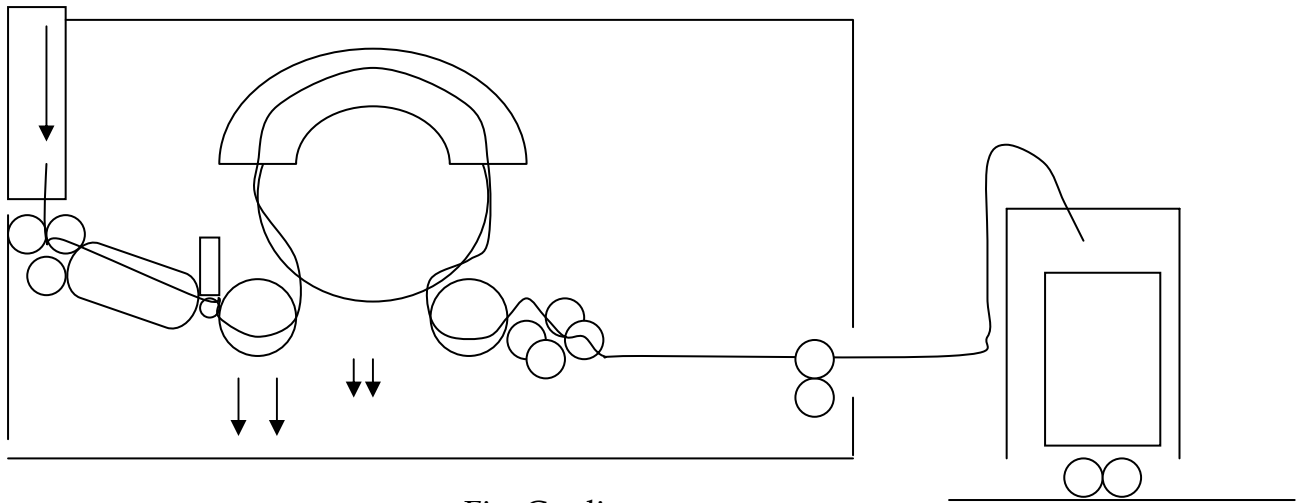
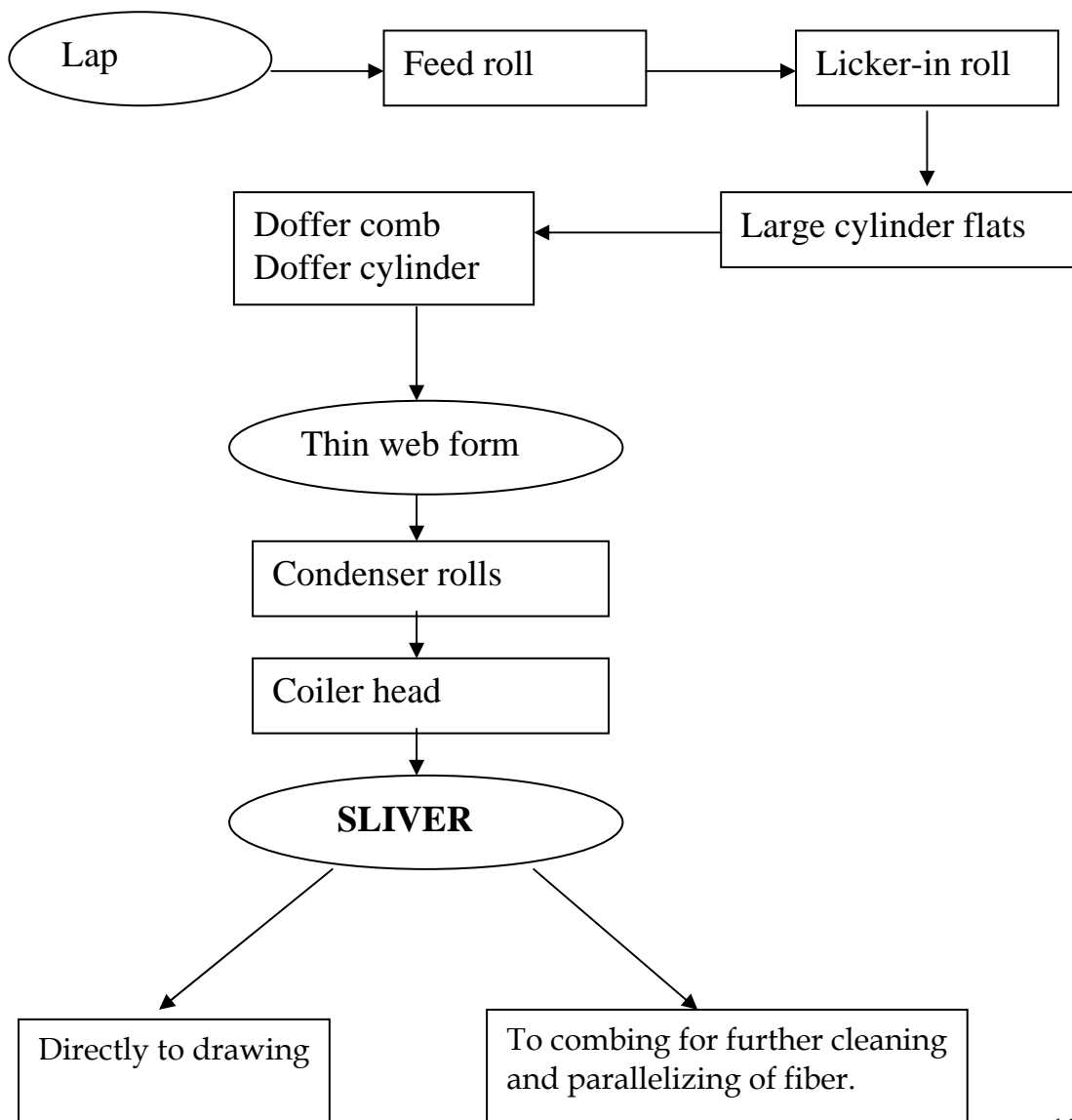


Fig: Carding

CARDING FLOW CHART:



## CARDED PROCESS:

## BREAKER DRAWING:

- Combines several slivers
- Eliminates irregularities that would cause too much variations if slivers were put through singly.
- Slivers passed through several pairs of rollers, each advanced set of rollers, revolves at a progressively faster speed.
- This action pulls the staple lengthwise over each other, thereby produces longer & thinner slivers.

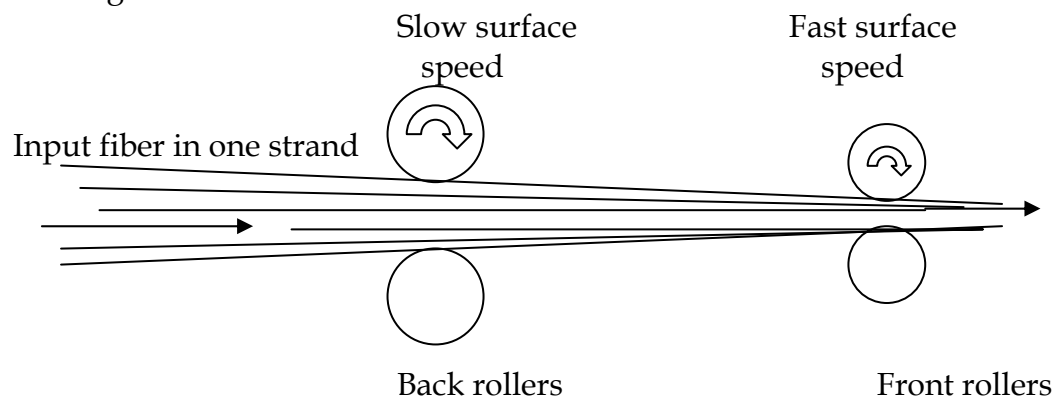


Fig: Drawing

## FINISHER DRAWING (auto leveling):

To measure the sliver thickness variations and then continuously to alter the draft accordingly so that more draft is applied to thick places, and less to thin places with the result that the sliver delivery is less irregular than it otherwise would have been.

Besides an improvement in production appearance, it also contribute to,

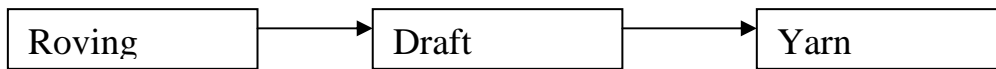
- Better productive efficiency
- Fewer end-breakage in subsequent processes
- Less waste, and
- Constant process conditions.

## SIMPLEX:

- After several drawing operations the fiber passes through simplex and the output is roving.
- Slight twist is given.
- The diameter is reduced.
- Gain some tensile strength.

## RING FRAME:

Roving is fed in ring frame and the output is yarn.



## AUTO CONER:

- The yarns are further winded on cone from the ring frame.
- Only the good quality product passes.

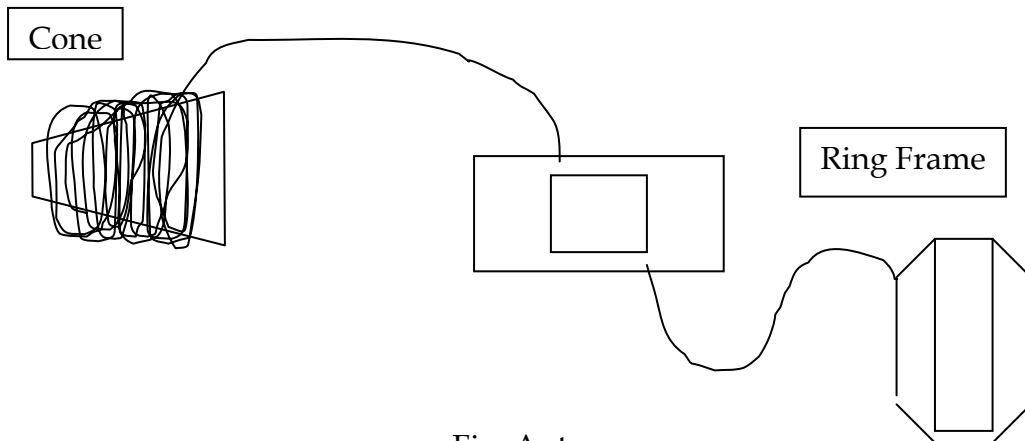


Fig: Auto coner

## HEAT SETTING:

- To make the twist permanent steam is passed through the yarn.
- Moisture is absorbed in the yarn.
- During dyeing more uniform performance is achieved.
- The steam is supplied from yarn conditioning plant.

## PACKING:

Finally the yarn is ready to export or weaving.

## COMBED PROCESS:

Combed process is different by two additional process, those are

- Unilap
- Comber

### **UNILAP:**

After carding the sliver is turned into lap form in unilap machine.

### **COMBING:**

- Combed sliver produces a smoother & more even yarn.
- Short fiber called noils are combed out & completely separated from longer fibers.
- Operations eliminates as much as 25% of the original card sliver, thus almost  $\frac{1}{4}$  of the raw cotton becomes waste.
- Produces consumer's goods with better quality.
- Long staple yarns produces stronger, smoother, more serviceable fabrics.

# Organogram of The Company

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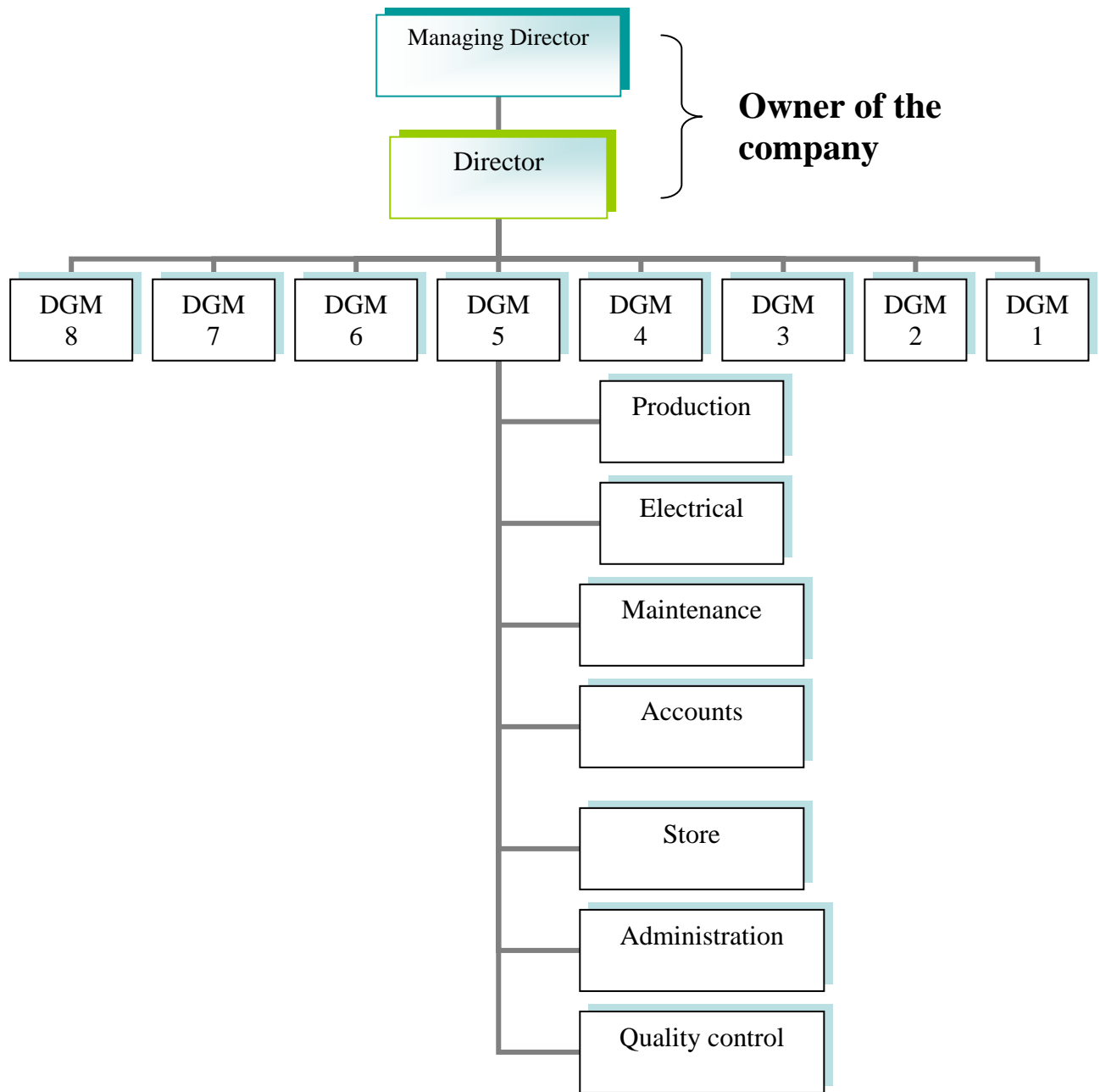


Fig: Organization Chart of the factory

## *Some Snap Shots of The Factory*











