

# Design, Fabrication and Experimentation on Automatic Feeding Mechanism for Mini Cotton Carding Machine

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## ABSTRACT

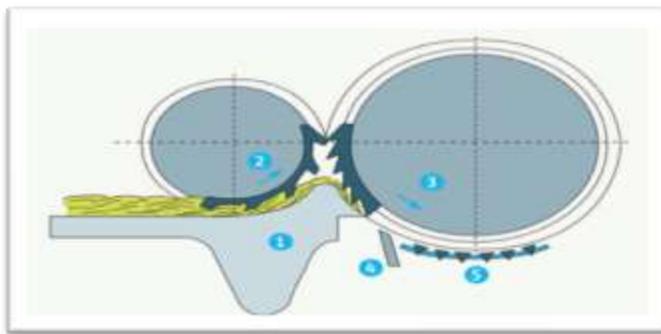
*It is well known that the effectiveness of the feeding system of a textile machine has remarkable effects on its performances. Therefore, when talking about card, correct feeding is vital. Feeding Machine is provided for automatically and sequentially supplying of cotton. Feeding process is nothing but a conveyor system through which ginned cotton is passed through the rolling system with uniform speed and with specific density of cotton. The ginned cotton, before get feed in to the carding machine it is getting transferred in to lap form by passing it through the rolling pairs which is then feed in to the carding machine.*

**Keywords:** Feeding, ginned

## 1. INTRODUCTION

**Carding** is a mechanical process that disentangles, cleans and intermixes fibers to produce a continuous web or sliver suitable for subsequent processing. This is achieved by passing the fibers between differentially moving surfaces covered with card clothing. It breaks up locks and unorganized clumps of fiber and then aligns the individual fibers to be parallel with each other. In preparing wool fibre for spinning, carding is the step that comes after teasing.

The word is derived from the Latin *carduus* meaning thistle or teasel, as dried vegetable teasels were first used to comb the raw wool. These ordered fibers can then be passed on to other processes that are specific to the desired end use of the fiber: Cotton, batting, felt, woolen or worsted yarn, etc. Carding can also be used to create blends of different fibers or different colors. When blending, the carding process combines the different fibers into a homogeneous mix. Commercial cards also have rollers and systems designed to remove some vegetable matter contaminants from the wool different colors. When blending, the carding process combines the different fibers into a homogeneous mix. Commercial cards also have rollers and systems designed to remove some vegetable matter contaminants from the wool.



1. feed plate
2. feed roller
3. Licker-in
4. Deflector nose
5. Knives

## 2. LITERATURE REVIEW

The exhaustive literature review has been carried out on feeding mechanism. The contribution of various researchers is presented below.

Since 1888, **Trützschler** stands for competence in fiber preparation. Our customers benefit from this continuously growing experience. Changing market trends, new technologies, economic crises - we have accepted these challenges and grown through the experience. This also enables us to manage current tasks better and more specifically. Today, the company is led by the two Managing Partners Heinrich Trützschler and Dr.-Ing. Michael Schürenkrämer, representing the fourth generation. The Managing Directors Dr. Dirk Burger, Andreas Ebenhöf and Dr. Ralf Napiwotzki are responsible for the operational activities. They use the Trützschler know-how accumulated over 125 years to continue the success story.

**Rieter** is the world's leading supplier of systems for short-staple fiber spinning. Based in Winterthur (Switzerland), the company develops and manufactures machinery, systems and components used to convert natural and manmade fibers and their blends into yarns. Rieter is the only supplier worldwide to cover spinning preparation processes as well as all four end spinning processes currently established on the market. With 15 manufacturing locations in nine countries, the company employs a global workforce of some 5 022, about 20% of whom are based in Switzerland. Rieter has developed a “unidirectional feed system” where the two feed devices (feed roller and feed plate) are oppositely arranged when compared with the conventional system. i.e. the cylinder is located below and the plate is pressed against the cylinder by spring force. Owing to the direction of feed roller, the fibre batt runs downwards without diversion directly into the teeth of the taker-in (licker-in) which results in gentle fibre treatment. This helps to reduce faults in the yarn.

## 3. PROPOSED DESIGN

- \* The Machine is can be studied by dividing it in to three processing units.
  - 1) Pre Processing
  - 2) Processing
  - 3) Post Processing

- Pre Processing:-

The preprocessing unit consisting two conveyor systems ,

- 1) Linked with hopper
- 2) Linked with vibrator system

- Pre Processing:-

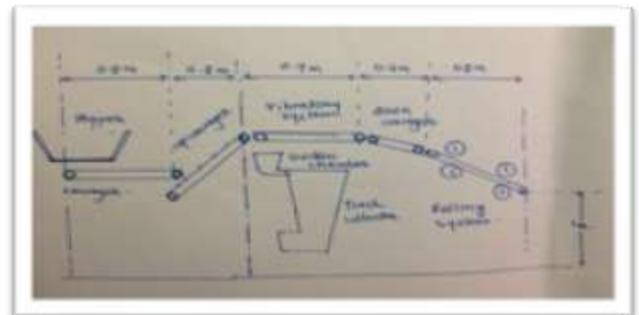
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- Processing Unit :-

The processing unit consisting,

- 1) Vibratory system with trash collector
- 2) Conveyor system with suction chamber
- 3) Rolling System



### Views of Indian Mills :

The only reservation that seem to have is that its introduction in the processing line may result in high yarn count variations. This should not be so since C.F system has gained good acceptance in all the textile mills in advanced countries.

### Feed Merits:

- Direct automatic feed to card increases B/R working efficiency.

- Elimination of Man power during scutcher operation.
- Processing of rejected lap is avoided.
- Due to loose form of feeding of fibres trash particles can be removed easily during carding.
- Suitable for synthetic fibres of bulky in nature, avoiding

#### **Advantages of flock feeding or chute feed system :**

- The automatic continuous feed directly linked to the blow room eliminates the lap formation. This increases the working efficiency of the blow room.
- The main power requirement in doffing the lap, weighing, transportation to card and feeding at the card is eliminated.
- The processing of rejected laps in the blow room is avoided.
- The fibres are fed to the card in loose sheet form as against compressed form so that trash particles can be easily extracted from fibres by the carding action.
- Excessive sliver irregularities due to the lap licking during high humidity, double lap feeding, lap splitting, lap piecing etc, are eliminated.
- When compared to lap fed, there is a reduction of 1 % CV flock feeding card sliver.
- Crushing of foreign materials seed bits and other trash particles during calendering and difficulty of removing a subsequent processes is reduced.

#### **Disadvantages or limitations of chute feed system :**

- Blow room should run the same number of hours per week as the cards do.
- The card production must be kept excessive to assure continuous feed to drawframe at the time of stoppages at blow room due to maintenance and other unavoidable problems.
- Chute feed system control short term variation but not the medium and long term variations.
- A reliable check on the nominal count can be established in lap forming system by controlling total lap weight and C.V. value of the weight per unit length. There is no such control in the chute feeding system.
- Change of mixing will result in more waste in chute feed.

Apparatus is provided for automatically and sequentially supplying uncared wool to a plurality of carding machines, each of said carding machines having a gate effective to divert the wool from a moving conveyor to the individual machine. A control system is provided to actuate the conveyor, and includes photocell arrangements at each machine for detecting a filled condition thereof, which photocells actuate the adjacent gate eliminating further diversion into that particular machine. The control system incorporates further provision for accommodating "leftover" wool on the conveyor by diverting it to a number of machines at the end of the conveyor, which machines accept the "leftovers" sequentially as they are filled in an upstream direction of the conveyor. Override provisions are included in the control system for manually controlling the gates of said machines for feeding selected ones as desired.

#### **Lint conveyor system**

We are a coveted organization that is engaged in manufacturing and supplying superior quality Cotton Lint Belt Conveyor. Offered range of conveyors is manufactured at our multifaceted infrastructure facility employing advanced technology and latest machines. This lint belt conveyor is used to convey seed cotton efficiently to a destination place.

#### **Features:**

- High operational fluency
- Impeccable performance
- Negligible maintenance

#### **Other-Details:**

- Robust & Heavy Duty body to avoid Vibration & improve life
- Skirting to avoid & Spillage of lint

- Diamond Cut Driver Roller to avoid Slippage
- Spatial Design lint try suitable to any Machine
- Very Low Power Consumption
- Very Simple Maintenance

#### **Card Auto-leveling System:**

The mass uniformity of the card sliver is an essential criterion for good subsequent processing. The main objective of an autoleveller is 1) to measure sliver thickness variation on real-time basis, and 2) to alter the machine draft so that a high consistent sliver thickness is continuously produced. In general, autolevelling systems may be divided into two main types: a) Open-loop autolevellers b) Closed-loop autolevellers. The open-loop system may generally be used for correction of short-term variations. The input material variation is measured using a measurement unit. The measured signal is then compared to a reference signal (nominal value). The difference between signals is determined by a control unit, which sends a signal to a draft control unit indicating the necessary action to be taken. In open-loop system, there is no check on delivered sliver. In other words the changes in draft are solely based on the mass variation in the input material. In the closed-loop system, is generally used for correcting long-term variation. In this case, the measurement is made on delivered sliver. In other words, the closed loop autoleveller.

#### **4.CONCLUSION**

From the findings and shortcomings of literature study it is concluded that it is essential to design such a mechanism which would help to feed the ginned cotton properly in the lap form. Hence it is decided to design incorporates the lap formation and feeds it in to the inlet of minicarding machine.

I would like show my sincere thanks to my guide **PROF. U.D. GULHANE** professor, Mechanical department, B.D.C.O.E for his continuous guidance and his valuable suggestion.

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