

## REVIEW PAPER ON DESIGN & DEVELOPMENT OF ROTOBAR GIN ROLL HANDLING ARRANGEMENT

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### 1. Abstract

The Design and development of Rotobar Gin Roll Handling Arrangement is planned essentially to securely place and travel as well as handle gin roll of Rotobar feeder machine to ground. The Design and development of Rotobar Gin Roll Handling arrangement is likewise having arrangement to add Hydraulic actuator with hand driven power plan option for making the work simple. It is beneficial over the customary strategies in which gin rolls put on ground with any wooden or metal part support joined to it. The connection and evacuation interaction of gin roll was additionally undeniably challenging. The details on the plan and drawings adjust to endorse fitting norms. This plan and improvement of such kind of gin roll arrangement is expected in each ginning machine plant to securely place and eliminate as well as handle gin roll of Rotobar feeder machine securely, effortlessly of voyaging. Such kind of roll taking care of gin roll. It will become one of the good modernization/improvement of different activities in the cotton ginning and cotton seed handling machines.

Keywords: Rotobar, Gin Roll Handling Arrangement, Hydraulic actuator, Rotobar, roll handling.

### 2. INTRODUCTION

The cotton ginning's main job is to clean the seed cotton, gin the lint, and produce a bale. Short buildup, also known as linters, covers the cotton seed after it is separated from the long cotton strands in the ginning mechanism. This brief buildup is simply referred to as buildup in the following. Similar rules are being chipped away at by the Rotobar gin and the roller gin. It is designed to provide more buildup per machine each hour and includes an alternating blender bar as opposed to a swinging one. Due to the rotational motion, the turning blade vibrates less and produces more than the responsive blade, which did nothing during backstroke. The fixed blade, rotating blade, and ginning roller are the three main components of a turning blade roller gin stand. The Rotobar Gin's most important and expensive component is the ginning roller. Thirteen layers of simple woven cotton textures are cemented with an elastic compound to create the roller covering material. The main component of the machine used to remove buildup from cotton and provide clean action is the gin roll. When the gin roll is taken out of the Rotobar feeding machine, there is no expansion device or other option for holding to it. This increases the likelihood that the ginning roll will result in damage. Additionally, because the gin roll weighs close to 500 kg, it is exceedingly challenging to carry it once it has been taken out of the machine. Because of this, a lot of rework is necessary, and to move this gin roll, overhanging cranes or forklifts are needed. In order to withdraw the gin roll from the machine securely and conveniently, a gin roll handling equipment was therefore absolutely necessary.

### 3. SET OF PROCEDURES PLANNED FOR THIS PROJECT

It is important to comprehend the company's actual needs and expectations. Additionally, it must identify any current system issues in real time and document any necessary improvements. The best design may be created with the resources, space, and money that are available. The holding system's various components should be constructed to withstand the highest load conditions. CAD software require for analysis of all components and it will use for all initial drawing related activities . To finish the procedure, CAD model production and project simulation are planned. Basic understandings of the machine working and roll importance for the project work. One of the greatest devices for the ginning industry is the rotobar gin machine. Making the machine function more smoothly is necessary for the convenience of operation. There are several pieces to this mechanism. Rotobar feeder is in the upper portion, and gin is in the lower section. One of the key components of the machine that is required for proper operation and must have a very long working life is the gin roller, as seen in the figure. To make machine operation simple and precise, it should be simple to attach and detach from the machine. Monitoring the Performance of the equipment and its troubleshooting is highly crucial.

### 4. LITRATURE REVIEWS

#### [I] Development of Pedal Driven Cotton Ginning Machine

Cotton is the world's most widely used textile fiber. Thus the quality of cotton is extremely critical for successful critical for successful textile processing. The quality of baled cotton depends on many factors including variety, weather conditions, harvesting and storage practices, moisture, trash contents and ginning processes. The problem in ginning of cotton in India is that while separating lint from seed the ginning machine damages the cotton fiber as well as seed because of out-dated local machinery. In this research our aim is to modify the existing ginning mechanism with emphasis on the design and development in saw gin blade to improve the spinning

Characteristics of lint cotton. Ginning machines are widely useful in rural areas where there is problem of power or electricity or use of electricity is unaffordable. The present research aims to develop human powered pedal operated ginning machine with low cost, which will facilitate the rural areas.

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#### [II] Optimization and Performance Evaluation of Feeder for Ginning Machine: A Review

Cotton fibers must be separated from the seed (ginned) before they can be used to manufacture textile goods. The first machine to gin cotton was the "Churka"gin was the most efficient when handling naked seeded varieties with loosely attached fibers. Early American settlers found that the fuzzy seeded varieties that yielded best in this country were difficult to gin on a roller gin. Consequently, the fiber was generally pulled from the seed by hand until Eli Whitney patented his gin in 1794.

The primary function of a feeder is to feed seed cotton uniformly to the gin stand at controllable rates. Seed cotton cleaning is a secondary function. Feed rollers, located at the top of the extractor feeder and directly under the distributor hopper, control the feed rate of seed cotton to the gin stand. The feed roller is powered by variable speed motors controlled manually or automatically by various interlocking systems with the gin stand. Irregular feeding of lint through the feeder to ginning machine, it decreases the production rate of seed and fiber. It also affects the quality of the fiber and seed. To overcome these errors, different analysis method will used .

The function of the gin is to separate lint from gin to create two marketable products, fiber and seed. The gin must also be equipped to remove foreign matter, control moisture and remove other contaminants that significantly reduce the value of the bale. The gin's customer is the grower, the one who pays in one way or another to have the cotton ginned. It is the ginner's responsibility to maximize the revenue from every module of cotton.

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### **[III] Roller Ginning**

Roller ginning provided the first mechanical means of separating cotton lint from seed. The first true roller gin was the Churka gin, which produced up to 2.3 kg (5.0 lb) of lint/day. In 1840, the McCarthy gin was invented to gin extra-long-staple (ELS) cotton. Although the ginning capacity of the McCarthy gin was a major improvement over the Churka gin, capacity was limited to about 18 kg (40 lb) of lint per hour. In the late 1950s and early 1960s, a rotary-knife roller gin was developed. The rotary-knife roller gin had a ginning rate 12 times higher than the McCarthy gin, though the rotary knife gin still processed cotton at only about one-fifth the rate of a saw gin with an equivalent width. Around 2005, commercial development of a high-speed rotary-knife roller gin was accomplished. The high-speed roller gin processes cotton at approximately the same rate per unit width as a saw gin. The high-speed roller gin not only allows ELS cotton (such as Pima) to be ginned more efficiently, but also permits high-quality Upland cotton to be roller ginned at a rate more comparable with the saw gin while achieving the benefits of better fiber quality resulting from roller ginning.

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### **[IV] Recent Advances in Cotton Ginning Technology in India**

Cotton Ginning is a primary processing industry whose major function is to clean and gin the seed cotton, clean the lint and form a bale. During 2012-13 and 2013-14 in about 1500 modern and 2500 semi-modern ginneries using double roller gins could able to gin about 36.5 and 38 million bales, respectively. The four Ginning Technologies, i.e., 1) Saw Ginning (about 55%) 2) Double Roller Ginning (about 35%) 3) Rotobar or Rotary Knife Roller Gin (about 5%) and 4) Single Roller (about 5%) being used in the world. These technologies are having their own considerations and the competitiveness of the cotton processing which in turn affects their adaptation. In advanced countries most of the ginning is performed on saw gins. Of late, however, there has been renewed interest in roller ginning, especially, its advantages over saw ginning in respect of higher ginning percentage and better retention of fiber length. It may be mentioned here that the saw ginning always results in loss of fibers sometimes to the extent of 2%. Further, most short fibers with length less than 12 mm are left un-ginned requiring further processing. It is also known that saw ginning leads to more naps in the yarn. Maintenance of saw gin is costly as compared to roller gins and spare parts are not easily available.

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## **5. CONCLUSION**

All after creating this industrial machine development related task, it is clear that gin machine operator finds it to be really beneficial and also use it frequently. It may not only remove the ginning roll from the ginning machine at any time; it is also used to move rolls from one location to the next. This roll-managing device may be used for ginning machines as well as another type of roll for selecting and transporting to different locations in accordance with the need. It's maintenance is easy to create and it is simple to put together. Comparatively, it tends to be easily assembled, disassembled, and transported without any issues. This kind of activity ensures that the ginning industry operates well.

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