

DESIGN & DEVELOPMENT OF ROTOBAR GIN ROLL HANDLING ARRANGEMENT

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ABSTRACT

The Design and development of Rotobar Gin Roll Handling Arrangement described in this project is designed primarily to safely place and remove as well as handle gin roll of Rotobar feeder machine to ground. The Design and development of Rotobar Gin Roll Handling arrangement is also having provision to add Hydraulic actuator with hydraulic power arrangement addition for making the work easy. It is advantageous over the traditional methods in which gin rolls placed on ground with any wooden or metal part support attached to it. The attachment and removal process of gin roll was also very difficult. The specifications on the design and drawings conform to approve appropriate standards. This design and development of such type of gin roll handling arrangement is required in each ginning machine plant to safely place and remove as well as handle gin roll of Rotobar feeder machine safely, with ease of travelling. Such type of roll handling arrangement has been introduced in the journey of modernization / improvement of various operations in the cotton ginning and cotton seed processing machines.

Keywords: Rotobar, Roll Handling Arrangement, Hydraulic Actuator, Rotobar, Roll Handling, Machine, Plant.

I. INTRODUCTION

The 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. Cotton seed, following separation from the long cotton fibers in the ginning process, is covered with short lint, also known as linters. This short lint, here in after referred to simply as lint. The Rotobar gin is works on the same principle as the roller gin. It has a revolving in place of oscillating rod, and is considered to give a higher amount of lint, per machine. The machine is uses rotating member circular type of shape for ginning. The main component of the machine is ginning roller.

The ginning roller is one of the main and essential as well as and costlier part in the Rotobar Gin. Roller covering material is very important part made from fabric and rubber items in layers. The gin roll is the main part of the machine which is used to remove the lint from Cotton and provide clean operation. There is no addition device or any arrangements available for holding to the gin roll, when gin roll is removed from Rotobar feeder machine. Due to this chance of the ginning roll to get damages is very high. The gin roll is also so bulky (around 500kgs); it is very difficult to change its place once it is removed from the machine. Due to which lot of rework happens and overhanging cranes or forklift are required to move this gin roll. Thus it was very needy required that a gin roll handling device should be there to remove the gin roll from the machine safely and easily.

II. METHODOLOGY

It should be understand the real need and requirements of the company. Also it has to be find real-time problems with your existing system and document any changes that need to be made. It is possible to make the best design according to available materials, available space, and budget. Build the different parts of the holding system according to the maximum possible load conditions. Analyses of all components with CAD software are also needed to complete the project with less effort. It is planned to CAD model creation and project simulation to complete the process. Basic understandings of the machine and the project to made is necessary while making this project. Rotobar Gin machine is one of the best machines for the Ginning industries. For The ease of operation of the machine it is required to make the machine to work smoother. This machine is having many parts. Upper section is Rotobar feeder section and lower is gin section. Gin roller as shown in the drawing is one of the main parts of the machine which is needed to be operated properly and it must have a very good working

life. It should be easily attached and detached to the machine to make the operation of the machine easy and accurate. Monitoring the Performance of the machine and its troubleshooting is very important.

Basic understandings

Rotobar Gin machine is one of the best machines for the Ginning industries. For The ease of operation of the machine it is required to make the machine to work smoother. This machine is having many parts. Upper section is Rotobar feeder section and lower is gin section. Gin roller as shown in the drawing is one of the main parts of the machine which is needed to be operated properly and it must have a very good working life. It should be easily attached and detached to the machine to make the operation of the machine easy and accurate. Monitoring the Performance of the machine and its troubleshooting is very important.

III. MODELING AND ANALYSIS

The 3D CAD model is made by using 3D CAD software for making this project successful. I have used the latest 3D CAD tool for making this project. All type of fasteners, castor wheels are and steel structure members as well as Hydraulic components and connections are properly added to the 3D CAD model so that it is very easy for manufacturing as well as for the analysis of the project. For making this project I have used Indians standard material like MS rectangular sections, MS angular sections, MS sheets, Steel blocks etc.

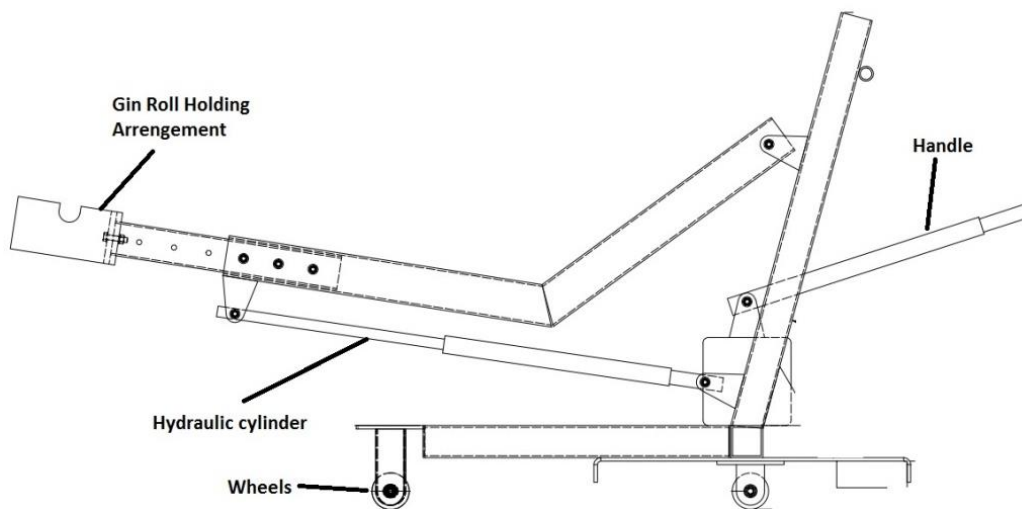


Figure 1: Basic line drawing showing concept of holding arrangement

The materials which are used to make the project are HRS sheet 4mm thk , MS plate 5 mm thk , MS plate 8 mm thk, MS plate 10 mm thk, MS plate 16 mm thk, MS rect. pipe 4.72x72x4.8, MS rect. hollow sec. 80x40x4, Schedule 80 pipe 1 1/4 inch, MS round bar dia. 45 mm, IAS 50x50x5. These all dimensions are in mm.

Table 1. Components used for making the Project

Rotobar Gin Roll Handling Arrangement_Item Lists			
No.	Description	Qty	Weight (Kg.)
1	Base Plate	1	50.928
2	Main Base Frame Assembly	1	50.492
3	Rib	1	3.525
4	Adjustable Arm Assembly	1	45.92
5	Front Wheel Assembly	2	3.8
6	Back Wheel Assembly	2	3.8
7	Ms Block (Weight)	1	200.175
8	Clamp- Hydraulic Cylinder Attachment	2	1.151
9	Top Plate Hydraulic Attchment	1	0.334

10	Hyd. Cylinder	1	35.798
11	Pin For Cylinder Attacment	2	0.975
13	Clit For Hydraulic Set	6	0.188
14	Hydraulic Set	1	25.6
15	Hose 150 To 200 Bar	1	0.367
16	Hose 150 To 200 Bar	1	0.384
17	Hex Head Bolt M12x1.75p, 100 Mm Long	1	0.105
18	Hex Head Nut M12x1.75p	2	0.009
19	Plain Metal Washer For M12 Bolt	38	0.006
20	Hex Bolt Full Threaded M12x35l	16	0.051

The CAD modeling is done for making the 3D model. Design and 3D modeling is done by using the latest CAD software. Mathematical calculation with the structural behavior load is also considered while making this metal framed project. In this project load calculation is one of the important points that is considered while making this project. Also, stress analysis is also done using the CAD software. Optimization with material weight and feasibility is also considered while making. I have done the design validation with comparing different types of conditions is also checked for making the project much better.

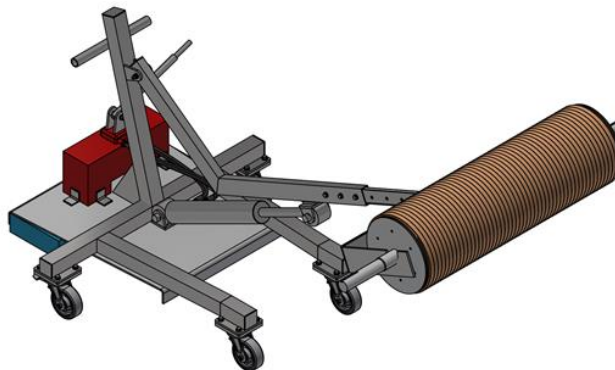


Figure 2: 3D view of Rotobar Gin Roll Handling Arrangement.

Construction and Working - Gin roll is utilized in Rotobar Gin machine in cotton industry. The gin roll is the primary piece of the machine which is utilized to eliminate the build up from cotton and give top notch build up. Gin roll dealing with plan is straightforward plan and it is certain and effective for taking care of gin rolls. The Gin roll dealing with plan implies greater reliability. Less and more straightforward changes, less support, and better availability to gin roll. The gin roll game plan is managed by powerfully and is controlling the speed of the stroke feed inside rollers inside the gin machine. Slanted hands or jaws are embedded into the machine and makes it more straightforward to deal with the gin roll.



Figure 3: 3D view of Rotobar Gin Roll Handling Arrangement.

There is an expansion gadget which is water powered chamber game plans accessible for lifting and holding as well with respect to letting down of the gin taking care of. The essential drawing demonstrating idea of the work to be done is displayed as underneath, it should alter according to attainability.

A superior way could be not to put accentuation on a specific method(s) as the main way to deal with idea determination, however rather to explain and reinforce the dynamic cycles utilized by an organization. Association it taken regarding working staff and all the site people confronting issues to clear the idea improvement process from the main stages. It is past the extent of this paper to seek after this thought process inside and out. These inquiries require addresses in light of authenticity, not vision, and should envelop all degrees of navigation.

Likewise, concerning the joining of assorted interests, there are sure rule rules that are deep rooted which may be helpfully utilized. Great venture choice making in idea improvement depends on the utilization of clear dynamic cycles which incorporate all undertaking or machine related in a significant manner, upheld by genuine strategies.

IV. RESULTS AND DISCUSSION

Due to the use of this role handling trolley the cotton ginning machine is now very effectively removing the role which can be used for its further processing. After the sufficient amount of trials, it is seen that the removal of the roll from the ginning machine is very easy and one person can also remove the role effectively from the machine. The project is lighter in weight and it can be more by a single person it is manually as well as hydraulic operated. There is no need of any type of electric current for this project. This project can run without using any type of electricity or petroleum fuel. Thus this is less costly in operation. The cotton ginning machine is currently removing the job that might be used for its resulting handling very effectively on account of the utilization of this job dealing with streetcar. After an adequate number of endeavors, it is obvious that eliminating a roll from a ginning machine is very straightforward and that one individual can do so effectively. The undertaking weighs less and can be dealt with both physically and using pressurized water by a solitary individual. No sort of electric flow is expected for this undertaking. There is no requirement for any sort of force or fuel to work this venture. Along these lines, working expenses are lower.

V. CONCLUSION

All after making this role handling trolley, it is seen that it is a very useful for and also just used by single men. It can not only remove the ginning roll from the ginning machine, it is also used for transferring roll from one place to another place. We can use this roll handling trolley for ginning machines as well as for any other type of roll for picking and shifting to other places as per the requirement. Handling trolleys is easy to make as well as easy to assemble. Similarly it can be easily disassembled, as well as assembled and can be carried in transport very easily. This type of project makes the ginning industry work properly and effectively.

VI. REFERENCES

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