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Dual Powered Operated Tiny Cotton Ginning Machine: A Review

Litesh K. Sonewane¹, S. M. Sheikh², Dr. Achal Shahare³

M. Tech Student¹, M. Tech prof.², HOD³ of Mechanical Engineering Department

G.h. Raison academy of engineering & technology Nagpur, Maharashtra, India

Abstract: 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. This process of cotton lint cleaning is done with the help of electricity. Here we can make machine which will be operated dual. Machine will be small and tiny. So that worker can move anywhere it easily. Cotton lint cleaning will be done by door to door. There will be no limitations of electricity. The primary aim of this project is to design and fabricate a prototype model of the cotton ginning machine. The purpose of this project is developed a new concept or technique for the cotton ginning. This machine is not used for industrial purpose. It is used for the domestic purpose. So we are going to design and fabricate the single roller cotton ginning machine which is dual power operated like electrically and manually. 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. This process of cotton lint cleaning is done with the help of electricity. Here we can make machine which will be operated dual. Machine will be small and tiny. So that worker can move anywhere it easily.

Keywords: Introduction of Ginning, Process of Ginning, Proposed work, Construction and working

I. INTRODUCTION

Ginning is the process of removing the seeds from the cotton and cotton gin is a machine that quickly and easily separates cotton fibers from their seeds allowing much greater productivity than manual cotton separation.

Cotton ginning is a primary processing industry whose major function is to clean and gin the seed cotton, cotton grown on short seasonal plant. More than 75 countries grow cotton on a commercial basis. The producers are USA, China and Uzbekistan, then comes India and Pakistan. Cotton most of the important commercial crops in India is grown mainly in 9 states namely Punjab, Haryana, Rajasthan, Maharashtra, Andhra Pradesh, Karnataka and Tamilnadu etc.

Indian Cotton Ginning Industry is the second largest in the world. Cotton ginning plays very important role of separation of fibers from cottonseed and converts field crop into a saleable commodity i.e. lint. Ginning acts as a bridge between cotton farmer and textile industry. In India, cotton is ginned on double roller gins manufactured domestically. About 36.5 and 38 million bales were ginned during 2012-13 and 2013-14, respectively in about 1500 modern and 2500 semi-modern ginneries. By introduction of efficient ginning, pre and post cleaning and novel material handling machinery along with implementation of skill development programs, Indian Ginning Industry has been transformed into remunerative business enterprise and has achieved global leadership in supply of quality cotton to domestic.

In India, the present ginnery can be categorized into three major groups:- a) Conventional Ginnery -In conventional ginnery, ginning, pressing or both operations are carried out but the handling of seed cotton, lint, cottonseed and bales are done manually. b) Semi-automatic Ginnery -This is a composite unit where all the unit operations of material handling except 1) Unloading and heap making of seed cotton 2) Feeding of seed cotton to the gins from central platform 3) Feeding of lint to press box and handling of bales in the press house are done automatically. c) Automatic Ginnery - It is either a composite unit or an integrated unit, where all the unit operations are done automatically except

- A. Seed cotton unloading and heap making
- B. Feeding to suction system and
- C. Unloading of bales

The growing population of India has created many problems – one of the problems is related to the time wasted in cotton ginning for the household purpose. There is lot of time and energy is required to take the cotton to the cotton ginning plant for the peoples who has already busy schedule. Time as well as transportation cost is required for the ginning the cotton which is used for the household application when it ginned in the ginnery shop.

So for overcoming from this problem the dual powered tiny cotton ginning machine is fabricated. It has the capacity of ginning 1kg cotton in about 45-50 minutes.

D. Manufacturing Process & Technology

Ginning process is shown in the flow chart given below. Seed cotton is fed to grading system where grading is done followed by pneumatic conveying. From here it is fed to preliminary cleaning process, followed by saw gin, lint cleaner, pre-bale press and cotton bales.

Ginning Process involves two cleaning stages

- 1) Pre Cleaning
- 2) Post Cleaning

The main operation of separating seed from cotton is done by saw gin. In the gin house after ginning process is completed the cotton lint and cotton seeds are separated and the lint passes out through pneumatic system to the Post-cleaner (Lint Cleaners) in which small impurities, dust particles, small fibers are carried out and cotton becomes free from contamination.

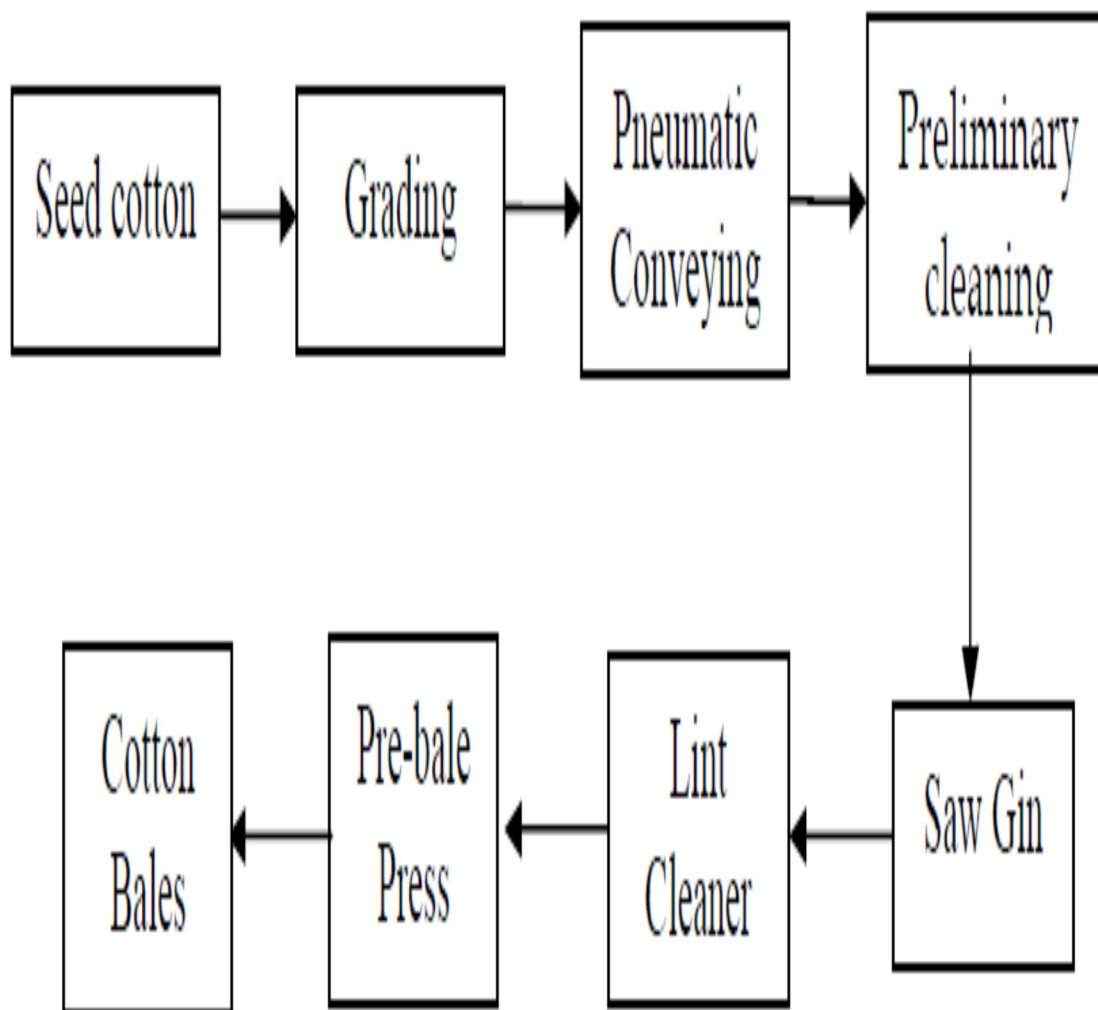


Fig 1.1 Block diagram of ginning process

3) A cotton gin is a machine that quickly and easily separates cotton fibers from their seeds, allowing for much greater productivity than manual cotton separation. The fibers are then processed into various cotton goods such as linens, while any undamaged cotton is used largely for textiles like clothing. Seeds may be used to grow more cotton or to produce cottonseed oil.

II. PROPOSED WORK

Propose work to propose new drive mechanism and to improve the productivity of cotton ginning through dual operated machine. Machine can be worked on manually and electricity supply.

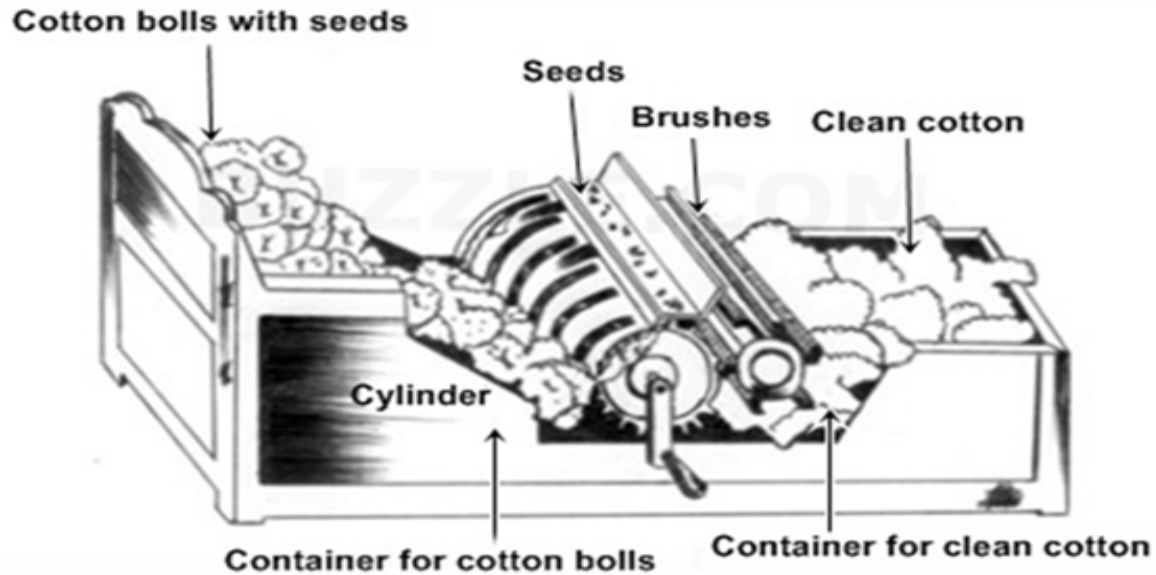
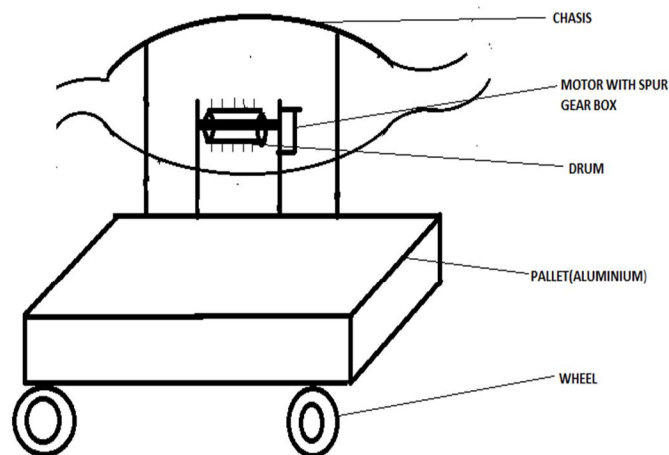


Fig cotton gin

A. Construction & Working

- 1) All the components used in this project are constructed on the aluminum pallet. The pallet is moved from one place to another by using wheels.
- 2) The wheels are attached with dc motor is coupled with spur gear box to increase the torque capacity which results in low rpm.
- 3) The working principle of this project is based on high torque and low rpm for this purpose the gear box is used.
- 4) Aluminum pallet has the very good load carrying capacity and safety purpose so we use aluminum pallet for this process.
- 5) The drum is rotating clockwise and anticlockwise by using the pressure switch mechanism. Pressure switch is the mechanism which is works on increase and decrease in pressure. When the pressure increases the contact plates are breaks and when the pressure reduces contact plates reaches its original position.



SET-UP FOR SINGLE ROLLER COTTON GINNING MACHINE



- 6) We required the 12v battery so two batteries of each having 12v are used by connecting the positive terminal of first battery with the negative terminal of the second battery and vice versa.
- 7) Chassis is used as a frame for the project. It is necessary that to maintain the required gap between the chassis and clipped pins which are attached on the circumference of the drum.
- 8) The power supply will supply dc volts to the chassis on the drum based gear cross section is connected and rotating drum with gear box having spur gear metal. Gears will rotate the drum and cotton will pushed into the drum & the pointed clips will be connected to drum will tear and move the beans in to another direction.
- 9) The wheels are moved forward and reversed direction as well as as in 360 degrees rotation by pressure switch mechanism. In this project no electronic circuit is used.
- 10) Here the low rpm and high torque logic is used.
- 11) There will be standing mechanism for the drum.

IV. RESULT

- A. After completion of the design and fabrication process of cotton ginning machine we tested our project. The result obtain from the testing is that the time required for the ginnery machine to gin the cotton of 1kg is approximately the 45-50 minutes. The efficiency is not 100% because during the testing the cottons seed are not fully separated from the cotton.
- B. For the improvement the automatic sorting mechanism can be used which detects the seeds and taken out. Also by using sensors the productivity of the ginnery machine can be improved. If the electricity is not available the machine can also be drive by using pedal operated bicycle or 2 wheelers bike engines.
- C. This concept is specially design for the purpose in which the system works on door-to-door concept.

V. CONCLUSION

This concept is specially designed for domestic purpose in which the system works on door-to-door concept. It is time saving system for the peoples living in apartments. By using sensors & high speed motors this systems can improved which increases its efficiency.

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