

DESIGN AND DEVELOPMENT OF COMBINED COTTON GINNING AND CARDING MACHINE

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ABSTRACT

The aim of the project is to design and develop combined cotton Ginning and Carding machine. Previously there are two separate machine use for cotton Ginning and Carding operation. These machines are available at very high cost and required more occupying area. This types of machine required more labour cost as well as more power consumption.

By combining of two machine i.e Ginning machine and Carding machine we reduce operational cost and labour cost. Also reduce rate of power consumption, cost of new developing machine.

Keyword: - 1. Ginning Machine, 2. Carding Machine

1. INTRODUCTION

Cotton ginning play very vital role in separation of fiber from cotton seed and convert field crop into a sealable commodity i.e. lint. Cotton ginning gives us two outputs in which one is fiber and other is in the form of byproduct i.e. seed. The fiber is used for further operation i.e. carding operation and seed is recycled and used to grow more cotton, if it is badly damaged, are used for making mustered oil, cattle feed production etc.

The cotton ginning section primarily developed during the 1980s and is one of the most important sectors of the economy. Carding is define that a machine for combing and paralleling fibers of cotton, flax, etc, prior to remove short, undesirable fibers and produce untwisted fiber. Also carding process is used for making fiber silky, remove impurities like dust and produce continuous web and fragment.

2. OBJECTIVE

A. Development of combined cotton ginning and carding machine.

B. Reduce the processing cost of cotton, labour cost, by developing a new machine.

C. Minimizes the handling of cotton engender to less wastage.

3. 2-D MODEL

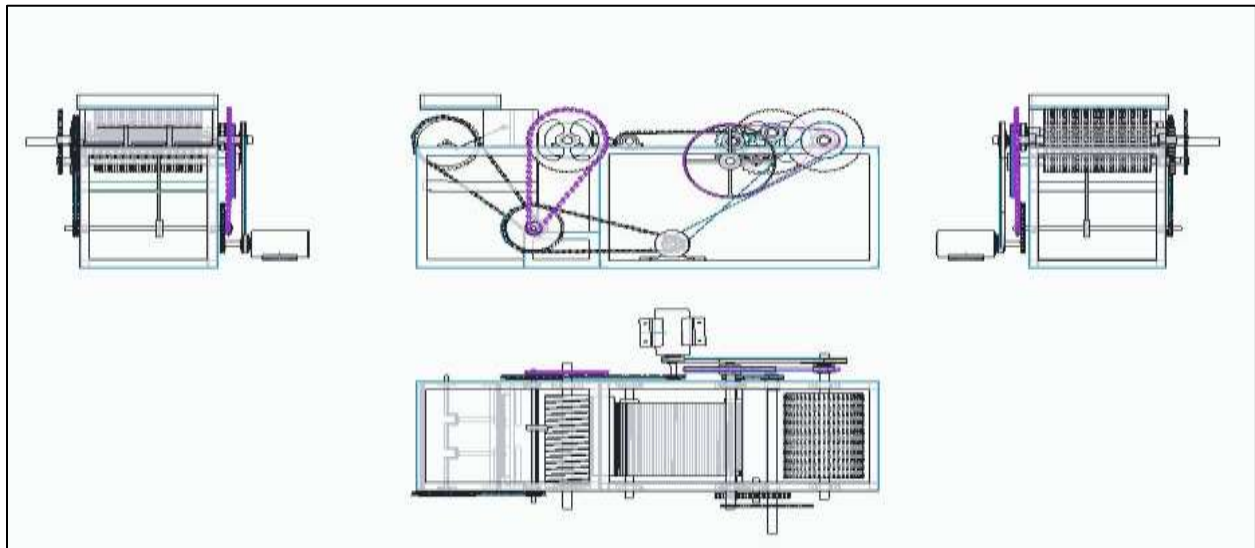


Fig. – 2-D model of design and development of combined ginning and carding machine

4. 3-CAD MODEL

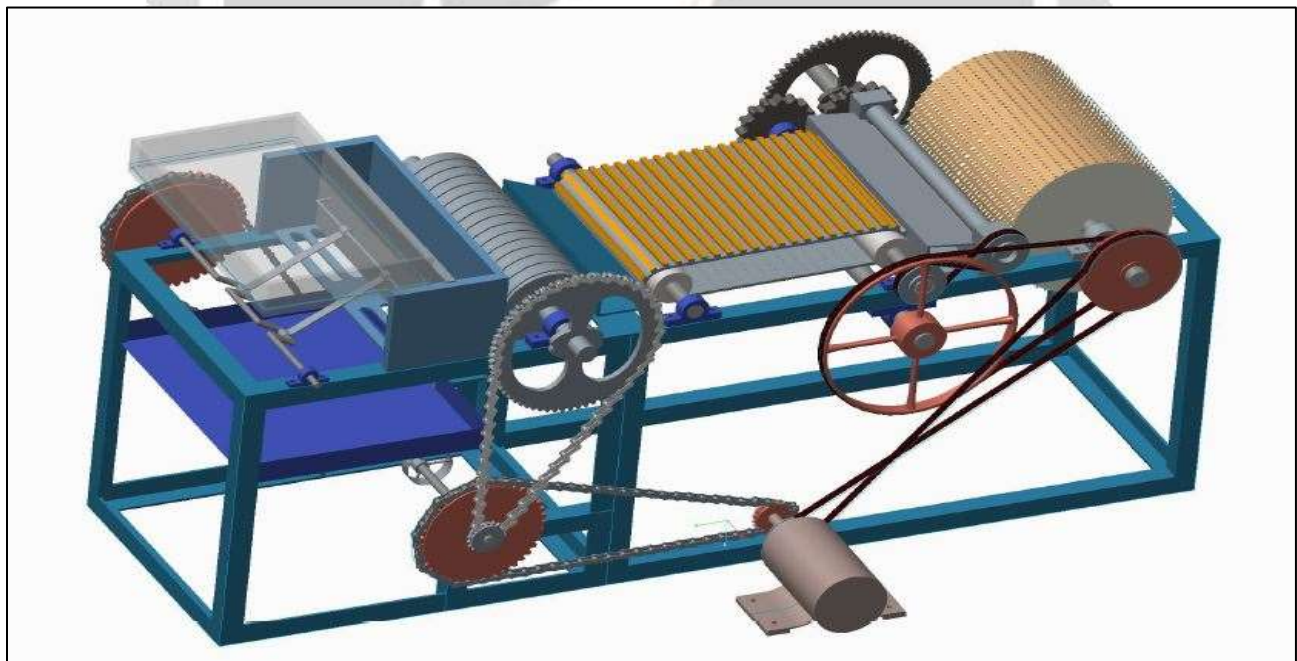


Fig. – 3-D model of design and development of combined ginning and carding machine

5. CONSTRUCTION

It consist of following main component which are given below:

1. Main frame
2. Ginning roller
3. Chain and sprocket
4. Bearing
5. Conveyor belt
6. Gear
7. Carding drum
8. Wheel
9. Pinion gear
10. Pulley
11. V-belt
12. Hopper

These are all main component of combine ginning and carding machine. first one is main frame which consist of steel material having good strengthen and harden quality. The main function of frame is hold all accessories mounted on it. Also chain and sprocket mechanism are use to transmit motion as well as torque. Ginning roller use to separate the cotton seed and fiber from raw cotton. Bearing is use for holding the shaft as well as smooth rotation. Conveyor belt act as a transport device which transmit raw material from one end to the another end. Gear are mainly transmit motion as well as torque. Carding drum consist of wooden block which is binding with nut and bolt to the circular ring which joint on the shaft. Wheel are use to guide the conveyor belt in specific direction.

6. WORKING

Cotton is use as a raw material for this machine. Basically it is very difficult to separate seed and fiber from cotton. but now days it becomes easy to do because of ginning machine. it is use to separate the cotton seed from cotton. Initially cotton insert into the hopper and then by induction motor provide motion to the ginning machine as well as to the carding machine. after starting, the motion roller start rotating then cotton fed toward the gin roller. when it come in contact with surface of gin roller it get stick on the outer surface of roller and by using the knife seed get separated from cotton. Then it becomes output of the ginning machine having poor quality which becomes input for carding machine through conveyor belt the fiber fed towards the carding drum having speed of 800rpm moving with anticlockwise motion and having blade on the outer surface. The cotton passed through the feeding shaft which maintain gap of 5 mm in between them then cotton comes in contact with blades of drum which rotates at high speed. the impurity present at cotton get clean through this process and final output collected at the end of machine.

7. DESIGN SPECIFICATION

Table -1

Sr. No.	Name of Component	Specification	Material	Quantity
1	Roller Drum	Inner dia. = 200mm Outer dia. =250mm	Wooden Block	1
2	Shafts	D=31mm D ₁ =25mm D ₂ =20mm	SAE1020	5
3	Conveyor Belt	L=900mm W=375mm	Wood	1
4	Wheels	Outer dia. =100mm Inner dia. =80mm Bore dia. =30.5mm	Plastic	4
5	Gear-1	Bore dia. =20mm PCD =40.24mm Outer dia. =46mm No. of teeth =14	Cast Iron	1
	Gear-2	Bore dia. =20mm PCD =69.24mm Outer dia. =75mm No. of teeth =24	Cast Iron	3
	Gear-3	Bore Dia. =20mm PCD =195.24mm Outer dia. =201mm No. of teeth =68	Cast Iron	1
6	Sprocket	No. of teeth =51 PCD =154mm	Cast Iron	3
7	Induction Motor	Power =1.12-1.5hp RPM =1400rpm Frequency =50hz Phase =1phase Voltage =220V-240V	_____	1

8.ADVANTAGES

1. It required less power.
2. Labour cost is less.
3. It occupies less area.

9. FEATURES

1. This machine having compact design. Therefore it require less area for operating the machine.

2. Two operation perform on same machine which can be reduces operational cost.
3. Rate of power consumption is less.
4. Built for small scale business that provide employment to the rural people.

10. APPLICATIONS

1. Use to separate the cotton seed and fibre from raw cotton .
2. Its can be use to make pillow , matrices etc

11. RESULT AND CONCLUSION

1. Power consumption is less.
2. Labour cost reduces.
3. Because of compact design, Less area required.

We conclude that this machine will perform better in small scale industries.

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