

Fabrication of cotton whiting machine

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Abstract - Textiles are whitened by the bleaching process. This process is generally applied to grey goods to finish them as white or to fabrics to prepare them for dyeing to pastel shades. Bleaching is a refurbishing step for modern textiles and a conservation/restoration procedure for historic textiles. The bleaching process removes natural colorants, water-borne stains, and oil-borne soils. Throughout history, ubiquitous bleaching practices were carried out in direct sunlight because it became apparent that the sun had a catalytic effect. In the past, bleaching agents had been identified as indigenous acids, bases, and mineral salts. They were applied as soaks and sours to achieve high whiteness levels. Up until the eighteenth century it was common practice to bleach linens and cottons in the sun and woollens in the fumes of burning sulphur. These relatively primitive bleaching practices were not only cumbersome and arduously slow, but required extensive acreage. It was not until the introduction of chlorine-based materials in the late eighteenth century that bleaching became facile. In the late 1920s, hydrogen peroxide became the most prevalent bleach. Since that time, hydrogen peroxide continues to be the prominent bleaching agent for natural fibers and blends with synthetic fibers. Synthetic fibers generally require little bleaching except for size removal, where necessary.

1. INTRODUCTION

Here we have fabricated the model for cotton whitening machine for change the cotton to white. It is new innovation for the cotton whitening process textile department. The process is semi-automated for easy operating the machine. Some electrical equipment is used for automatic operation here we are fabrication with following components like motor, drum, blade, belt and pulley etc.

2. LITERATURE REVIEW

The major chemical component of a living tree is water, but on dry weight sugar-based polymers (carbohydrates) becomes the main component of all plant cells, which are combined with lignin, along with smaller amount of extractives, protein, starch, and inorganics. There is diverse variation in the percentage of different chemical and it depends upon numerous factors, which include, plant to plant, and within different parts of the same plant, geographic locations, ages, climate, and soil conditions (Han and Rowell,2009) Sugar based polymers (carbohydrates) are

the major constituent of naturally occurring agro-based plants. Lignin is one of the chemicals along with carbohydrates and responsible for the binding of the polymers. Additionally, other chemicals, like, protein, starch and a few inorganic chemicals are present. There are primary and secondary layers in the cell and chemical components are present throughout the cell but their concentration varies across the cell. Moreover, there is much variation in the composition of the chemicals from plant to plant. Even there is a marked variation within the plant (Orwell et al. 2000). Same is the case with cotton fiber. Cellulose is the main ingredient if cotton since it comes from a naturally growing plant. Cotton fiber has more than 90% cellulose along with some non-cellulosic matters. Nevertheless, there is a slight variation in the chemical constituents of cotton, depending upon many factors e.g. the environment where it has been cultivated and after that type of seed along with the ginning process since damage of seed during ginning can add some protein matter to cotton fiber (Fan, 2005). There is an understood variation in the composition of the fiber since it is a natural product and there are many factors which can influence its composition. Hearle (2007), ingeminate findings of Gold wait and Guthrie (1954), that cotton fiber is mainly composed of cellulose, which is 88-96.5 % of the total mass of the fiber. This study further reveals that secondary wall of cotton fiber is of pure cellulose, whereas non-cellulosic material is present ton the outer layers or inside the lumen of the fiber. Hsieh (2007) supports the general observation about the variation and points out that the chemical composition varies with the variation in varieties of cotton, environment where it is cultivated and maturity level of the fibers. With the increase immaturity level there is an increase in the cellulosic percentage.

2.1. DESCRIPTION OF COMPONENTS:

a) Frame

This is made of mild steel material. The whole parts are mounted on this frame structure with the suitable arrangement. Boring of bearing sizes and open bores done in one setting so as to align the bearings properly while assembling. Provisions are made to cover the bearings with grease.

b) A.C. MOTOR (1/4 HP MOTOR)

An electric motor is a device for converting electrical power into mechanical power. An electric motor will try to deliver the required power even at the risk of self-destruction. Therefore, an electric motor must be protected from self-destruction. Motors may be ruined by physical damage to the windings but, usually, the enemy of a motor is excessive heat in the windings. Overheating breaks down the thin varnish like insulation on the windings. When the insulation fails, the motor fails. Overheating is the result of excessive current flow or inadequate ventilation. Accumulation of dust and dirt on and in the motor can reduce ventilation and heat removal. The induction motor is the motor most commonly used in agriculture. The speed of rotation of an induction motor is fairly constant, but it does vary somewhat with loading. As the motor is loaded, it slows down slightly.



Fig. 1 Ac motor

c) Blade

A blade is the portion of a tool, weapon, or machine with an edge that is designed to puncture, chop, slice or scrape surfaces or materials. A blade may be made from a flaking stone, such as flint, metal (usually steel), ceramic, or other material.

d) Tilting Shaft

This is made of mild steel material. The shaft was connected to motor then motor is using worm gear to tilting the mixing drum.

e) Mixing Drum

The drums are the foundation of a great mix. You can be adventurous with the guitars, making them sound off the wall and unnatural, but if the drum sound strays too far off the path of punchiness, you'll end up with a lackluster mix. There are certain things that need to be present in a great drum mix, and similarly, certain things that need to be taken out. With a few simple tricks that I swear by I'll teach you to get a tight and punchy drum sound. Anytime you start

mixing drums you can try these tricks to instantly make your drums sound better.

f) Rotating Shaft

Shaft is a common and important machine element. It is a rotating member, in general, has a circular cross-section and is used to transmit power. The shaft may be hollow or solid. The shaft is supported on bearings and it rotates a set of gears or pulleys for the purpose of power transmission. The shaft is generally acted upon by bending moment, torsion and axial force. Design of shaft primarily involves in determining stresses at critical point in the shaft that is arising due to aforementioned loading. Other two similar forms of a shaft are axle and spindle.

g) Worm Gear

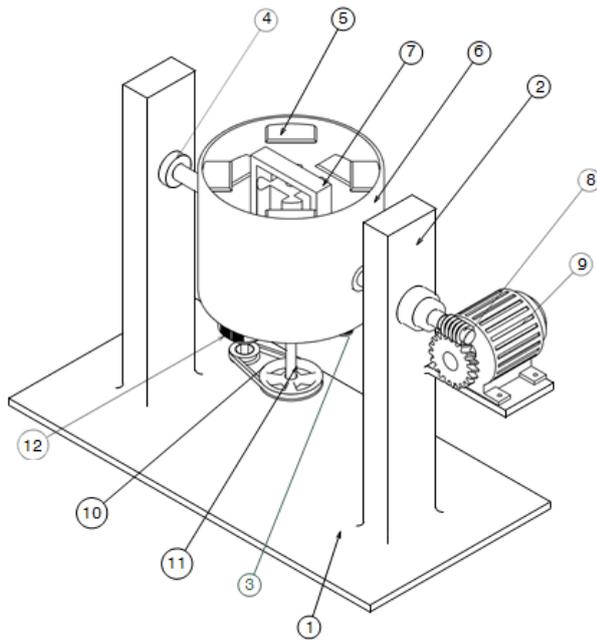
Worm gears are used when large gear reductions are needed. It is common for worm gears to have reductions of 20:1, and even up to 300:1 or greater. Many worm gears have an interesting property that no other gear set has: the worm can easily turn the gear, but the gear cannot turn the worm. This is because the angle on the worm is so shallow that when the gear tries to spin it, the friction between the gear and the worm holds the worm in place.



Fig.2 Worm and Worm Gear

3. WORKING PRINCIPLE

Here we are fabricating the model for cotton whitening process in the textile department and medical department. In this arrangement we are placing the motor, belt and pulley, drum and blades. Water and chemical are mixed and poured into the drum and the raw cotton is placed inside the drum. After placing of the cotton the motor is switched on then the shaft connected to the pulley starts rotate clock wise and anticlock wise and it will mix the cotton and chemical. This process will change the cotton into white after finishing of the process the water is drained through water outlet. Then the whole drum is tilted using the motor and collecting the cotton on tray and it is the whole process of the machine.



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|----------------------|-----------------------|
| 1. Base | 7. Moving Blade |
| 2. Supporting Member | 8. Worm Gear |
| 3. Water Outlet | 9. Ac (1/4) Hp Motor |
| 4. Bearings | 10. Pulley |
| 5. Fixing Blade | 11. Rotating Shaft |
| 6. Mixing Drum | 12. Ac (1/4) Hp Motor |

Isometric View

Fig.3 Working Diagram

4. ADVANTAGES

- Low cost
- Easy to work and reduces the manual stress
- Good efficiency
- Fast process

5. CONCLUSIONS

This project is made with pre planning, that it provides flexibility in operation. This innovation has made the more desirable and economical. This project "FABRICATION OF COTTON WHITING MACHINE" is fabricated with the hope that it is very much economical and helps full to medical field and textile industries. This project helped us to know the periodic steps in completing a project work. Thus we have completed the project successfully.

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