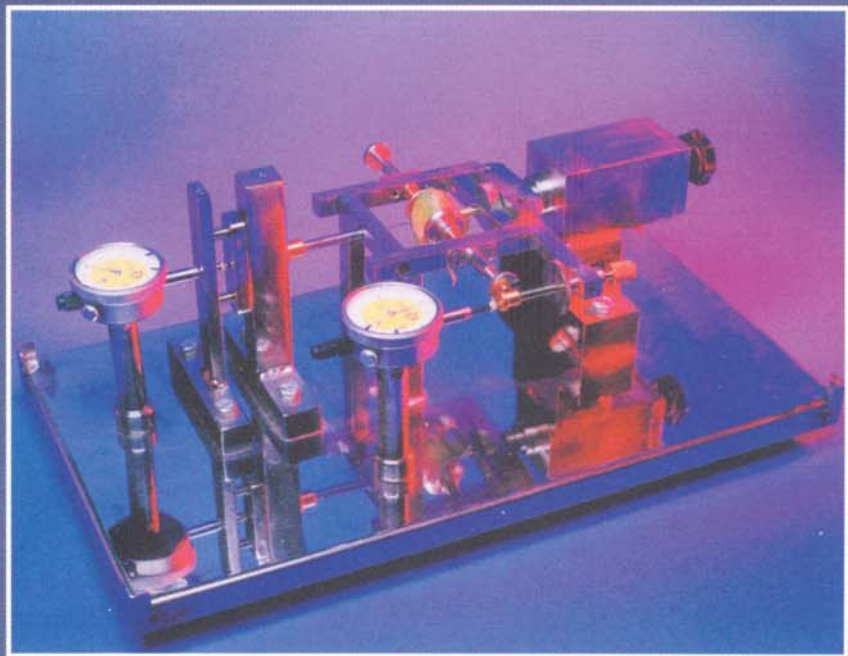


COTTON BOLL HARDNESS TESTER

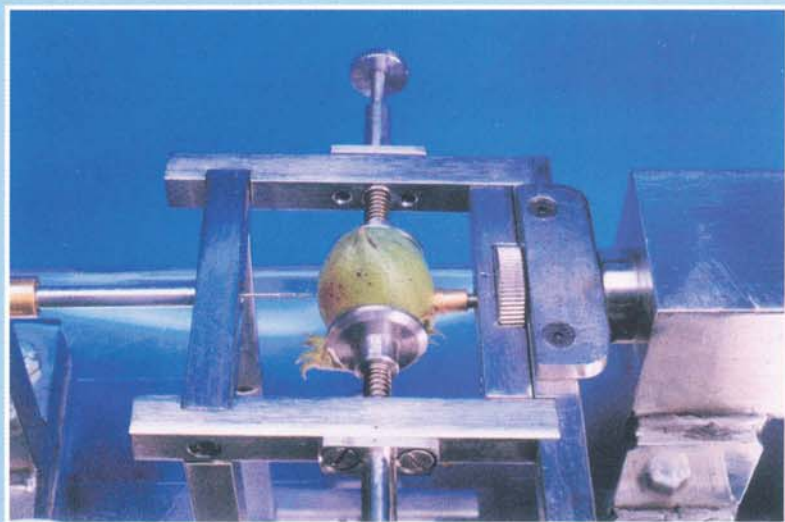


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Introduction

Numerous pests and insects feed on various parts of cotton plant and the extent of damage to the crop is dependent on the vulnerability of the genotype. Apart from certain chemical characters of the genotype, the hardness of various plant parts contributes to resistance to the insect/pest attack. To categorise all the varieties showing promise, there is a need for developing a reliable instrument to measure the stiffness i.e., resistance to penetration. Keeping this requirement in view an instrument was designed at CIRCOT way back in the seventies to measure the stiffness of cotton bolls, and also to test other parts such as cotton stem, nodes near the cotton flowers and cotton boll rinds. Few pieces were fabricated and sold. Recently the demand has been felt once again for an improved version of the instrument. Accordingly, the boll hardness tester has been redesigned.

For the purpose of design, the resistance to penetration at a given depth has been defined as the force in grammes required



Clamping Arrangement for Cotton Boll on the Instrument



Dial Gauges with the Clamping Mechanism

by a standard 16 number sewing needle to pierce through that depth. As per definition there is need for providing continuously increasing load on the pin and monitoring the force and the depth, simultaneously. These have been accomplished in the instrument with the aid of a pair of springs and two dial gauges. The pair of springs that are in contact with the pin develop tension when the cotton boll is pushed against the pin resulting in penetration. By measuring the compression of the springs the force is determined.

The Instrument

This tester consist of :

- ◆ A job carrier with provision to mount cotton boll
- ◆ A tail stock to move the job carrier in a horizontal plane
- ◆ A head stock housing the tapered pin
- ◆ Two helical springs on the back of the head stock
- ◆ Two dial gauges to monitor the motion of the job carrier and the compression of the springs

The Operation

The determination of the force required to push the needle into the boll through a given depth involves the following steps :

- * Fix the cotton boll between the cups and move the job carrier until the pin tip is in contact with the boll.
- * Adjust both the dial gauges to read zero
- * Advance the job carrier steadily and note down the dial gauge readings simultaneously
- * Note down the difference in the readings to get a measure of the depth of penetration.
- * The reading shown by the dial gauge monitoring the springs can be converted into absolute force by multiplying with the spring constant supplied along with the instrument.

Advantages

- * Easy to operate
- * Portable
- * Simple analogue meters
- * Suitable for field work

Additional facilities can be provided on order for testing other parts of the cotton plant such as stems, leaves etc.

The cost of the machine is Rs. 30,000/- per unit

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