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COCONUT TREE CLIMBING DEVICE

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Keywords: Coconut,gripping, friction, height adjustment, tree climber

ABSTRACT

Primary aim of this study is to design a coconut tree climbing device for farmers and residents. It is very difficultto climb on coconut tree manually due to the constant cylindrical structure and single trunk. In other type of trees there willbe branches for holding and to support the climber.Consideringthis scenario, a device which will help the user to climb coconut tree easily useful forthe people who are having large coconut cultivation as well as residents with less coconuttrees. This kind of devices will encourage more people to come forward to agricultural sector.The mechanical structure is designed to move the structure upwards against the gravitational forces in successive upper body and lower body movements similar to a tree climber. The gripping is designed in such a way to hold the upper or lower part of the structure to the tree facilitating the upward movement. Hence to reduce human efforts and save human life we are introducing a coconut tree climbing device.

INTRODUCTION

The proposed tree climber is made of hollow mild steel square pipes. It has two frames- the upper and the lower frame. The upper frame is operated with both the hands and the lower frame is operated by both the feet. The two frames are connected to each other by adjustable belts. The upper frame is also provided with a seating arrangement for the person to sit and the lower frame has the provision for resting the feet. The entire unit is supported on two frames one above the other. The frames move up and down by applying and removing load to both the legs and hands alternately. The grippers attach the device to the tree and the harness attaches the climber to the device safely. Also arrangements can be provided to hold the equipment to avoid cuts to the climber.

MATERIAL AND METHODS

- **Material**

1. ***Upper Frame***
   - I. Mild Steel
   - II. Rubber Bushes

2. ***Lower Frame***
   - I. Mild Steel
   - II. Rubber Bushes

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- **Design**

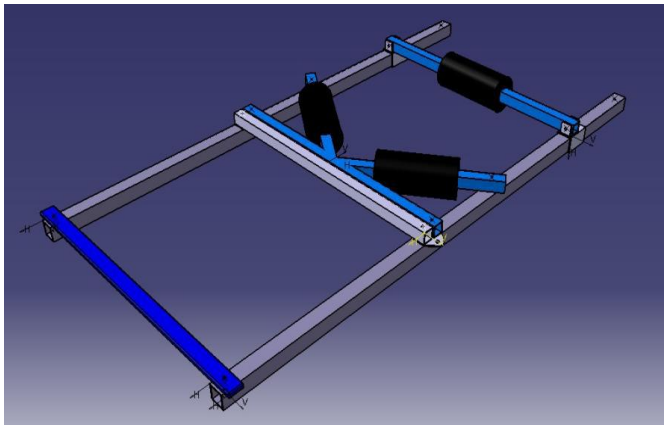

Fig 1. Upper Frame

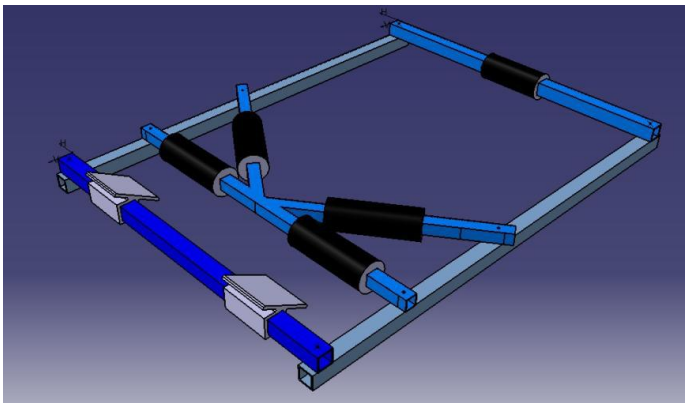

Fig 2: Lower Frame

RESULT AND DISCUSSION

The working model has assembled and taken into user's environment. The validation of the coconut tree climbing device has done by self and by a residential user.

FORMULAE

Moment of Inertia: $I = b^4/12 - (b-2t)^2/12$ (1)

Shear Modulus: $Z = I/ym$ (2)

Maximum Bending Moment: $M = \omega . L$ (3)

Maximum Bending Stress: $\sigma max = M/Z$ (4)

Deflection of the Beam: $\delta = (\omega l^3/3EI)$ (5)

TABLE

NO.	COMPONENT	SUBCOMPONENTS	MAX. STRESS
1	Upper Frame	Longitudinal member	133.83 N/mm2
		K-member	P=1697.4 N
		Lever	103.5 N/mm2
2	Lower Frame	Longitudinal member	50.53 N/mm2
		Foot resting member	P=686.7 N
		K-member	P=1697.4 N

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CONCLUSION

Our project has been to bring together both simplicity & safety, along with comfort to the user of the machine which is the duty of every engineer. The end result of our effort has resulted in the development of "Coconut tree climbing equipment". We feel the project that we have done has a good future scope. Benefits resulting from the use of this device will make it pay for itself within a short period of time & it can be a great companion for any agriculturalist. The device affords scope for modifications and further improvements.

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