AUTOMATED RUBBER TAPPING AND RUBBER MILK MIXING MACHINE

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Circular gear, Solenoid valve, Tapping blade, Wiper motor.

Introduction:
Rubber tree finds a dominating position among the plantation crops in India. There exists a vast majority of rubber cultivators in Karnataka and Kerala. The rubber plant produces sticky, white latex that is collected and processed to produce natural rubber. A rubber tree can produce latex for over 25 years from when it is first tapped. The tree would be ‘tapped’, that is, an incision is made into the bark of the tree. The latex from within the tree seeps to the surface of the cut and trickles down the cut into a container, tied to the trunk of the tree. Tapping is considered to be a skill oriented job and the availability of such labors are getting worse nowadays. In this project tapping machine is constructed using wiper motor, circular gear and tapping blade.

In rubber mixing there are some procedures to be followed for the best result, which requires solutions like rubber milk, water, and dilute acid. Proposed device contains separate container for each ingredient. Ingredients are mixed with standard ratio with aid of controlling device and then mixed solution is poured to the dishes for further process. This project is aimed at assisting rubber planters in mixing process and is implemented using microcontroller P89V51RD2, Power supply unit, Solenoid valve.

Objectives:
In order to avoid the damage to the tree, the incision depth made on the rubber tree trunk should not go beyond the cambium of the tree. The path made for the latex to flow by the incision shouldn’t have any obstructions. The project also aims to minimize the wastage of rubber scrap and to produce best grade of rubber sheet to the market.

Methodology:
1) Fig 1: 3D model of Rubber tapping machine
Working:

A mechanical model is constructed in such a way that it performs the rubber tapping process automatically. Circular rod with geared teeth is the main supporting structure of tapping machine. The whole model is held by a Circular clamp which can be attached to the tree. Structure can be adjusted with bolt and nuts based on the tree diameter. Small circular gear which is attached to the wiper motor along with tapping blade moves on large circular gear. This movement of blade forms the path for the latex to flow. To and fro movement of the wiper motor is controlled by DPDT switch.

2)

![Diagram](image1.png)

Fig 2: Block diagram of Rubber milk mixing machine.

![3D Model](image2.png)

Fig 3: 3D model of Rubber milk mixing machine

Working:

Rubber sap is collected from rubber trees using tapping process. Rubber sap, water, dilute acid is taken in a separate container. Valve is attached at the bottom of each container which adjusts the flow of solvents to be mixed in a required ratio. Mixer is attached to the output of the three valves. All the three solvents are mixed. Output of the mixer is collected in a dish.
**Results and Conclusion:**
Tapping and mixing machines are designed.

Manual tapping of rubber tree can damage the tree if the unskilled labor taps below the Cambium layer. In case of rubber milk mixing, if the solvents are not mixed in required proportion then the quality of rubber sheet is affected. These two problems are solved with tapping and mixing machine.

**Scope for future work:**
- Tapping process can be made completely automatic by placing a tapping machine in each tree trunk.
- After tapping, collected milk can be made to flow directly to the container for the further mixing process.