

Mini Table Saw Cutting Machine

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Abstract -

This document presents the design and fabrication of a cost-effective Mini Table Saw adapted for precision cutting operations. The project focuses on creating a versatile, compact tool capable of cleanly cutting various lightweight materials such as wood, acrylic, plastic, and soft metals. By utilizing a high-torque motor and a stabilized circular saw blade system, the machine provides a budget-friendly alternative to bulky industrial-grade table saws. The abstract outlines the objectives of achieving high precision in material sizing and straight-line cutting while maintaining a portable and safe form factor.

workpiece is guided across a flat table surface against a fence to ensure straight cuts.

- **Motor:** A high-RPM, high-torque DC motor (such as a 775 or 895 series) serves as the primary driver.
- **Saw Blade:** Interchangeable circular blades (e.g., High-Speed Steel or Carbide-tipped) tailored for specific materials like wood or plastic.
- **Frame & Table:** A rigid, flat structure (typically aluminum or thick acrylic) to support the material and minimize vibration during high-speed cutting.

Key Words:

Table Saw, Cutting Machine, Mechanical Engineering, Circular Blade, Material Parting, Fabrication, DIY Power Tools.

1. INTRODUCTION

The integration of compact power tools in small-scale workshops has led to significant advancements in DIY manufacturing, model making, and repair tasks. Traditional industrial table saws are often excessively bulky, heavy, and expensive for minor operations; therefore, this project proposes a budget-friendly, miniaturized alternative. This paper details the hardware integration and mechanical design required to build a functional, safe, and precise miniature cutting unit.

2. Body of Paper

The body of the paper presents the main findings regarding the mechanical assembly, structural stability, and power transmission of the mini table saw.

2.1 System Architecture

The machine operates by driving a circular cutting blade rigidly mounted to a motor shaft via an arbor coupling. The

Table -1: Sample Table format

S.R	Component Name	Specification / Model	Quantity
A	Electronic Components		
1	Prime Mover	775 or 895 DC Motor (12V-24V)	1
2	Speed Controller	PWM DC Motor Speed Regulator	1
3	Power Supply	12V-24V, 5A+ DC Adapter	1
4	Wiring	Heavy Duty Wires & Switch (Set)	1
B	Mechanical Hardware		
5	Saw Blade	4-inch Circular Saw Blade (Wood/Acrylic)	1 Lot
6	Spindle/Coupling	Motor Shaft Arbor / Connecting Rod	1

7	Structural Frame	Mild Steel / Aluminum Plate for Table	3
8	Guide Fence	Aluminum Extrusion Profile / Rail	1

The project successfully demonstrates a functional Mini Table Saw suitable for precision cutting of lightweight materials. The results prove that high-quality, straight-line material parting is achievable with low-cost components and a simplified mechanical design. This system serves as an efficient tool for small-scale mechanical engineering applications, architectural modeling, and hobbyist workshops.

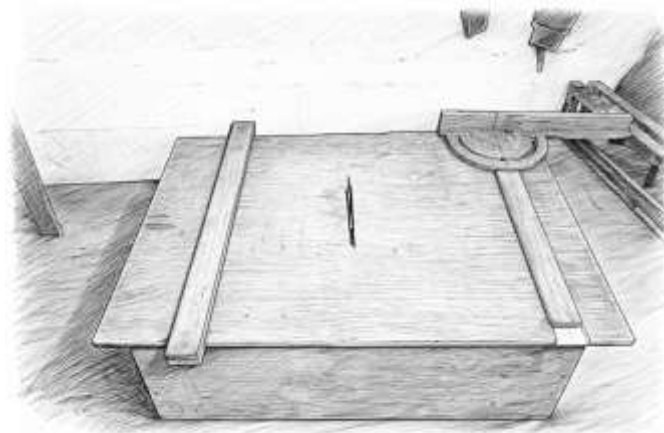


Fig -1: Figure

BIOGRAPHIES (Optional not mandatory)

Author	Description
Sanket Kailas Thorat	Student of Diploma in Mechanical Engineering at Samarth Polytechnic.
Shahrukh Bashir Saikh	Mechanical Engineering student with a focus on machine design.
Sohel Ibrahim Pathan	Interested in mechanical fabrication and manufacturing processes.
Shrirang Dattatray Aher	Project team member focused on hardware assembly and testing.

3. CONCLUSIONS

The project successfully demonstrates a functional Mini Table Saw suitable for precision cutting of lightweight materials. The results prove that high-quality, straight-line material parting is achievable with low-cost components and a simplified mechanical design. This system serves as an efficient tool for small-scale mechanical engineering applications, architectural modeling, and hobbyist workshops.

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