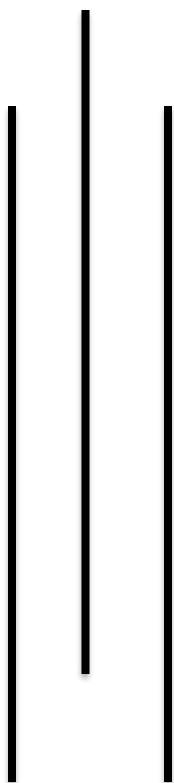




Report on Reverse Engineering of a Mechanical Rotary Pencil Sharpener



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❑ Introduction

- **Purpose of the Report**

To analyze the design, functionality, and components of a rotary pencil sharpener through reverse engineering.

- **What is Reverse Engineering?**

Reverse engineering is the process of deconstructing a product to understand its design, functionality, and manufacturing process.

- **Importance of Reverse Engineering**

Helps in improving existing designs, understanding competitors' products, and innovating new solutions.



Mechanical Pencil Sharpener

❑ Objectives of Reverse Engineering the Rotary Pencil Sharpener

- To understand the mechanical design and components.
- To analyze the functionality and working principles.
- To identify materials used and their properties.
- To explore potential design improvements.

❑ Key Features:

- **Rotating Blades:** The sharpener uses a rotating blade or set of blades to shave the wood and graphite of the pencil, creating a fine point.
- **Adjustable Settings:** Many rotary sharpeners allow users to adjust the sharpness of the pencil tip, catering to different needs (e.g., fine point for writing or a thicker point for sketching).
- **Manual Operation:** Rotary sharpeners are operated manually (hand-cranked).
- **Durable Design:** They are often built with sturdy materials to withstand frequent use.
- **Waste Collection:** Most models include a compartment to collect pencil shavings, making cleanup easy.

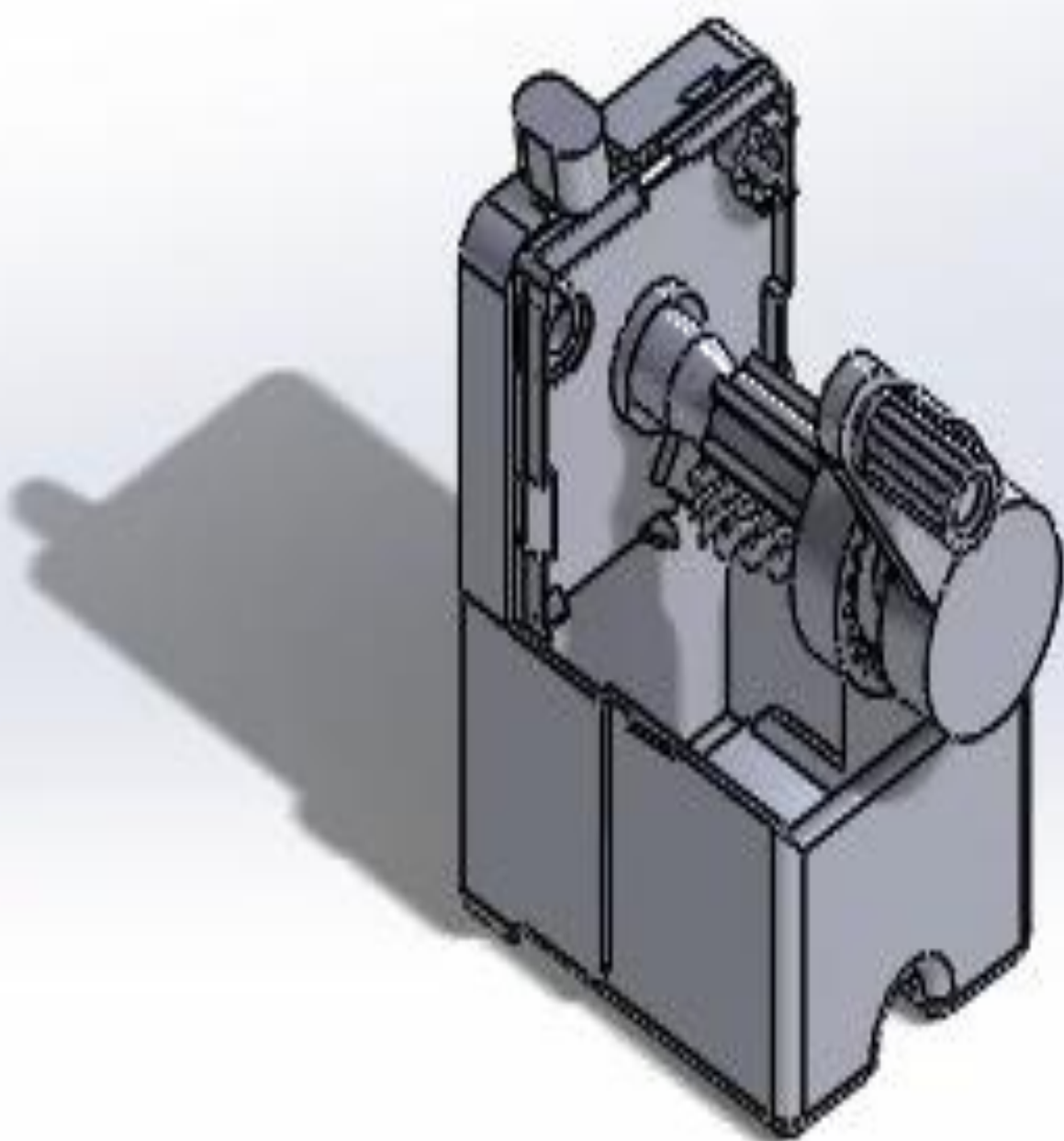
Step-by-Step Reverse Engineering Process

❑ Disassembly

- Carefully disassemble the rotary pencil sharpener.
- Document each step with photos and notes.
- Label and organize components for easy reassembly.

❑ Component Analysis

- **Housing:** Typically made of plastic or metal. Analyze its durability and ergonomics.
- **Blade:** Material (usually steel), sharpness, and angle.
- **Gear Mechanism:** Understand how rotation is transferred to the blade.
- **Springs and Screws:** Role in maintaining tension and assembly.
- **Pencil Holder:** Design and adjustability for different pencil sizes.



❑ Measurements and CAD Modeling

- Take precise measurements of each component.
- Use CAD software to create 3D models of the parts and assembly.

❑ What Did We Learn?

- It's simple and effective.
- The materials (like the steel blade) are durable.
- The design is compact and easy to use.

❑ Advantages :

- **Consistency:** Provides a uniform sharpness every time.
- **Efficiency:** Sharpens pencils quickly.
- **Ease of Use:** Simple operation, suitable for all ages.
- **Versatility:** Can sharpen standard pencils, colored pencils, and sometimes even crayons.

❑ Common Uses :

- **Educational Settings:** Ideal for classrooms where many pencils need sharpening.
- **Artistic Work:** Preferred by artists for precise sharpening of drawing pencils.
- **Office Environments:** Convenient for maintaining a supply of sharp pencils.







