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Fabrication of Dual Side Shaper Machine

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ABSTRACT

Numerous varieties of reciprocating machines are available in the majority of industries to perform machine operations on small-scale work. The tools can be shaped in a variety of ways, including horizontally, vertically, or inclinedly, using a shaping machine. Materials are moulded from both sides in a dual shaper machine, making it more advantageous than a typical shaper. Industries can increase production rates while spending less time and money thanks to dual shaper machines. The time and production costs are both decreased by the dual shaper machine. With the aid of a quick return mechanism, a dual side shaper machine is created in this project. The tool, which shapes the material mounted on the vice from both sides, moves linearly as a result of the motor's circular motion. In contrast to the crank and slider, the rapid return mechanism transfers rotational action into reciprocating motion, although the forward reciprocating motion is slower than the return stroke. Chain and sprockets are used to connect the DC motor to the mechanism. The entire device is supported by a sturdy metal frame.

Keywords: shaping machine, high production rate, minimal amount of time and cost

1. Introduction

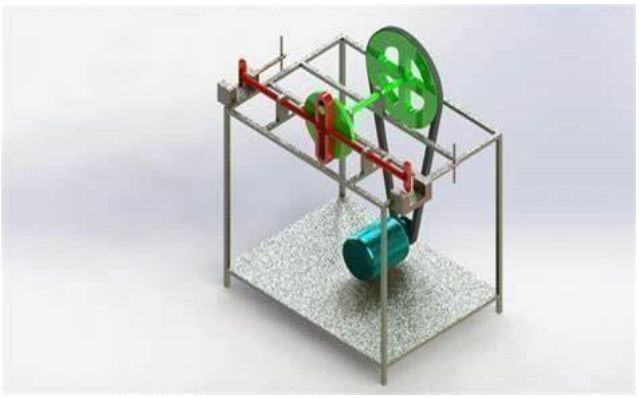
The Dual Side Shaper Machine is a specialized cutting tool that is widely used in the manufacturing industry for shaping and cutting a variety of materials such as wood, metal, and plastic. The machine is designed to work on both sides, making it an efficient and productive tool for reducing production time. The dual-sided feature allows the machine to work on two materials simultaneously, thereby increasing productivity. The machine is equipped with a cutting tool that can create different shapes and designs on the materials, enabling the production of various industrial components, furniture, and machinery parts. Overall, the Dual Side Shaper Machine is an essential tool for any manufacturing industry looking to improve efficiency and productivity. The purpose of manufacturing a Dual Side Shaper Machine is to provide a highly efficient and productive cutting tool that can shape and cut various materials like metal, wood, and plastics on both sides simultaneously

2. LITERATURE REVIEW

A dual side shaper machine is a machining tool used for shaping various materials such as metals, wood, and plastics. It consists of two shaper heads that are mounted on opposite sides of a bed, which allows for simultaneous shaping of two sides of a work piece. In this literature review, we will examine various aspects of dual side shaper machines.

3. Experimental Set-Up and Methodology

Dual side shaper machines are commonly used in metalworking to produce flat surfaces or shapes with a high degree of accuracy.



If you're looking to experiment with a dual side shaper machine, there are a few things to consider:

Material selection: Choose the appropriate material for your project, taking into account the machine's capabilities and limitations. Consider factors such as the thickness, hardness, and ductility of the material, as well as any potential hazards, such as toxicity or flammability.

Setup: Set up the machine properly, ensuring that it is level and securely anchored to the floor or workbench. Align the cutting tool and work piece correctly, and adjust the feed rate and cutting depth according to the material and desired outcome.

Monitoring: Keep a close eye on the machine while it is running, checking for any signs of malfunction or overheating. Regularly inspect the cutting tool and workpiece for wear and tear.

Record-keeping: Keep detailed records of your experimentation, including the materials used, cutting parameters, and any issues or successes encountered. This information can help you refine your techniques and achieve better results in future experiments.

4. EXPERIMENTAL PROCEDURE

Dual side shaper machines are used to create flat surfaces, slots, and other shapes on metal and other materials. The machine typically has two cutting heads that work simultaneously to produce a symmetrical shape on opposite sides of the workpiece. Here is a basic model for a dual side shaper machine:

1. The job was checked to the given dimensions.

2. The square was scribed on the cross

3. Section of round rod of diameter of 40mm and was done.

4. The job was attached in the vice of a shaper.

5. The job was checked for perpendicular dimension.

6. The width tool is fitted in tool post.

7. Tool is advanced into job with certain depth.

8. The tool is made to cut the job by its reciprocating motion from one end by simultaneous motion of job in horizontal plane.

5. RESULTS

MACHINE CALCULATION

Name of material	Type of material Frame
	450mm×300mm Metal
Crank	ø210mm Mild steel
Shaft	ø30mm &200mm(length)
Steel Connecting Rod	ø15mm & 450mm
Mild steel Slotted Bar	ø25 &70mm(length)
Mild steel Shaper tool	High-Speed steel (HSS)

Preferring of Pulley diameter:

For power given selected small pulley dia (d) from the v-belt table in pg. No. 7.58 then used speed ratio to calculate large pulley dia. (D) speed ratio = D/d =N1/N2 D = speed ratio × d For power = 736 watts

Small pulley dia (d) = 10cm = 100 mm Motor speed = 1000 rpm, N2 = 500 rpm D = speed ratio × d D= 2×10 = 20cm large pulley dia (D) = 200mm

Design Parameters

Diameter of crank = 0.21m Length of slotted bar = 0.185m Length of connecting rod = 0.45m

Calculation of Cutting Forces

Assume,

Power = 736 watts Speed = 200rpm (Power)

Q = 2ΠInt/60

(Torque) T = 35.159Nm

Torque = force × Radius of Crank T=F×r

F=T/r

F= 296.75N

Design of shaft

Diameter of Shaft = 0.3m

Permissible shear stress for mild steel = 34 N mm2 Shear Stress,ζ = 16T/πd3 ζ =6.635 N/mm2< ζ Permissible Therefore design is safe.

6. CONCLUSION

The double side shaper apparatus looks like amassing of two existing shaper machines. Subsequently, the machine consumes less space, the quantity of gear's are diminished. For a similar measure of work created by the current shapers the work cost and force utilization are diminished and furthermore the general machining time is decreased to 40% contrasted with the current shapers. The primary target is to lessen the time and to expand the creation rate. From the above task it tends to be reasoned that "Double side shaper machine and pounding wheel connection" is having acceptable machinability and it will be in valuable in business industries.

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