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Portable Riveting Machine

Adil Dabir[1], Sahil Kumbhar[2], Rohan Karale[3], Samarth Barake[4], Prof. Mohammad Amin S[5]
Students, Department of Mechanical Engineering[1,2,3,4]
Professor, Department of Mechanical Engineering[5]
Zeal Polytechnic, Pune, Maharashtra

Abstract: *Portable Riveting Machine can change many industries Increase productivity, ensure fairness and improve worker safety. This provides the basis for the design and development of these machines, which focus on Purpose, components, and design and safety procedures. The demand for an automated hammering machine in various industries has increased significantly, Replaces repetitive and painful tasks like shaving or tool making Increase productivity, improve consistency and improve employee safety. This foundation is the basis for the design and development of such machines. Produces building materials. Should include the design and development of impact drills Collaboration between engineers, designers and industry professionals to ensure they meet.*

Keywords: Riveting, Portable

I. INTRODUCTION

Portable Riveting Machine have the potential to revolutionize several industries by increasing productivity, ensuring precision, and enhancing worker safety. This background provides a foundation for the design and development of such machines, emphasizing their purpose, key components, design specifications, and safety measures. The need for Portable Riveting machines has grown significantly in various industries, such as manufacturing, construction, and metalworking. These machines are designed to automate the repetitive and labour-intensive task of hammering or shaping materials, thus increasing productivity, improving consistency, and enhancing worker safety. This background sets the stage for the design and development of such a machine. The primary purpose of the Portable Riveting Machine is to streamline and automate the hammering process, which would otherwise be time-consuming and physically demanding when performed manually. This machine aims to reduce human labour, increase efficiency, and achieve precise results in various applications, from metal forging to shaping materials in the construction industry. The design and development of anPortable Riveting Machine machine should involve collaboration among engineers, designers, and industry experts to ensure that it meets the specific needs of the target application. Additionally, ongoing maintenance and safety training for operators are essential for the successful and safe operation of such machines

II. PROBLEM STATEMENT

In many industries and workshops, manual hammering remains a prevalent method for shaping, forging, or modifying metal components. However, manual hammering processes are labour-intensive, time-consuming, and can lead to inconsistent results due to variations in human strength and precision. Additionally, prolonged manual hammering can cause fatigue and potential health hazards for the workers involved. To address these challenges, the development of a manual hammering machine is essential. The manual hammering machine aims to automate and streamline the hammering process while ensuring precision, efficiency, and safety. This machine should be designed to cater to various metalworking tasks, including shaping, flattening, bending, and punching, thereby enhancing productivity and quality in metal fabrication processes.

III. SOLUTION OVERVIEW

The development of a Portable Riveting Machine specifically tailored for automobile components addresses the need for efficient and precise metalworking processes in the automotive industry. This machine aims to streamline production, enhance quality, and improve productivity in the manufacturing of various automobile parts such as chassis components, body panels, brackets, and structural reinforcements.

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IV. DESIGN OF HAMMERING MACHINE

A. Calculations

1) To calculate maximum torque by motor rating,

Given Data:

N = 30 RPM I =8 Amp

V = 12v strength Transmitted by means of Motor =V ×I = 12 ×8

P=2 πNT/60

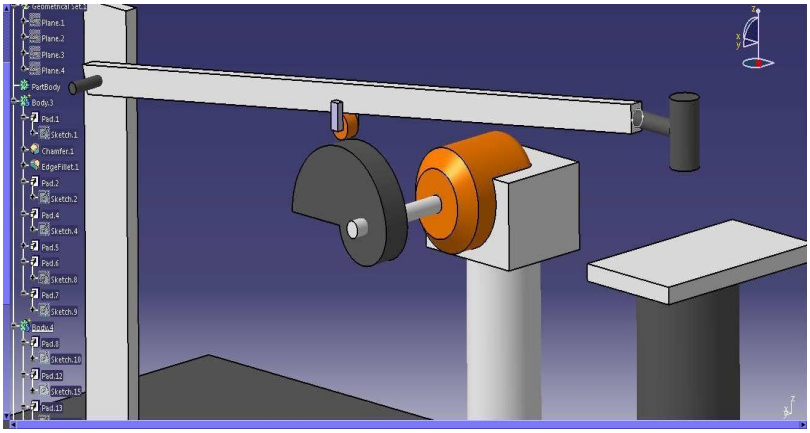
T=30.54 N-m

To find the space of BA means of Pythagoras theorem

$(AB)^2 + (BC)^2 = (CA)^2$

$(AB)^2 + (153)^2 = (420)^2$

AB=391.16 mm



2) To discover torque pressure transmitted we have two instances

CASE 1: while Hammer moves downward

Given:

(BC)=h =153 mm= 0.153 mm

Torque =30.55 N-m

= 30.55×103 N-mm

Length of hammer rod=420mm

= 0.42 m

Torque pressure = Tmax × length of hammer rod =30.55 ×0.420.153

CASE 2: when hammer goes upward

Given:

H=153 mm=0.153 m

T (time required for one re revolution of Disc) = 2 sec. So,

V =h ×T

V =0.15 ×2

So the impact speed of hammer is 0.306 m/sec.

RESULT:

Hence for riveting of 2mm rivet calculated the impact velocity is 0.306 m/sec with a torque force of 83.86 N-m is sufficient and it is calculated successfully.

To calculate shear pressure in bolted jointwe have bolted joints other torsional shear strain in joints, we have,

T=30.55 N-m.

D=Diameter of bolt 10mm. J= polar second of inertia

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End result:

As the standard permissible cost of shear stress for M10 bolt is $396.8\times10^3/mm^2$ and the calculated valve of shear stresses is 311.73×10^3 N/m^2 so therefore the valve of shear stress is less than permissible shear pressure the designs secure.

V. WORKING OF SYSTEM

In this machine mechanismis to convert rotary motion into linear motion. A crank is an arm attached at a right angle to a rotating shaft by which reciprocating motion is imparted to or received from the shaft. It is used to convert circular motion into reciprocating motion, or vice versa. The arm may be a bent portion of the shaft, or a separate arm or disk attached to it. Attached to the end of the crank by a pivot is a rod, usually called a connecting rod (con rod). The end of the rod attached to the crank moves in a circular motion, while the other end is usually constrained to move in a linear sliding motion. Here in this machine, An DC sewing machine motor is used in order to move the hammer. DC motor is powered by a power source. The DC motor connects with a disc in one end and in other end of the disc a shaft is connected with nut and bolt joints. One end of the hammer is connected to this connecting rod through a nut-bolt joint in order to achieve desired hammer motion with enough torque. The disc is used here to convert the lateral motion into rotary motion. Now use a suitable bed where work piece can be placed. The bed is placed on the top of a hollow bar

VI. CONCLUSION

A riveting machine is a versatile and innovative tool designed for various applications across industries. This compact and mobile device is engineered to deliver precise and controlled hammering or striking actions to work pieces. It has gained popularity due to its portability, ease of use, and ability to automate repetitive hammering tasks.

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