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FORGING HAMMER

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Abstract Use of machine is increased in many industries .The reason behind is machine because this machines are easy to use & it can be use continuously without a brake .This project deals with forging hammer . Forging hammer machine is one of the most important machine in automobile industry. It is primarily used in the drop forging to from the metal between two dies .The forging hammer machine works with the help of Pedal, motor and ms plate .The ms plate & hammer is connected in inclined by connecting plate and pedal is connected to the plate by welding .This machine is portable in size so easy transportable. This result in reduce cycle time. Other possible advantages are increase in productivity, reduced Labour. This machine is to design & fabricate a simple mechanical operated forging hammer by applying the principle of kinematic arrangement & mechanical design concepts.

Key Words: Development, Industries, Machine, Forging Hammer,

1. INTRODUCTION

1.1 Project Definition

This project is planned to design and manufacture a simple frame. The project is very important to the industry as through understanding the characteristics of failure, time and money will be saved. This is also very important from the safety view as this will lead to a safe operating place for machines.

1.2 Project Objectives

The main objectives of this project are:

1. To design an hammering machine that can give Motor operated blows.

2. To replace the use of Hand hammering for heavy operations.

3. To make an hammering machine that can help Labour in hammering processes.

4. To increase the efficiency and accuracy of the forging operations.

1.3 Project Specifications

Total weight	3kg
Hammer weight	900g
Hammer length	600mm
Hammer stroke height	350 mm
Width	600mm
Length	600 mm
Height	700 mm
Motor	12v

2. LITERATURE REVIEW

2.1 Project background

With the development of technology and the progress in the industry, Machine has become an important assets for industrial operations. Hammering is a very common process in the industries of mechanical engineering. Most of the industries that involve the making and machining of metal components use hammering. Moreover, hammering is extensively used in the wood industry. This project intention is designing and making an hammering machine that can perform hammering operations efficiently. Moreover, the hammering operation is hand performed that results in different types of injuries to the operators. Adding more to it, the efficiency and accuracy required in hammering operations are not succeed through hand hammering operations. Therefore, this project is selected that aims at designing and making an hammering machine.

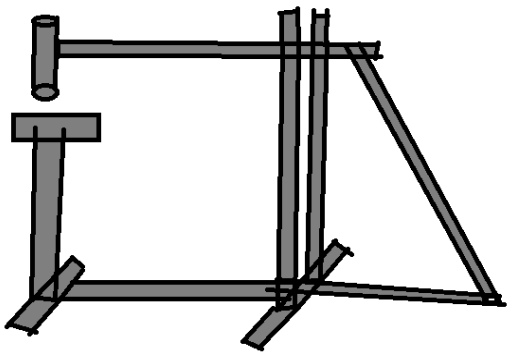
2.2 Justify

Forging hammers are used in the drop forging to form the metal between two dies. The first half of the die is attached to the anvil and the second part to the hammer. Hammers are classified in single effect (drop forging), double effect and counterblow hammers, depending on the drive of the ram movement. These are very flexible and multivalent equipment, and therefore committed mostly to small and medium series production. However, automatic hammers

have been developed to produce automotive parts in big series such as connecting rods for automotive and trucks engines. Hammers are particularly suitable to the forging of thin components and heavy parts, made of steel, Ni-based alloys or titanium.

3. SYSTEM DESIGN

Here is the architecture diagram of the Portable Hammering Machine



3.1 Design Limitations:

Sustainability limitations:

Principles of Sustainable design:

1) Optimize the site potential.

2) To minimize the energy consumption of non renewable.

3) To use the product which is friendly to the environment.

4) Not water waste.

5) To increase maintenance and operational practices.

Geometric Limitations: Geometric limitations help in controlling the relationships of objects with respect to each other. We use dimensional limitations for the control distance, radius, angle, and length values of objects. With limitations you can: include formulas and equations within dimensional limitations.

Economic limitations:

Primary considerations for the economic limitations are the cost of the making product, what will be its price the pricing of a product.

Environmental limitations:

This project has plus and negative points for environmental limitations

Health and Safety Constraints:

The purpose of this constrain is that product should be for the betterment of the human being. It should be designed such that its daily use doesn't cause any health issues for humans. And it should be safe for use.

Manufacturability Constraints:

It is related with the designing of a product so that it can be manufactured.

Social Constraints:

Our product is designed to meet human needs, it provides an ease to humans.

Ethical Constraints:

It is basic worried it to insured the design of the product so that it doesn't heart the feeling of others, you should be aware of code and conducts which provide us the standards of the proper behavior while interactions with others.

3.2 Engineering Standards and Codes:

Standards, codes, and specifications are extremely important and are often essential – technical documents in engineering and that of the related technical fields.

3.3 Theory and Theoretical Calculations:

Hammer:

A **hammer** is basically a tool which is consisting of the weighted "head" which is fixed on a long handle that is swung to give the impact to a small area of the object.

Hammering Machine:

An hammering machine is a device, which works automatically with the help of an automated system, which drives by the motor, output rotary motion, which them transfer to the pulley, and then finally, the motion of the hammer. Input to the motor may be a battery source.

Calculations

Calculations for the Hammering Machine are the following:

- Weight Total =20 kg
- Weight of hammer = 900g
- Length of hammer =600mm
- Hammer stroke height = 50 mm.

4. SYSTEM TESTING AND ANALYSIS

4.1 Experimental Setup, Sensors and data acquisition system

After making a practical model, experimental testing for the purpose of analysis and its performance is also very important. So, we make an experimental setup for the hammering machine. Which is describes below:

Summary and Conclusion:

Experimental results showed that an hammering machine can replace hammering machine due to the following reasons:

• It has excellent repetition of force

• Its ability to reduce the time and efforts required for the process.

• Using hammering eliminates double hits and a single hit was obtained from every measurement.

• The operator-independent process can be achieved using hammering.

5. PROJECT MANAGEMENT

5.1 Project Plan Break Down of Tasks:

We have divided the into 8 tasks

• Literature review

• 3D Modeling

• Identification of the material

• Material purchase

• Making a practical model

• Performing test

• Concluding the project

• Report writing.

5.2 Project Execution Monitoring Project Execution performs the following activities:

• First of all team members had a meeting and we select the topic project.

• We had the Literature review

• Then, we make a meeting with the Guide for the project approval.

• After the project is approved by the advisor, we search for the right form for the completion of the project

• Purchase of the selected material

• Working on practical model according to the model

• Meeting with the advisor and define the testing

• Analysis and testing of the portable hammering machine

• Report writing of the whole project. Finally, we complete the project.

6. PROJECT ANALYSIS

6.1 Life-long Learning Life-long learning from the project:

• It makes us familiar to the tools like lath machine use, paper cutting machine and so. We make use of these machines and get great information regarding manufacturing engineering processes.

• We learn about different tooling techniques

• We use engineering knowledge in the practical application.

6.2 Impact of Engineering Solutions

Machine has many engineering impacts, the impacts of the automatic hammering machine are described below:

• hammering is an instant process, we can make use of it for instant use

• Efficiency is increased using an hammering machine

• hammering is a fast process

• Various Operations can be done by using an automatic hammering machine

• hammering machine makes use of proper repetition and impact.

7. CONCLUSIONS

In this project, an hammering machine is designed and manufactured.

➢The materials were selected for each component on the basis of the engineering standards.

➢This machine is a unique machine and no other hammering machine of this exists.

➢Previously designed hammering machines did not involve variable strokes.

➢The project was full of challenges because of COVID-19 and the shortage of the important components.

➢The project explain us regarding economic limitations that how can we manage a project under a given budget.

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