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Development of Motorized Power Hammer

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Abstract: Hammering is the most widely used industrial as well as construction activity. Hammering or screws, metal sheets, parts etc requires a lot of time and effort. So here we propose an automated hammering system that allows for fully automatic hammering process. This allows for accurate, fast and automated hammering wherever and whenever needed using a 12V battery. The person just needs to insert workpiece and start the hammering machine. This machine can be used for automatic hammering work as and when needed. We here use a dc motor in order to move the hammer. The DC motor consists of a pulley attached to it which is connected to a larger pulley for efficient power transfer and to increase torque. This large pulley is connected to a shaft that has a connecting rod attached to it. This rod is used to achieve lateral motion from the spinning shaft. We now connect the other end of hammer to this connecting rod through a mid-swinging arrangement in order to achieve desired hammer motion with enough torque. We now use a suitable bed where workpiece can be placed.

In the present scenario due to the technologies advancement there are lots of demands of the products in the market for production of many components. This invention is relates to fabricate a simple power hammer machine having low cost, compact, easy to operate, and having less power requirement for a forging operation performed by blacksmiths. More particularly this invention is relates use of power hammer by small scale industries or workshops having less force requirement in forging than the other hammer machines available in the market to produce or manufacture a small parts like knives, medical equipment's, sockets, hooks, clips, dental equipment's, rings, manifolds, couplings, etc.

Keywords: Motor, Hammer

I. INTRODUCTION

Forging is the one type of mechanical process in which metal is heated and hammered by blacksmith, but in the present scenario the forging operation done by means of hammer machine tool. Whole operation is replaced from manual to automatic. The machine requires power source to perform the forging operation.

Power hammer is one type of machine tool which is used in forging operation. This machine use power source for up-down the hammer to being hammered any parts or components. They have been used by blacksmiths since 1880s, by replacing trip hammers. Generally power hammer consists of Ram, Frame, Anvil, Hammer head, Dies, Connecting Rod, Leaf Spring and power source like electric motor. Simply, power hammer is the machine tool which uses the electric power source to run the motor and this rotary motion of the motor is utilize to reciprocate the ram by attaching the leaf spring between ram and connecting rod. In this invention we have been modeling the machine in the software and made a simple and compact layout of the machine as per requirement of forging operations. This project is basically worried about the upset outline process and assembling machine of programmed compact hammering machine. Prototype which can be defeated the issue of off base hammering and strange effect of hammering in procedure of manufacturing. A conceivable arrangement of the issue of moderate hammering speed and anomalous hammering by a work is plan a programmed convenient hammering machine given mechanical advances in assembling process technique. The suitability of such an idea was explored as far as delivering reasonable and compacted plan for specialist which can be exchange anyplace of this machine by any laborers.

Automatic portable hammering machine can be considered as the backbone of any hammering operation in mass production its principle function is to safely and preciously hammering work like to perform the punching operation, filleting operation, riveting operation and smithy operation i.e.

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upset forging etc for all designed operating conditions. This paper describes cad modeling, design and analysis of automatic portable hammering machine. A programmed hammering machine self-working machine going to assume an imperative part in the assembling procedure (hammering process). Hammering machine utilized as a part of the generation of material extending from instruments, to pivots, car frame forming, molding of metal and so forth. The present development identified with metal squeezing machine and forming machine included certain outstanding challenges in regard of to drive nail, fit parts, forge metal and break separated question. The innovation has for its question cure this downside and to empower, by including helper implies, to drive nail, fit parts, manufacture metal and break separated protest the like. Hammering is the most generally utilized in mechanical operation and also development action. Hammering or screws

Now the project mainly concentrates on designing a suitable operating system. To maintain simplicity and economy in the design the locally fabricated unit has been used.Our project achieves higher safety, reduces human effort, increases the efficiency, reduces the work load, reduces the fatigue of workers and reduces maintenance cost.

II. OBJECTIVE OF THE PROJECT

- To understand the basic principal of the our project
- Describe the construction and working of various parts of our project
- Development of the working model of the our project

III. LITERATURE REVIEW

[1]. John Byron Henry, et.al. Invention relates to power hammers, and particularly to steam forge hammers including a supporting frame, a hammer operating power cylinder provided with a piston and piston rod carrying a ram or hammer attached.

[2]. Richard W. Hall, et.al, invention is to double acting forging hammers and, more particularly, to forging hammers actuated by pressurized gas and/or hydraulic fluid. Accordingly, there is a need for double-acting forging hammer which utilizes pneumatic and/or hydraulic hammer driving systems, yet does not have the energy losses associated with pneumatic systems or the complex and sophisticated of hydraulic systems.

[3]. Howard Terhune, et.al, invented this project is simply is an improvement of forging hammers used for industrial purposes. As we aware that in forging operation the temperature of the metal is so high that manual hammering operation is quite difficult for this purpose. So in this project they provided control valves which directing the ram up or down by the steam power.

[4]. Invention relates generally to portable motor-operated and manually controlled machine tools or implements, and more specifically to an improved hammer tool and operating mechanism of the reciprocating, rotary cam actuated type, and designed for interchangeable us as a portable power-operated hammer, wood chisel, scaling chisel, piercing punch, rock drill, and other similar power tools.

[5]. John I. Kupta et.al, invention herein disclosed relates to steam and air hammers of the pile driver type and in which, usually, the motive fluid is just admitted to lift and then released to drop the ram. ‘Operating in this manner such hammers naturally are inetiicient the use of steam or air and since gravity is the force relied on for the striking blow, the ram and other parts have had to be heavy and bulky.

[6]. David A. Giardino, et.al, invention relates to the art of rotary impact wrenches of a type in which a rotating member is periodically reciprocated into and out of rotary impacting relation with an anvil portion of torque output shaft. From the detailed literature review it can be observed that there was not any simple and compact machine designed. All the research was heavy and complex machine related. So, we have been trying to modelling a simple power hammer machine to perform forging operation easily.

IV. CONSTRUCTION & WORKING OF PROJECT

4.1Parts used in the project

- Shaft
- DC Motor

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- Hammer
- Mounts & Fixtures
- Supporting Frame
- Joints & Screws

4.2Diagram of the project

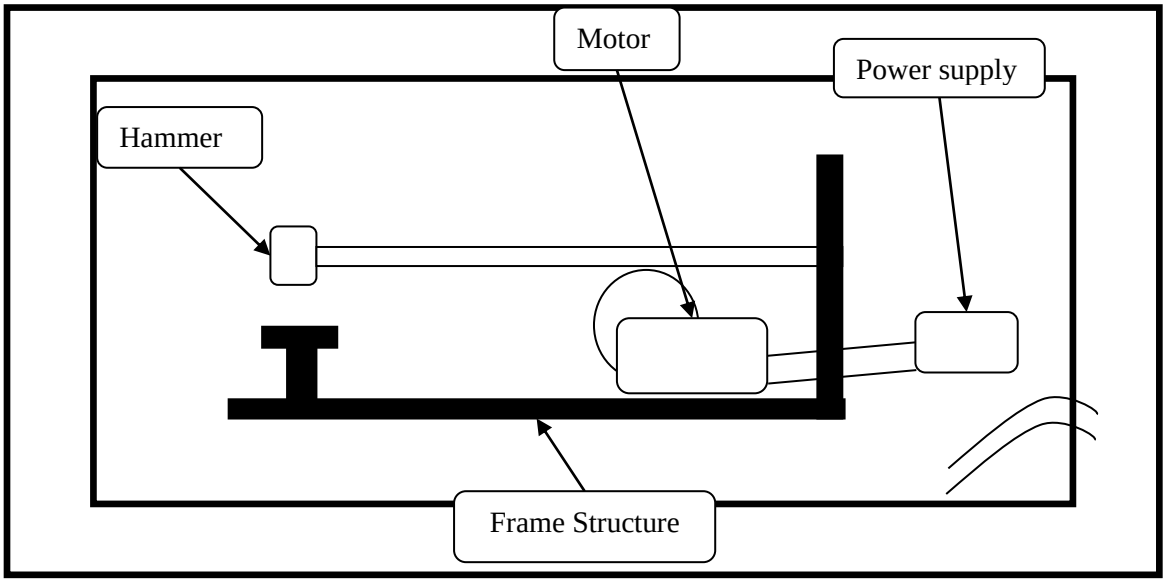

Figure 3.1 Motorized Hammer

4.3 Working of the project

This project has various different design paths to complete our products while matting the objectives. these means we will have to implement and compare our different design to insure the best product on our sat of objectives .this paths have changed as we progressed through our project, and there were few fore seen methods that we expand upon in the design section.

The basic design for automatic hammering machine is to have motor fixed on stand, and then motor shaft is inserted in center hole of the disc. Disc is connected to the hammer rod with the link rod when we supply the dc current to the dc motor by using adopter then the motor shaft start rotating further transmit the spinning motion to the disc by using shaft the first decision is to create an impact force for the respective operation this will help to determine product affordability. A more efficient yet expensive design would be to have battery instead of adopter. There is bound to be various obstacles and design method to be implemented as projected progressives and will be observed and recorded as they occur.

V. ADVANTAGES, DISADVANTAGES AND APPLICATION OF THE PROJECT

5.1. Advantages of the project

Advantages of the projectas per following like as:

- No conventional grid electricity required
- Long operating life
- Highly reliable and durable
- Easy to operate and maintain
- Eco-friendly

5.2. Disadvantages of the project

Dis-advantages of the project as per following like as:

- High installation cost
- Operating speed is low

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- Maintenance cost high
- Operating cost is high
- Skilled operator required

5.3. Application of the project

Our project should use for following various applications like as:

- To perform smithy operation i.e. upset forging.
- To perform the punching operation.
- To perform filleting operation as torque force produce is sufficient for the operation.
- To perform riveting operation etc.
- Industrial purpose
- Agricultural purpose
- Domestic purpose
- Commercial purpose
- Automobile application

VI. CONCLUSION

Our project is successfully implemented for we have successfully calculated the torque force of the motor. For the design the impact velocity and torque force for riveting of 2 mm rivet is calculated accurately. The entire modelling of the project is done with fabrication. In this addition to this. The project work has provided us an excellent opportunity and experience, to use our limited knowledge. We gained a lot of practical knowledge regarding. Planning, Perching, assembling and machining while doing this feel that the project work is good solution to bridge the gates project work. We between institutions and industries. We are proud that we have completed the work with limited time successfully Automatic hammering machine is working with satisfactory condition. We have done to our ability and skill making work.

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