

# Modification and Fabrication of Simple Power Hammer Machine

Sagar Makvana<sup>1</sup> Nishith Lashkari<sup>2</sup> Kalpesh Ram<sup>3</sup>

<sup>1,2,3</sup>Department of Mechanical Engineering

<sup>1,2,3</sup>Dr. Subhash Technical Campus, Junagadh, Gujarat, India

**Abstract**— 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 equipments, sockets, hooks, clips, dental equipments, rings, manifolds, couplings, etc.

**Key words:** Simple Power Hammer Machine

## 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.

## II. OBJECTIVE

The main objective of this relates to modelling and fabricates a simple power hammer having low cost, compact in size, less power requirement, easily move from one place to another place. To decrease the cost of machine by application of simple mechanism.

## 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. Gupta 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 in efficient 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. MODELLING

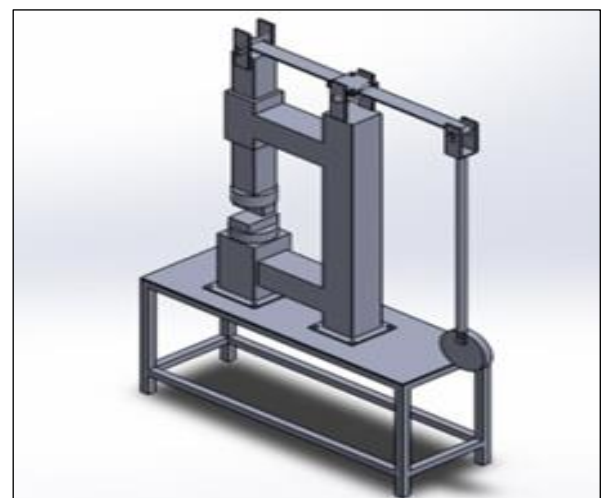


Fig. 1: Assembly of Machine

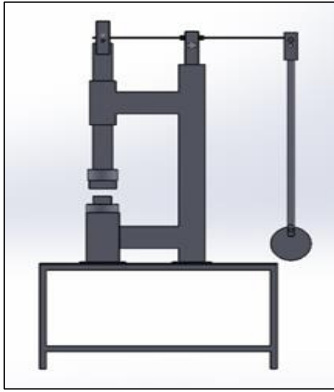


Fig. 2: Side View

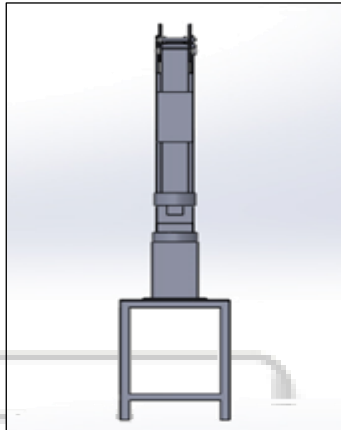


Fig. 3: Front View

#### V. SPECIFICATION

Particular	Specification
Working Outfit	Electric
Nominal Dropping	10 Kg
No of Hits	110 rpm
Motor Power	0.5 H.P
Motor RPM	1440 rpm
Volt	250
Stroke	8 inch
Control	Switch Control
Approximate Weight	60 Kg

#### VI. FABRICATION WORK

**Table:** To support the whole machine or to accommodate frame, electric motor table is used. It is made from 1"x1" square galvanized pipe. The length of table is 36", width is 12" and height is 18". The frame is standing on the table by means of nut and bolt.

**Frame:** It is the major component of machine tool. It is made from 4"x4" galvanized pipe. It supports the ram by means of nut and bolt, at the top of frame a leaf spring is pivoted by nut and bolt.

**Ram:** Ram is the component of the machine which reciprocates in the slot of frame. It is made from 2"x2" galvanized pipe. At the bottom of ram hammer head is fitted.

**Anvil:** The hammer head is strike on the anvil to perform the forging operation.

**Connecting rod with U clamp:** It is used to convert the rotary motion of motor into reciprocation motion of ram.

The connecting rod is the rod which is welded at the bottom of U-clamp.

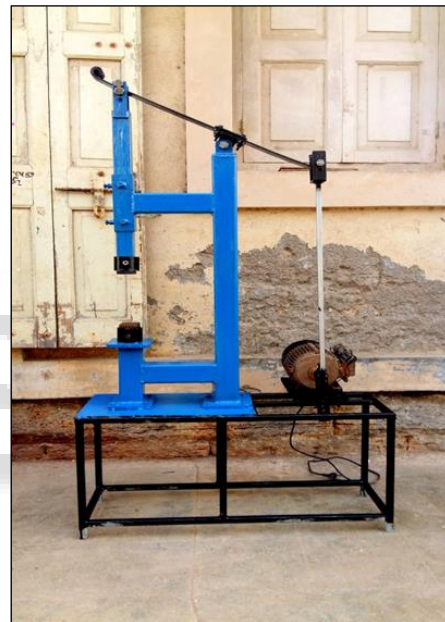
#### VII. ADVANTAGES

- Compact in Size
- Easy to operate
- Simple in construction
- Maintenance cost is low
- Less power consumption
- Time consumption during operation is less
- Different operation can be performed easily

#### VIII. DISADVANTAGES

- It cannot use for heavy forging work
- Very large part cannot be performed easily

#### IX. PHOTOGRAPH



#### X. CONCLUSION

After completion of the fabrication we put the machine in the workshop of blacksmith. We heated a metal rod of iron, and hammered the rod on our machine. We started forging operation on the machine; within a 5 to 8 strokes of ram we get our desired dimension and shape of the component easily. Similarly we used the machine for other small components. After performing all operation on the machine in the workshop and taking the feedback from the blacksmith, we realize that our machine is completely designed as per blacksmith requirement. Main objective of our project was that total cost of hammer machine is very less than that of other machines available in the market. Our machine cost is 10,000 INR.

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