VII. BLACK SMITHY

INTRODUCTION:

Black smithy or Forging is an oldest shaping process used for the producing small articles for which accuracy in size is not so important. The parts are shaped by heating them in an open fire or hearth by the blacksmith and shaping them through applying compressive forces using hammer.

Hand forging process is also known as black-smithy work which is commonly employed for production of small articles using hammers on heated jobs. It is a manual controlled process even though some machinery such as power hammers can also be sometimes used. Black-smithy is, therefore, a process by which metal may be heated and shaped to its requirements by the use of blacksmith tools either by hand or power hammer.

Forging by machine involves the use of forging dies and is generally employed for mass-production of accurate articles. In drop forging, closed impression dies are used and there is drastic flow of metal in the dies due to repeated blow or impact which compels the plastic metal to conform to the shape of the dies.

Applications of Forging:

Almost all metals and alloys can be forged. The low and medium carbon steels are readily hot forged without difficulty, but the high-carbon and alloy steels are more difficult to forge and require greater care. Forging is generally carried out on carbon alloy steels, wrought iron, copper-base alloys, aluminium alloys, and magnesium alloys. Stainless steels, nickel-based super alloys, and titanium are forged especially for aerospace uses.

Common Hand Forging Tools:

For carrying out forging operations manually, certain common hand forging tools are employed. These are also called blacksmith's tools, for a blacksmith is one who works on the forging of metals in their hot state. The main hand forging tools are as under.

Tongs: The tongs are generally used for holding work while doing a forging operation

Straight-lip fluted tongs are commonly used for holding square, circular and hexagonal bar stock.

Rivet or ring tongs are widely used for holding bolts, rivets and other work of circular section.

Flat tongs are used for mainly for holding work of rectangular section.

Gad tongs are used for holding general pick-up work, either straight or tapered.

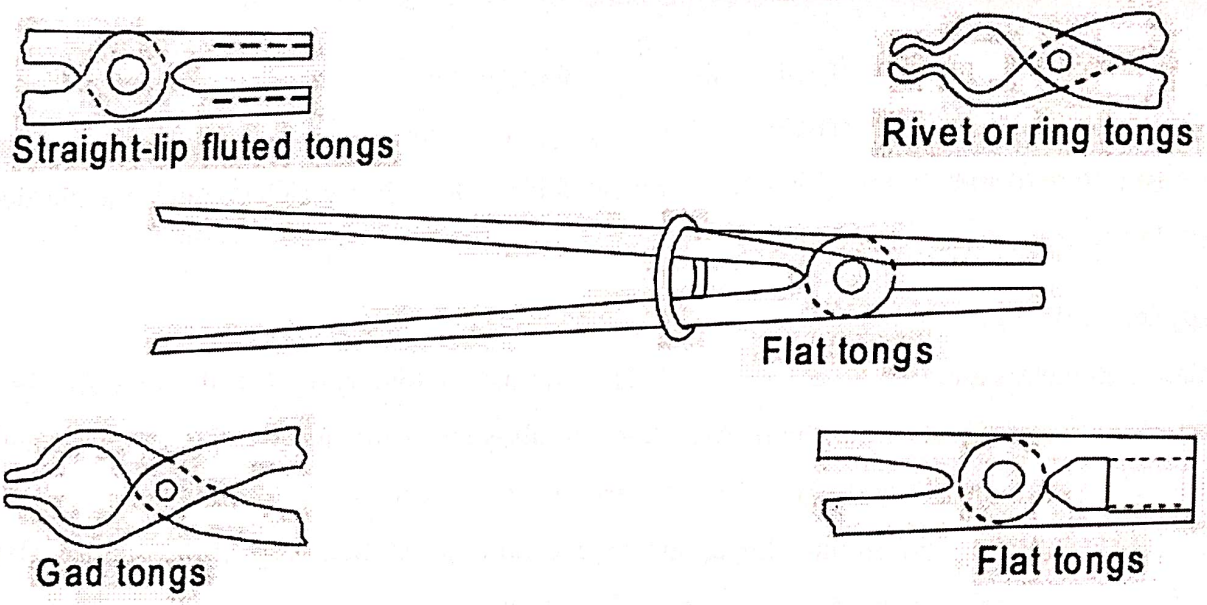
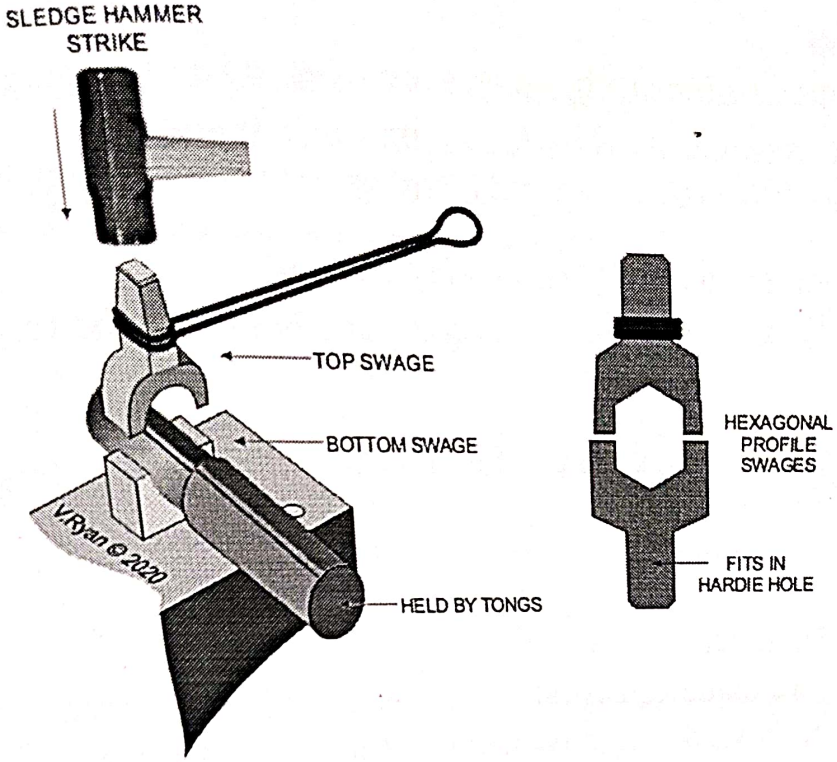


Fig.: Types of Tongs

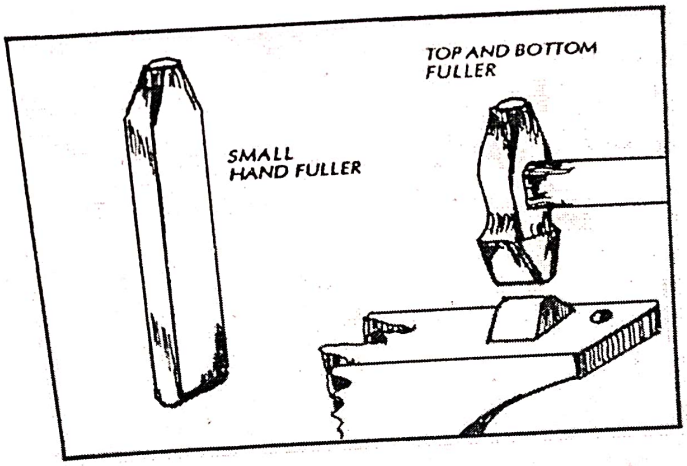
Swage

Swage is used for forging work which has to be reduced or finished to round, square or hexagonal form. It is made with half grooves of dimensions to suit the work being reduced. It consists of two parts, the top part having a handle and the bottom part having a square shank which fits in the hardie hole on the anvil face.



Fuller

Fuller is used in forging shop for necking down a forgeable job. It is made in top and bottom tools as in the case of swages. Fuller is made in various shapes and sizes according to needs, the size denoting the width of the fuller edge



Hand hammers

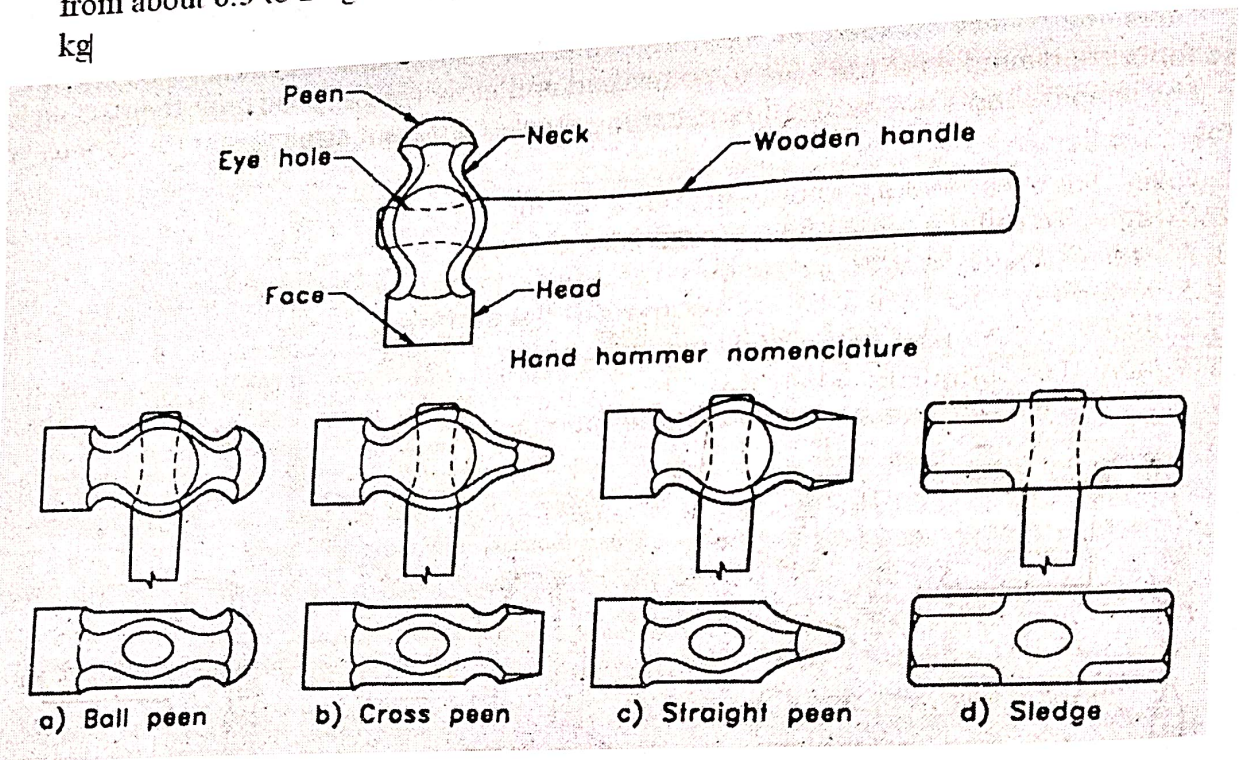
There are two major kinds of hammers are used in hand forging:

a. The hand hammer used by the smith himself and
b. The sledge hammer used by the striker.

- Hand hammers may further be classified as (a) ball peen hammer, (b) straight peen hammer, and (c) cross peen hammer.
- Sledge hammers may further be classified as

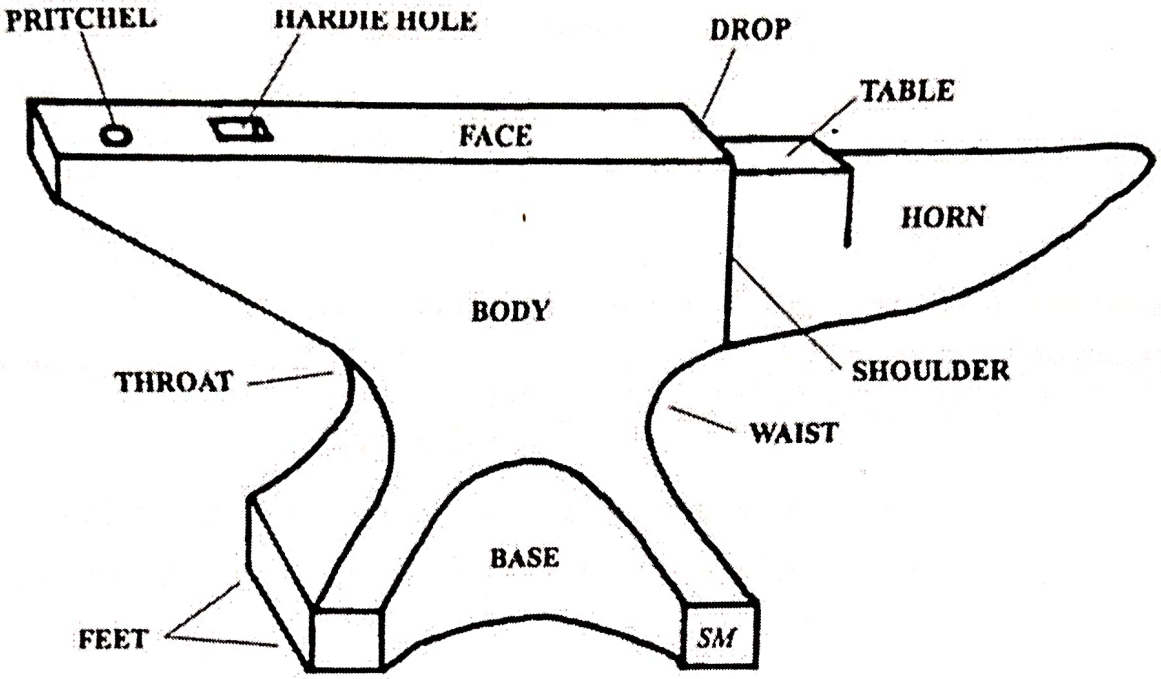
(a) Double Face Hammer, (b) Straight Peen Hammer, And
(c) Cross Peen Hammer.

Hammer heads are made of cast steel and, their ends are hardened and tempered. The striking face is made slightly convex. The weight of a hand hammer varies from about 0.5 to 2 kg whereas the weight of a sledge hammer varies from 4 to 10 kg



Anvil

An anvil is a most commonly tool used in forging shop.It acts as a support for blacksmith's work during hammering. The body of the anvil is made of mild steel with a tool steel face welded on the body, but the beak or horn used for bending curves is not steel faced. The round hole in the anvil called pritchel hole is generally used for bending rods of small diameter, and as a die for hot punching operations. The square or hardie hole is used for holding square shanks of various fittings. Anvils in forging shop may vary up to about 100 to 150 kg and they should always stand with the top face about 0.75 mt. from the floor. This height may be attained by resting the anvil on a wooden or cast iron base in the forging shop.



Swage block

Swage block generally used in forging shop.It is mainly used for heading, bending, squaring, sizing, and forming operations on forging jobs. It is 0.25 mt. or even more wide. It may be used either flat or edgewise in its stand.