

BLACK SMITHY SHOP

Introduction

Black smithy may be defined as the process of heating metal pieces up to its plastic state and then applying external pressure on metal pieces to acquire desired shapes and sizes.

Tools/Equipment's

1- Supporting Tools: Tool's used in smithy work for holding and supporting purposes are-

- a) **Leg vice:** It is used to hold the hot job/ work piece for further operations like hammering and bedding etc. this is generally made up of mild steel.
- b) **Anvil:** It is used to provide support to withstand heavy blows of hammer normally made up of casted mild steel or wrought iron.
- c) **Swage block:** It is also a supporting device which have number of slots and holes of different shapes which give support to job for obtaining the desired shape and size.
- d) **Tongs:** It is a holding device used to hold the job while some operation is to be carried out. It is made up of mild steel. On the basis of application, it may be classified into following types.
 - 1) Flat tong
 - 2) Flat mouth tong
 - 3) Round tong
 - 4) Square hollow tong
 - 5) Pick up tong
 - 6) Side bit tong

2- Striking Tools: To provide a blow or impact load on job to acquire desired shape and size. Hammer is generally made up of high carbon steel/tool steel by forging method. It is specified by its weight excluding the handle.

- a) **Hand Hammer:** The hammer which are operated by manual energy come under this category. On the account of their shape it may be further divided into following types.
 - 1) Ball pin hammer
 - 2) Cross pin hammer
 - 3) Straight pin hammer
 - 4) Sledge hammer
- b) **Power Hammer:** Some heavy hammers are operated by other power (hydraulic or electric) than manual power. These are used in heavy blow such as spring hammer pneumatic hammer steam hammer and drop hammer etc.

3- Cutting Tool: The tool which are used in cutting metals in smithy shop.

Chisel: It is most widely used as a cutting tool. On the basis of its working condition it may be classified into hot chisel & cold chisel.

4- Miscellaneous Tools/Device:

- 1) **Punch:** Punch is a tool used to make a hole in metal in hot condition as per the requirement of different size and shape.
- 2) **Drift:** It is used to expand the size of a hole after punch.
- 3) **Fuller:** It is generally used in increasing length of metal in hot condition and in making neck of job etc. It is made in two parts one is top and another is bottom.
- 4) **Swage set:** These are generally used in shaping metal in different shape like cylindrical, square, hexagonal and octagonal etc. in hot position of metal.
- 5) **Flatter:** It has a flat surface and a rode handle it is made in single part and used in making surface more flat and smooth. It is placed above the work piece /job while hammering is done on the flatter, so that there are no dents on the surface of job/work piece.

5- Smith Forge: The furnace desired for heating purpose for metal job is known hearth or smith forge it may be classified as follows.

- 1) Open hearth forge
- 2) Close hearth forge
- 3) Oil fired furnace

6- Operation Carried Out in Smithy Shop:

- 1) Heating
- 2) Cutting
- 3) Bending
- 4) Punching and drifting
- 5) Setting down
- 6) Upsetting
- 7) Drawing down
- 8) Swaging
- 9) Forge welding

PRACTICAL NO.-1

OBJECTIVE

To make a square of a round mild steel bar.

MATERIAL REQUIRED

Mild steel bar (diameter = 10 mm, length = 200 mm)

TOOLS REQUIRED:

1. Open hearth cool furnace is oil, furnace with boiler.
2. Anvil (100kg)
3. Cross pin sledge hammer (5kg)
4. Scale (300mm)
5. Flat tongs (300mm)

PROCESS INVOLVED:

1. Drawing
2. Upsetting

PROCEDURE:

1. Oil furnace in started and working is put on flame and on becoming red hot the piece is put with a tong and placed over anvil.
2. Position the red hot work piece on the anvil by one person and a proper hammering is being done by second person till flat shape is formed.
3. Again heat up the job to red hot and put the piece by rotation 90-degree angle with earlier position and proper hammering is done by other person all four faces are flattened uniformly and an equal rod is obtained.

RESULT ANALYSIS

Changes in dimensions (length, width, dia., weight etc.).

LEARNING OUTCOMES

What did you learn in this practical?

APPLICATION

Where we can apply the knowledge gained in this practical.

SUGGESTIONS

If you have any suggestion related to this practical, please advise.

PRECAUTIONS:

1. Avoid plastic wearing.
2. Wear only cotton cloths.
3. Avoid scattering of unwanted tools near work place.
4. Job must be hold rigidly in the tong.

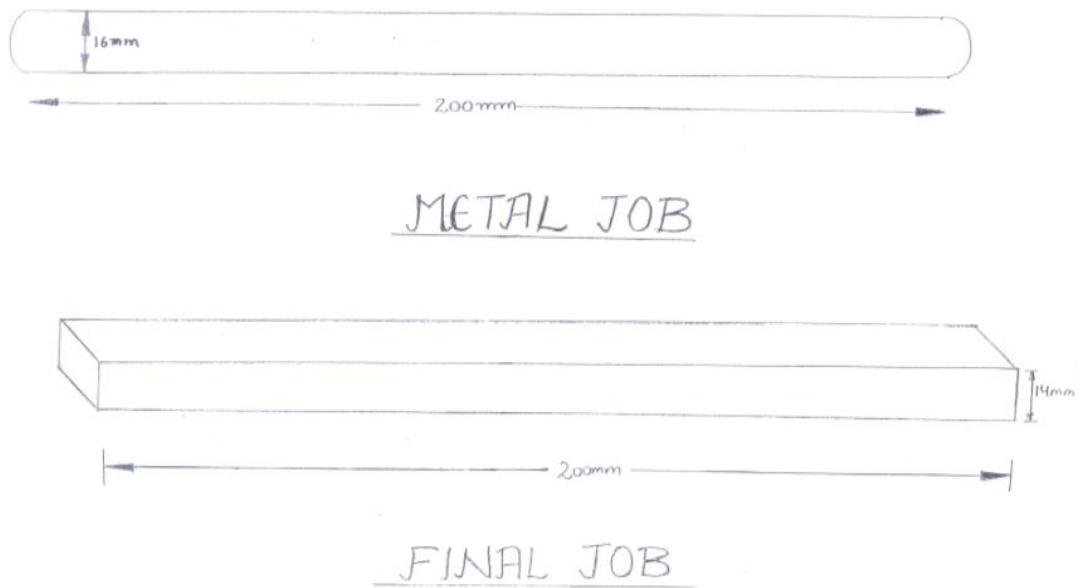


Fig. 1: Job

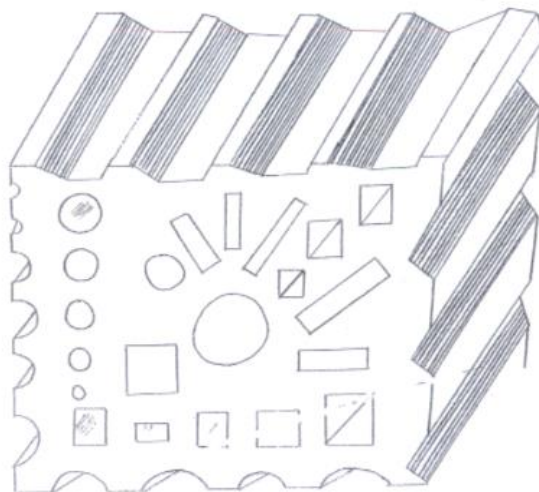
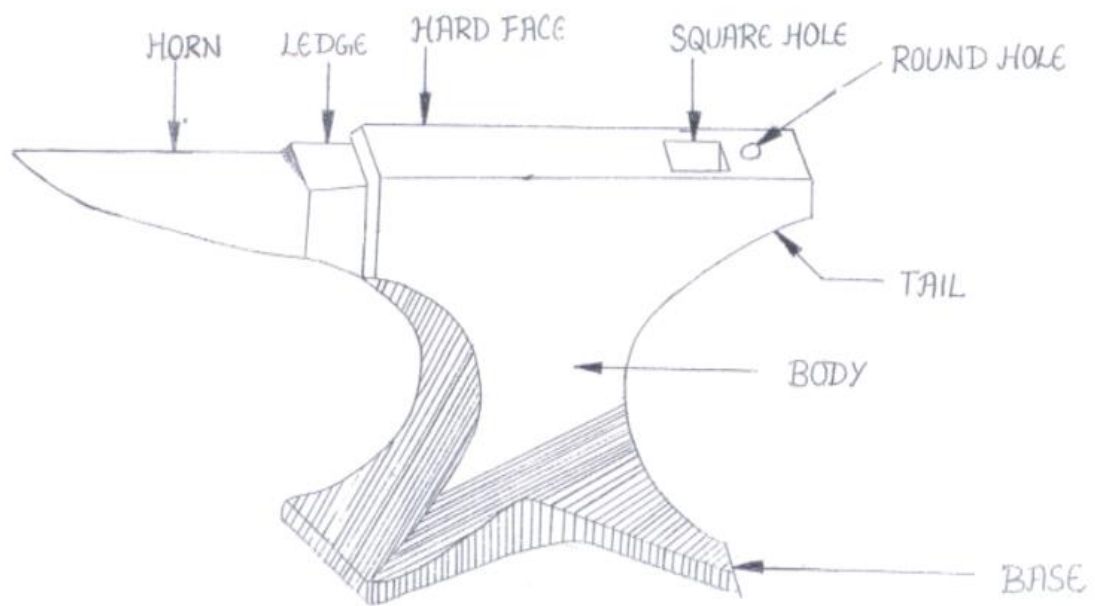


Fig. 2: Swage Block



ANVIL

Fig. 3: Anvil

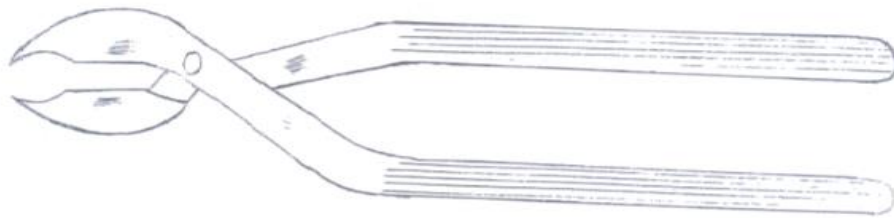


CLOSED MOUTH TONG

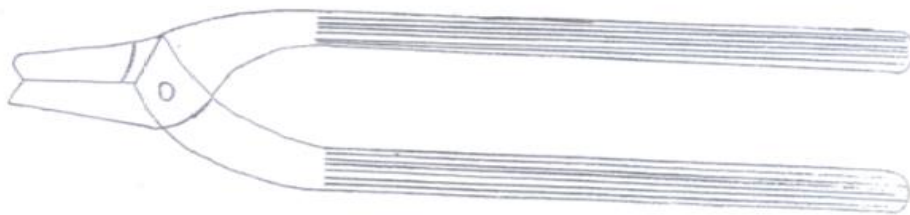


OPEN MOUTH TONG

Fig. 4: Close & Open Mouth Tong



ROUND HOLLOW TONG



CLOSED HOLLOW TONG

Fig. 5: Closed Tong

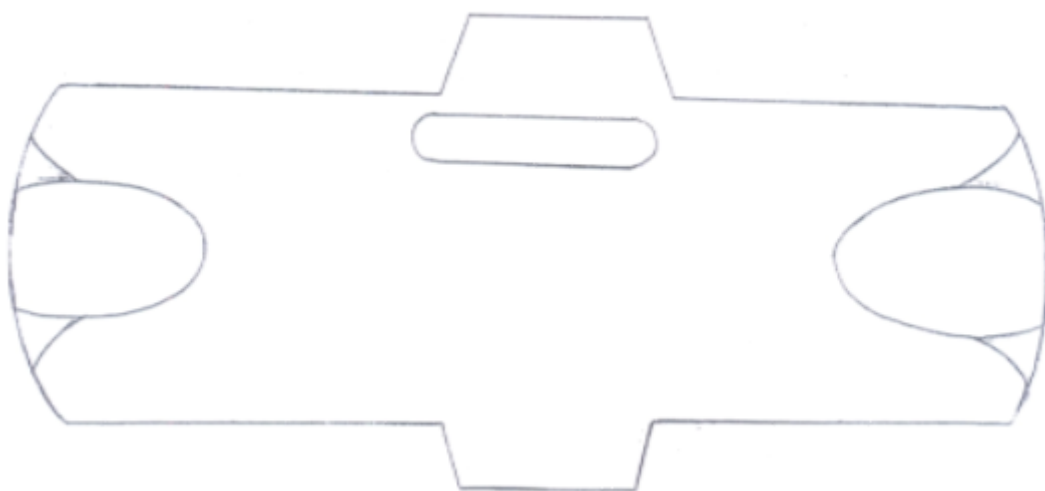


Fig. 6: Sledge Hammer Double Face

PRACTICAL NO.-2

OBJECTIVE

To make a mild steel chisel/nail.

MATERIAL REQUIRED

Mild steel bar (Round and Square cross section)

TOOLS REQUIRED:

1. Open hearth coal furnace or oil, furnace with boiler.
2. Anvil (100kg)
3. Cross pin sledgehammer (5kg)
4. Scale (300mm)
5. Flat tongs (300mm)

PROCESS INVOLVED:

1. Drawing
2. Upsetting

PROCEDURE:

1. Oil furnace is started and work piece is put inside the furnace and on becoming red hot the piece is held with a tong and placed over anvil.
2. For chisel, position the red-hot work piece on the anvil by one person and a proper hammering is being done by second person till a sharp edge of chisel is formed.
3. For nail, position the red-hot work piece on the anvil by one person and a proper hammering is being done by second person till a pointed tip of nail is formed.
4. Again heat up the job to red hot and put the piece by rotation in different angles with earlier position and proper hammering is done by other person all the sides are formed as per the desired shape of chisel and nail.

RESULT ANALYSIS

Changes in dimensions (length, width, dia., weight etc.).

LEARNING OUTCOMES

What did you learn in this practical?

APPLICATION

Where we can apply the knowledge gained in this practical.

SUGGESTIONS

If you have any suggestion related to this practical, please advise.

PRECAUTIONS

1. Avoid plastic wearing.
2. Wear only cotton cloths.
3. Avoid scattering of unwanted tools near work place.
4. Job must be hold rigidly in the tong.

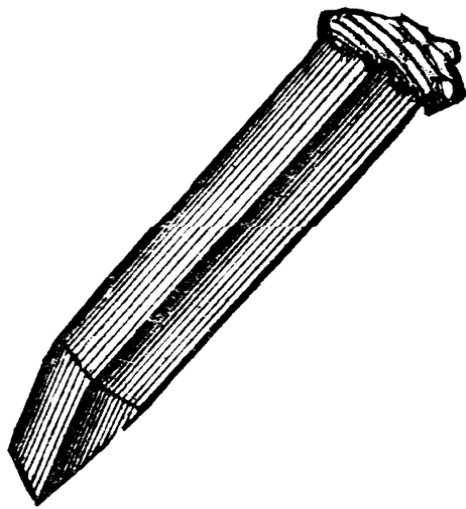


Fig. 7: Mild Steel Chisel

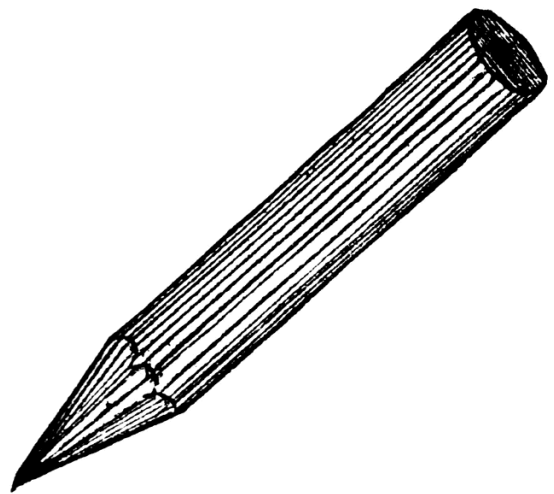


Fig. 8: Mild Steel Nail