# UNIVERSITY OF ENGINEERING & MANAGEMENT KOLKATA

## DEPARTMENT OF MECHANICAL ENGINEERING


PAPER CODE- ESME192 / 292 (WORKSHOP / MANUFACTURING PRACTICES)

B.TECH 1ST YEAR

1. **EXPERIMENT No. :** 02

## 2. TITLE : Job Process Operation in Fitting shop & Tools' Description.

**3. OBJECTIVE :** i) To be familiarize with different types of tools used.
ii) To be familiarize with different types of job operations performed.

**4. INTRODUCTION :** The term Fitting is related to the assembly of parts, after bringing the dimension or shape to the required size or form, in order to secure the necessary fit. The operations required for the same are usually carried out on a workbench, hence the work is done on the bench is called Fitting work.

**5. TOOLS USED :** The following tools are generally used.

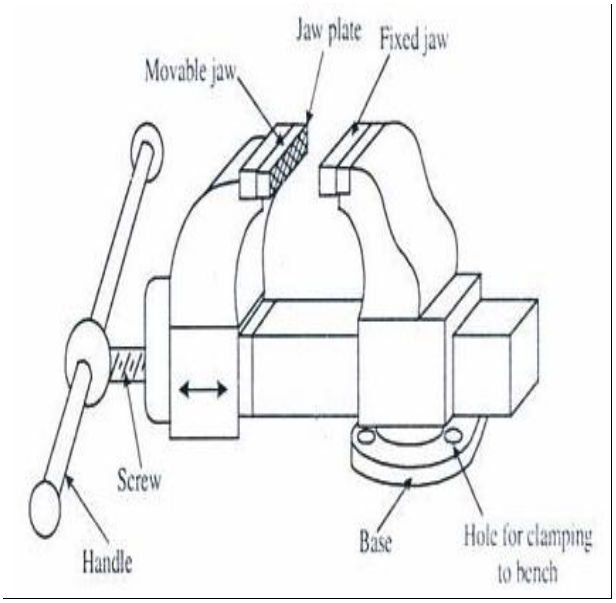


Fig : BENCH VICE

The bench vice is a holding device which is used to hold the work piece when performing Filling and Cutting on the job.

Bench vice has two jaws one is fixed (Stationary jaw) and another is movable (Sliding jaw). Sliding jaw slide over the slide face, when the handle is rotated.

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|  <br>Fig : C-CLAMP | A C-clamp or G-clamp is a type of clamp device typically used to hold a wood or metal work piece.<br>It is typically made of steel or cast iron.<br>The size of a C-clamp is measured by its jaw capacity. |

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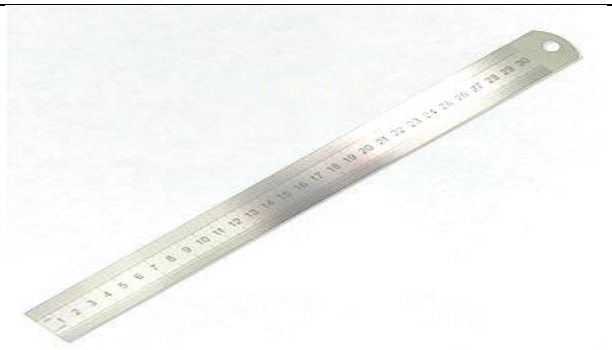
|  <br>Fig : STEEL RULE | The steel rule is used to measure the linear dimensions of a component with limited accuracy.<br>This is manufactured from bright, hardened and tempered steel. |

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|  <br>Fig : TRY SQUARE | The try-square is composed of two parts, the stock and the blade.<br>It is used for measuring the accuracy of a right angle (90 degrees); and is also used to check the straightness of a surface or correspondence to an adjoining surface. |

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|  <br>Fig : SCRIBER | Scribers are made from a rod of Hardened and Tempered Tool Steel<br><br>They are used to mark lines - usually when working in metal. |

Fig : DIVIDER

Dividers consist of a jointed pair of legs, each with a sharp point.
They can be used for geometrical operations such as scribing circles but also for taking off and transferring dimensions.

Fig : HACKSAW

Hand hacksaw is a cutting tool which is used in the fitting shop for manual cutting.
It has three parts, Handles, Hacksaw frame, and blade.
The blade is made of high-speed steel or high carbon steel and the frame is made of mild steel.
Blades are specified by length, width, thickness and and the number of teeth per inch (TPI).

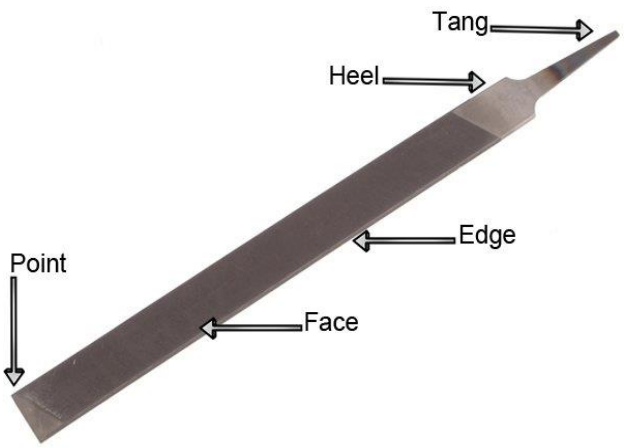


Fig : FLAT FILE

A flat file is a tool used to remove fine amounts of material from a work piece.

Most files are made from high carbon steel where the Length has been hardened and tempered.

Files are usually made in two types of cuts, Single Cut and Double Cut. Files are also classified by the coarseness of the teeth.

Fig : TRIANGULAR FILE

Their triangular files are used mainly for filing corners with angles less than 90 degrees.

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|  <br>Fig : ROUND FILE | Round files are used for filing concave surface and also for enlarging round holes. |

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|  <br>Fig : HALF-ROUND FILE | The Half-Round File is Double Cut on the flat side and Single Cut on the curved side. It tapers slightly towards the point in both width and thickness. It is used for filing concave surfaces and the flat face is used for filing convex surfaces. for filing concave surfaces and internal corners. |

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|  <br>Fig : BALL PEEN HAMMER | Ball peen hammer: This is the most common type of hammer which has a ball-shaped end of the head opposite to the striking face.<br>It is used to deliver blows to an object or strike another object. This is made of Cast steel or carbon steel. |

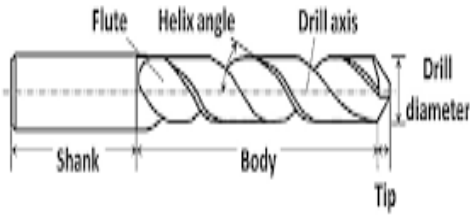


Fig : TWIST DRILL

Twist drill is a cutting tool comprised of cutting point at tip of a shaft with helical cutting edge. The following are the main parts of a twist drill.

1. Body
2. Shank
3. Drill axis
4.Flutes
5. Flank
6. Lip
7. Helix angle

Fig : TAP WRENCH

A tap wrench is a hand tool used to turn taps or other small tools, such as hand reamers. A tap is used to cut or form a thread on the inside surface of a hole. Reamer is applied to finish drilled holes accurately to size and with a good surface finish.

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|  <br>Fig : DIE WITH HOLDER | A die is used to cut an external thread on cylindrical material, such as a rod, which creates a male threaded piece which functions like a bolt. Dies are generally made in two styles: solid and adjustable. |

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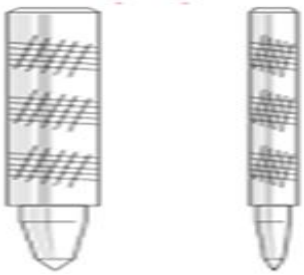
|  <br>Fig : CENTER PUNCH & PRICK PUNCH | A center punch is used to mark the center of a point. It is usually used to mark the center of a hole when drilling holes. The tip of a center punch has an angle between 60 and 90 degrees. A prick punch is used for marking out. The tip of a prick punch is 40 degrees It is also known as a dot punch. |

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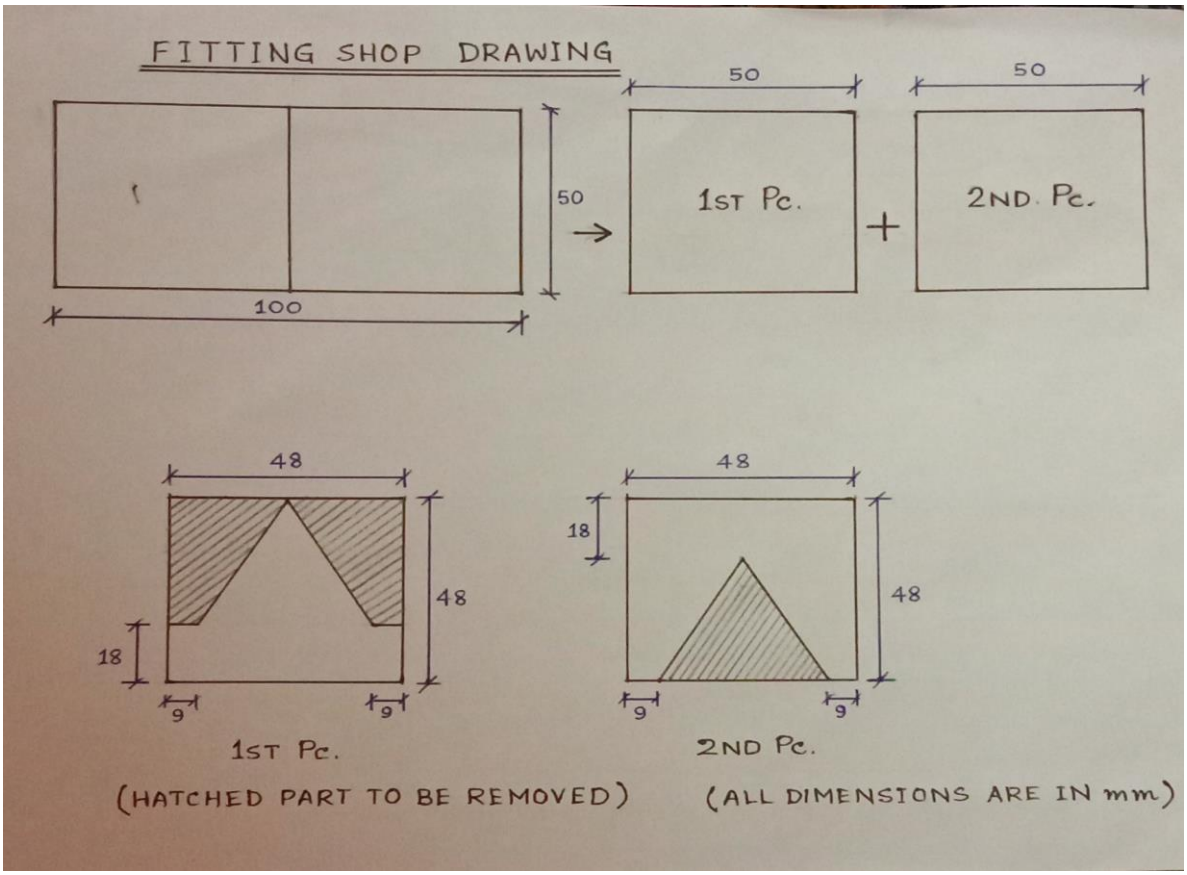
|  <br>Fig : LETTER PUNCH |  <br>Fig : NUMBER PUNCH | Letter punches and number punches are used to emboss the impression of a letter or number into a work piece. They are most common in the reverse image, this allows the end result to be immediately readable, |

**6. JOB PIECE :** A 100mm long mild steel flat bar of 50mm.




**7. JOB OPERATIONS PERFORMED :** The following job operations are performed to make a fitting job- fitting of male and female part. (Hash part of above fig. to be removed)

**i) Chalking :** Write in your own words. (Already discussed in class)

**ii) Marking :** Write in your own words. (Already discussed in class)

**iii) Cutting :** Write in your own words. (Already discussed in class)

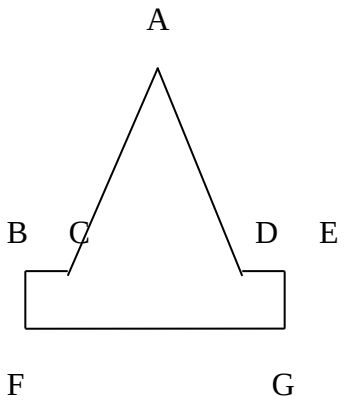
**iv) Checking the squareness of object :** Write in your own words. (Already discussed in class)

**v) Filling :** Write in your own words. (Already discussed in class)

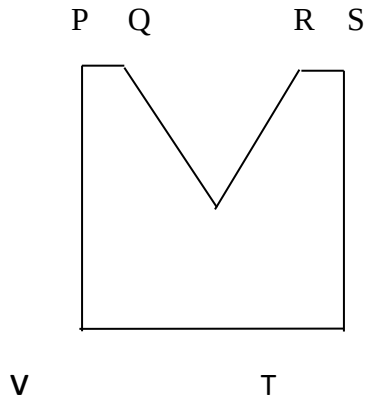
**vi) Punching :** Write in your own words. (Already discussed in class)

## 8. INVESTIGATION REPORT :

**MALE PART**




**FEMALE PART**




| MALE PART | Name of sides | Desired dimension in mm | Observed dimension in mm | FEMALE PART | Name of sides | Desired dimension in mm | Observed dimension in mm |
|---|---|---|---|---|---|---|---|
| | BC | | | | PQ | | |
| | DE | | | | RS | | |
| | EG | | | | ST | | |
| | BF | | | | VT | | |
| | FG | | | | VP | | |

**9. CONCLUSION :** Write in your own words.