M. B. M. ENGINEERING COLLEGE

FACULTY OF ENGINEERING

JAI NARAIN VYAS UNIVERSITY, JODHPUR

Date 24-03-2020 Experiment No. Index P. No.

Name NARESH AGRAWAL Faculty No. 19/12/623 Class B.E. I Year Batch E-2

Lodha

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Date..... Experiment No..... P. No.....1.....

Name.- Naresh Agrawal Faculty No. 19123623 Class B.E. 1st year Batch... E-2....

General Instructions :-

Introductions :-

In Engineering, practically in heavy & medium, engineering industries with heavy use of automatic machines, bench work & fitting have important role of play to Complete & finish a job to the desired accuracy. Much of the raw material goes into the machine shops & reppear as finished Component body for assembly work is carried out on bench work.

The term bench work generally denotes the production of an article by hand on the bench work. the term "fitting" means assembling to gather of parts & removing metals to get the necessary fit.

However, these two types of work require the use of large no. of tools & equipment & involve a no. of operations to finish the work to desired shape & size. ① Fitting ② clipping ③ marking ④ Punching ⑤ Sawing ⑥ Drilling ⑦ Tapping ⑧ Dieing ⑨ measuring ⑩ cheeking.

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Date..... Experiment No..... P. No. 2

Name. NARESH AGARWAL Faculty No. 13/2862.3 Class..... Batch. E2

SAFETY PRECAUTIONS :-

1. Keep your mind fresh & alert in the lab.
2. Wear proper uniform, do not wear loose dress.
3. Always use sharp tools.
4. Do not use a hammer with loose handle.
5. Do not use file without handle.
6. Never attempt to make repair of electric or mechanic equipment without the permission of your teacher.
7. Arrange all the tools on bench properly.
8. Do not use a chisel with a mushrooms head.
9. Wear safety goggles when working on tool grinder.
10. Work should be gripped properly in the vice.
11. While Hack-Sawing, ease-up cutting pressive when the cut is nearly through.
12. Use the right tools, for the job, do not use a Spanner, hammer & file as a screwbar.
13. Work should be properly clamped before the machine is started.
14. Keep your hands away from all the revolving parts.

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Date..... Experiment No..... P. No. 3

Name. NARESH AGARWAL Faculty No. 19123623 Class..... Batch.....

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CAUSE OF Accident :-

1. Carelessness
2. worries and tiredness
3. over Confidence.
4. loose clothing.
5. less time and Space.

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Date..... Experiment No..... P. No. 04.....

Name NARESH ... Faculty No. 13/12362 ..... Class..... Batch.....

Specifications of Some Common Hand Tools :-

S.No.	Types of Tools	Specified Under	Examples
1.	BENCH VICE	max. opening btw jaw plates & width of the jaw plates.	width of jaw plate - 80mm max. opening 120mm.
2.	PIN VICE	Min. & max. opening of collet chuck.	0.5 to 3mm diameter, small work piece can be held.
3.	PIPE VICE	min. & max. diameter of work which can be held	25.4 to 50.4 mm diameter of pipe can be held.
4.	Hand VICE	Width of jaw plate & total length of vice.	width 42mm length 125 mm.
5.	FILE	length shape - cut - grade.	300mm flat double Bastard, 200mm rectangular double file.
6.	chisel	Shape of cutting edge of total length of chisel.	Flat chisel, 19mm - 200mm

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Date..... Experiment No..... P. No. 05

Name... MAHESH AGARWAL... Faculty No. 19123623 Class..... Batch.....

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7.	HACKSAW	min./max. distance blw the centres of the holes at each end & type of hack saw frame.	300 mm adjustable Hacksaw frame.
8.	HAMMERS.	Shape of pane & total weight of hammer.	Ball pane hammer 600 gm.
9.	Try SQUARE	Total length of measuring blade.	150 mm try Square.
10.	BEVEL SQUARE	Total length of measuring blede.	150 mm bevel protactor.
11	CALIPERS	Shap of legs, greatest distance blw measuring edges & type of joints	outside (Spring type) 150 mm Caliper.
12.	Drills.	Types of shank, size, materials, type of flute.	parallel shank, 9mm Size, high Carbon steel or high speed steel twist drill.

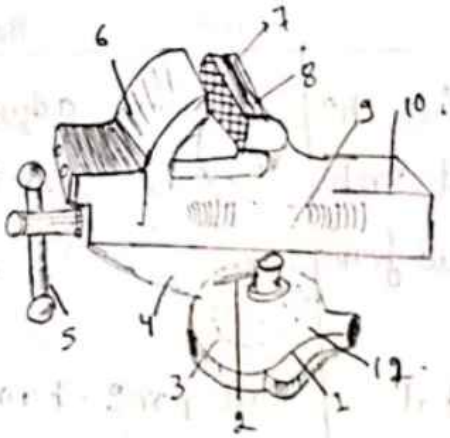
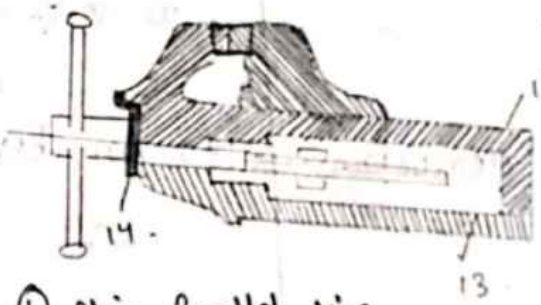


Fig.1: (a) Swivel Parallel Vice

1.) stationary Support Disc
2.) Turning Lever
3.) Swivel Plate
4.) Base Plate.
5.) Handle.
6.) Movable Jaw
7.) Jaw Plates
8.) Fixed jaw
9.) Fixed Nut
10.) Clamping Screw
11.) Circular Slot
12.) Prismatic Shank.
13.) Base
14.) Coupling Plate.



(b) Plain Parallel Vice

Parallel Vice.

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Date..... Experiment No..... P. No. 06

Name... NARESH AGARWAL Faculty No... 19123689 Class..... Batch.....

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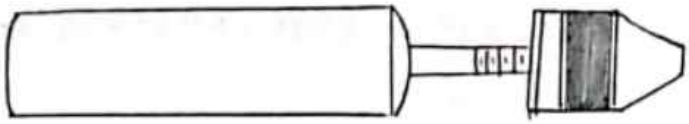
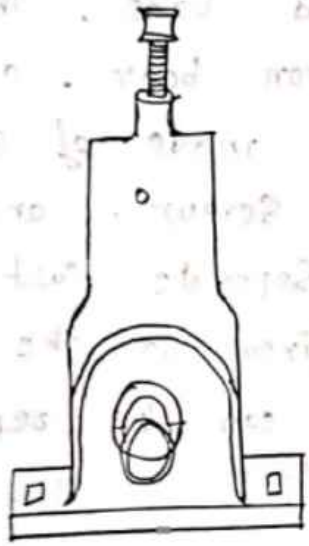
1. BENCH VICE :-

The most Commonly used is the engineer's parallel jaw bench, vice, Sometimes Called fitter's vice. It must be firmly fixed to the bench with Coach Screws, or with nuts and bolts. The vice escentially Consists of Cast iron body, a fixed jaw, a movable jaw - both made of Cast iron Steel, handle, a Square-threded Screw, and a nut - all made of mild steel, Seperate Cast Steel plates known as jaw plates are fixed to the jaws by means of Set Screws & they Can be replaced when worn.

The Movement of vice is caused by the movement of the Screw through the nut fixed under the movable jaw & the Screw is is provided with collar inside to prevent it from coming out of the jaw when revolved. The size of a vice is known by the width of its jaws. the width Suitable for Common work varies from 80 to 140 mm.



Pin vice.



Pipe vice

Hand vice.

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Date..... Experiment No..... P. No. 07

Name. HARISH ... Faculty No. 19123622 ... Class..... Batch.....

2) PIN VICE :-

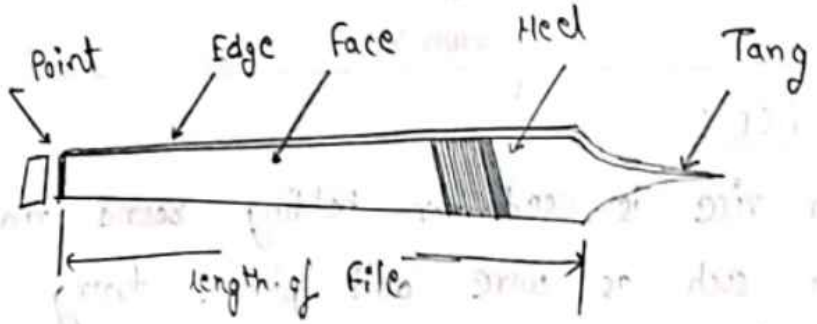
The Pin vice is used for holding round material of small diameter such as wire & pins, during working. It also forms a very usefull handle for small files. It consist of a handle & a tappered nose covering a small called at its end. The chuck carries the jaws which are operated by turning the handle.

3) PIPE VICE :-

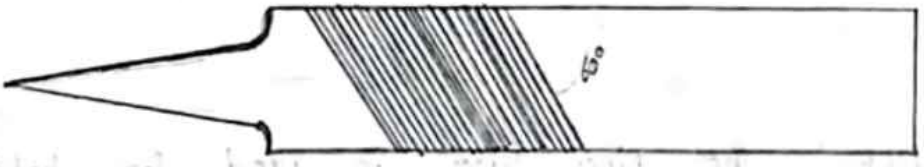
The pipe vice is used for holding round section metal, tubes, pipes etc. In this case, the screw is vertical & the movable jaw works vertically. Its grips the work at four points on its surfaces.

4) HAND VICE :-

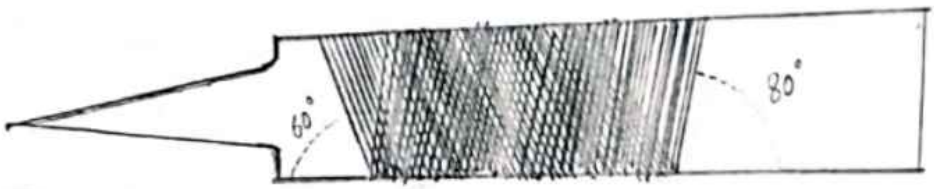
The hand vice is used for gripping screws, revels, keys, small drills & other similar objects which are too small to be conveniently held in the bench vice. The length varies from 125 to 150 mm & the jaw width from 40 to 44 mm.



Different Parts of a file.



Single Cut file.



Double Cut File:

Date..... Experiment No..... P. No. 08.....
Name MARIAM AGARWAL Faculty No. 21/23622 Class..... Batch.....

5) FILE :-

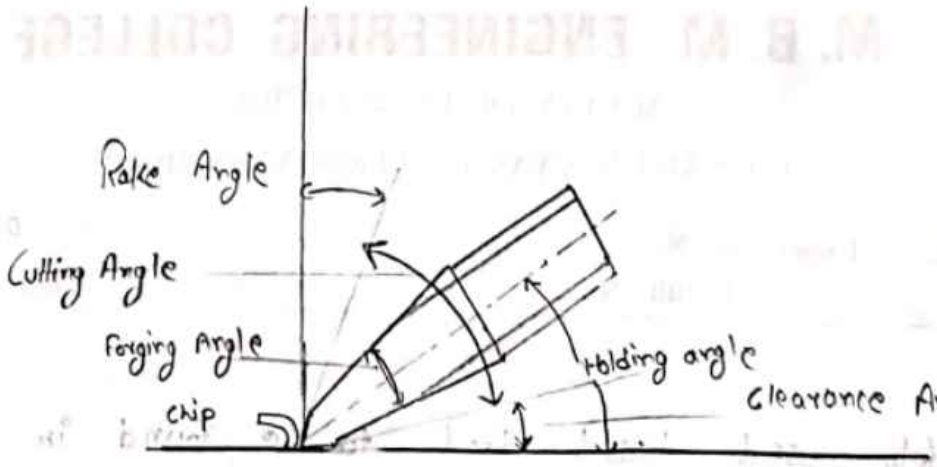
A most widly used hand tool to be found in an engineering workshop is the file. It is a hardened piece of high grade steel with starting rows of teeth. It is used to cut, Smooth or fit metal parts. It cuts all metals except hardened steel.

A file is consist of following parts. The tang is the pointed part which fitted into the handle. the point is the end opposite the tang the heel is next to the handle.

6. Size :-

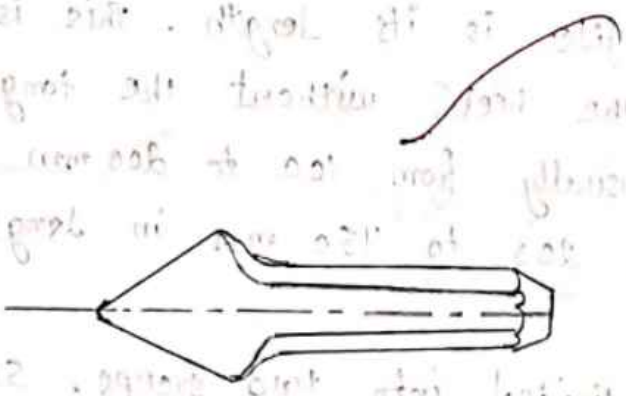
The size of a file is its length. this is distance from the point to the heel. without the tang, file for fine work are usually from 100 to 220mm.

Cut of teeth :- It is divided into two groups. Single cut files teeth are cut parallel to other across the file at an angle of 60°



Chisel in Operation

Flat chisel



Cross-Cut chisel

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Name. NARESH AGARWAL Faculty No. 19/2.9/6.3 Class..... Batch.....

Single - cut and double - cut files are further divided according to the coarseness or spacing btw the rows of the teeth. In descending order of roughness they one listed as:

1.) Rough (R)
2) Bastard (B)
3. Second Cut (Sc)
4.) Smooth (S)
5) Dead Smooth (DS)
6) Super Smooth (SS)

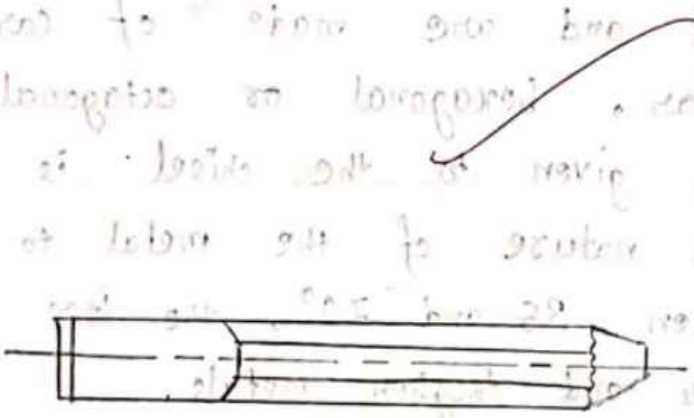
6) CHISELS :-

Cold chisels are used for cutting & chipping away pieces of metal & are made of Carbon Steel usally rectangular, hexagonal or octagonal Cross - Section. The cutting angle given to the chisel is determined usually by the nature of the metal to be chipped.

The chisel is subdivided into cutting edge & head, & this is generally Specified by the length and width of cutting edge. A 25 mm Cold chisel means a chisel with a 25 mm wide cutting edge.

Half Round chisel.

Diamond - Point chisel



Side chisel.

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Name..NARESH AGARWAL... Faculty No...19122623..... Class..... Batch.....

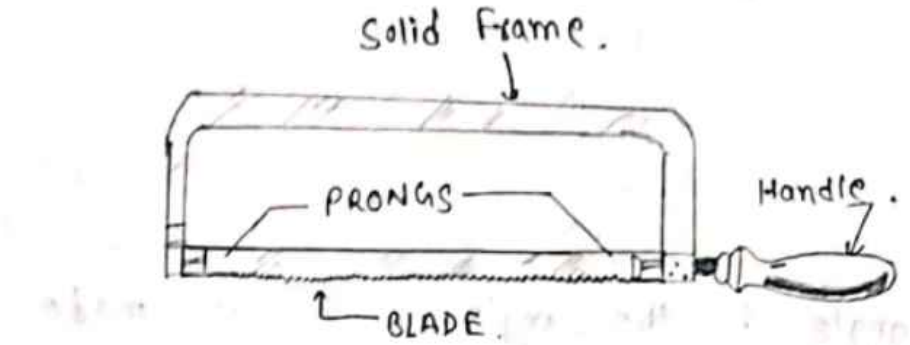
The rake angle is the angle which is made by the upper taper surface of the chisel point & a line perpendicular to the point of metal surface. The clearance angle is dependent of the way the operator derives it & it is made more than 10°.

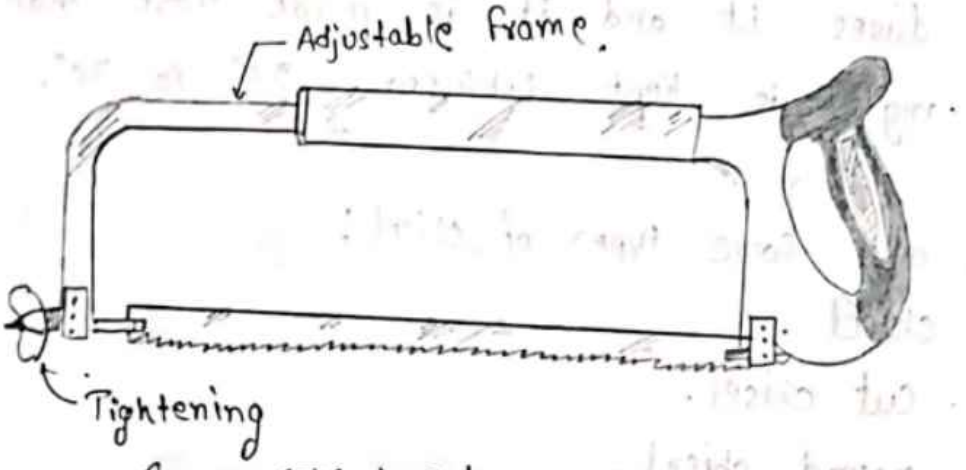
Following are some types of chisel.

1.) Flat chisel
2.) Cross - Cut chisel
3.) Half - round chisel
4.) Diamond point chisel
5.) Side chisel.

7) HACKSAW :-

The hacksaw is used for sawing all metal except hardened steel. A hand hacksaw consist of a frame, handle, prongs, tightening screw and nut and blade. The frame is made to hold the blade tightly, they are made in two types: The solid frame in which the length cannot be changed &





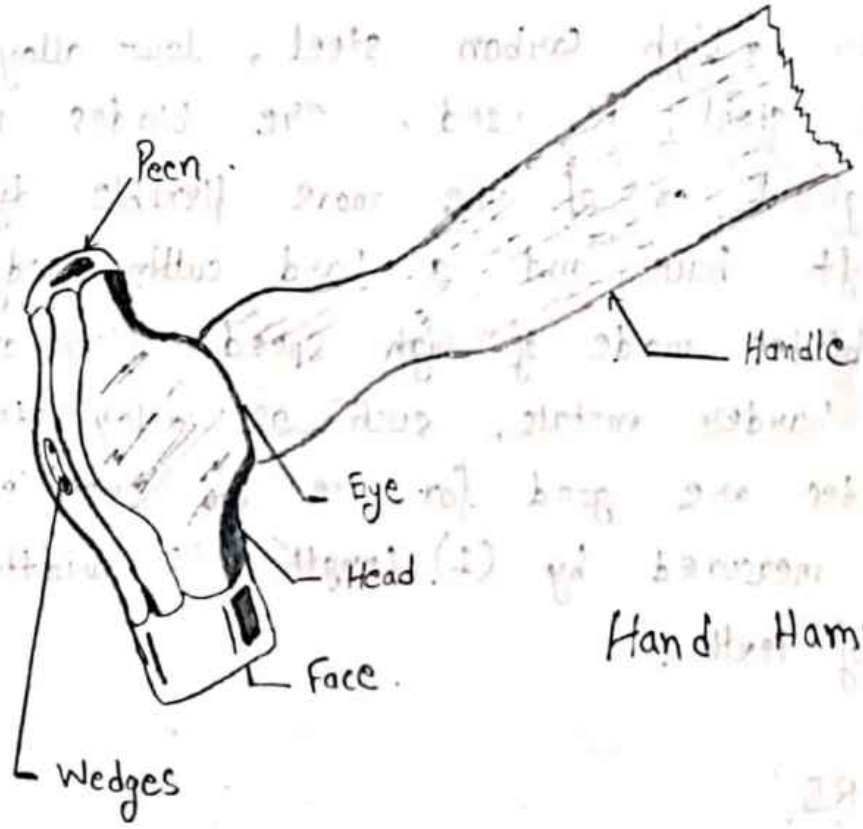
Different Parts of a Hand Saw.

adjustable frame which has a back that can be lengthened or shortened. to hold blades of different length.

Hacksaw blades are made of special steels. for hand saws either high carbon steel, low alloy steel or high speed steel is used, The blades may be hard throughout or of the more flexible type, which has a soft back and a hard cutting edge.
All hard blades of high speed steel are used for cutting the harder metals, such as alloy steels, while flexible blades are good for use by unskilled operators blades are measured by ① length ② width ③ Thickness ④ Pitch of teeth.

8.) HAMMERS :-

Hammers are used to strike a job or a a tool. they are made of forged steel of various sizes. and shapes to suit various purpose. A suitable range would be from 0.11 to 0.33 kg for light work such as clinching small rivets and dat punching, 0.45 kg for chiselling.



Hand Hammer.

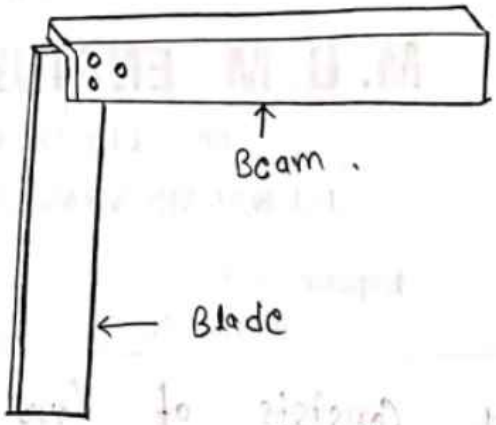
A hammer consist of four parts namely peen, head, eye and face. The eye is normally made oval elliptically in shape, & it accomodates handle or shaft. The handle is made of elastic wood or bamboo.

hammers are classified, according to the shape of the peen, as ball peen, cross peen & straight peen hammer.

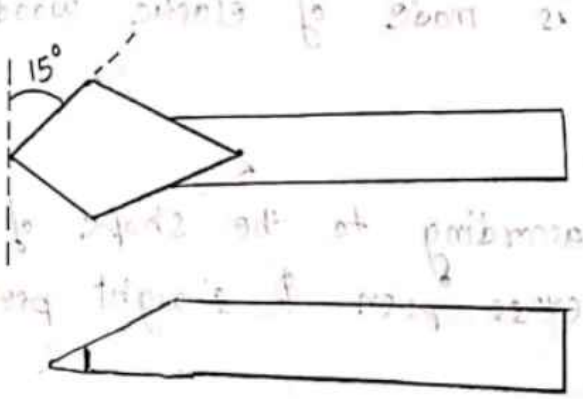
Ball peen hammer: Also called as engineer's hammer the peen has a shape of ball. This hammer is chiefly used for chipping & riveting. size of this hammar varies from 0.11 to 0.91 kg.

Cross peen hammer: this is to ball peen in shape & size except peen which is across shaft or eye size varies from 0.22 kg to 0.91 kg.

straight Peen hammer: this has a peen straight with the shaft i.e. parallel to the axis of the shaft. this is used for stretching or peening the metal. Size varies from 0.31 kg to 0.91 kg.

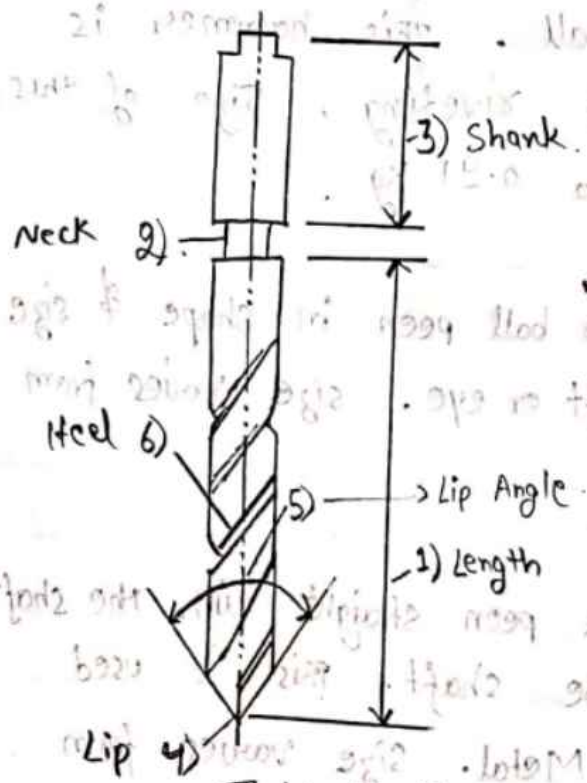


Try Square.

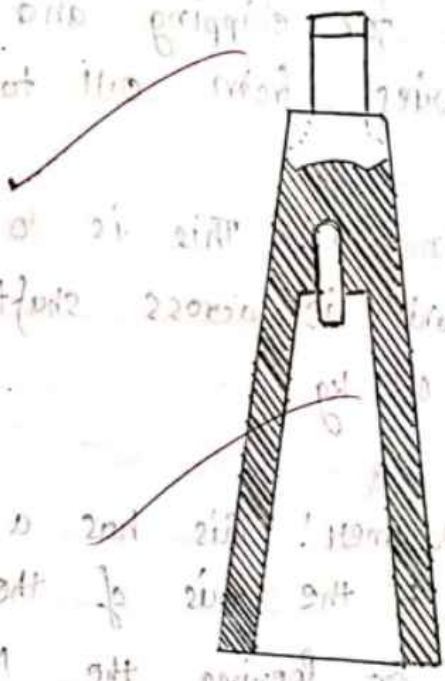


Flat drill

Straight fluted drill.



Twist Drill



Drill Socket.

1. Length 2. Neck 3. Shank
4. Lip 5. Lip angle 6. Heel

Date..... Experiment No..... P. No. 13

Name. HARISH AGARWAL Faculty No. 19102609 Class..... Batch.....

9) TRY SQUARE :-

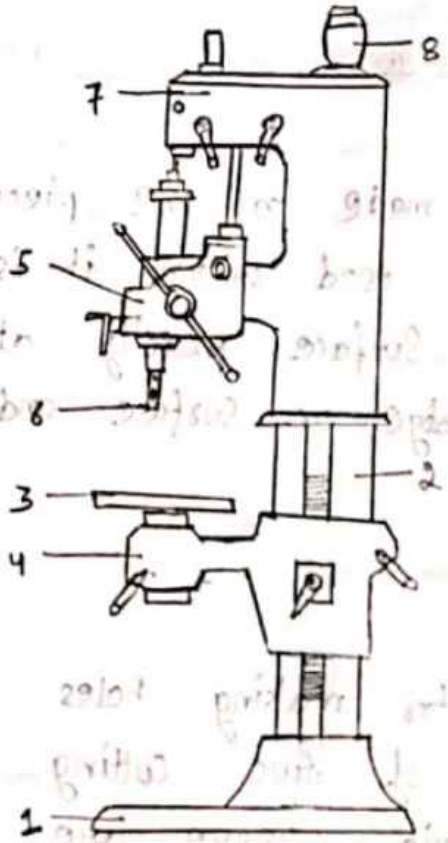
The try Square is made in one piece both blade & beam. this is used when it is necessary to get another edge or Surface exactly at right angles to an already formed edge or Surface & also for laying out work.

10) DRILLS :-

A drill is a tool for making holes in a metal piece. It usually consists of two cutting edges set at an angle with the axis. there are 3 types of drills: ① flat drill ② Straight fluted drills ③ twist drill.

The use of flat drill & Straight fluted drill has many disadvantage & they are not generally used in a fitter's shop.

For rapid & accurate work twist drill are universally adapted. the best cutting angle is 118° & to obtain the correct diameter of the hole.



1.) Base Plate
2.) Pillar
3.) Table
4.) Racket
5.) Drill Head
6.) Drill Spindle
7.) Gear Case
8.) Motor

Piller Drilling Machine.

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Date..... Experiment No..... P. No. 14

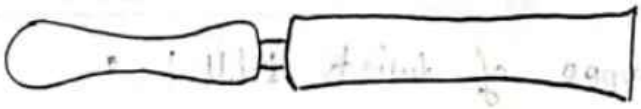
Name. NARESH AGRAWAL Faculty No. 19/2362.3 Class..... Batch.....

There are two types of twist drill :-

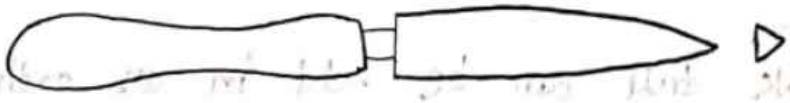
(1) Parallel shank (2) Tapered shank.

(1) Parallel shank drill can be held in an ordinary Self. Centering drill chuck which have parallel jaws to hold these straight shank drills. they are made from 0.200 mm to 40 mm size.

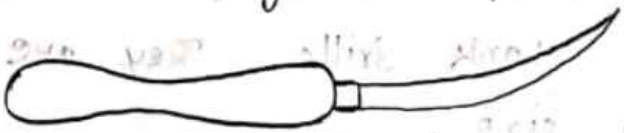
2) In a tapered shank drill the shank is tapered & drill spindle is bored out with a corresponding taper. when it is necessary to use a drill with smaller shank than the bore in the spindle a drill Socket or sleeve is generally used. the drills are made from 3.0 mm to 100 mm size.



Flat Scraper.



Triangular Scraper.



Half - round.

Date..... Experiment No..... P. No. 15

Name... MAHESH ... Faculty No. 19123623 ... Class..... Batch.....

11 **Scraper :-**

Scrapping means shaving or paring off thin slices or flakes of metal to make a fine, smooth surface. This is done with tools called scrapers which have very hard cutting edges. The material is a good quality forged steel and the cutting edge is usually left hard. Old files make excellent scrapes. The teeth of the file must first be ground off on all sides. They are then heated & bent to the desired shape & ground to have the cutting edge followed by hardening & tempering. Scrapers are filled with short, round handles that fit handle snugly.

Scrapers are made in a variety of lengths from 100mm upwards and in many shapes, depending on the work to be done. These are : triangular & half round.

...y a file.

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Date..... Experiment No..... P. No.....16.....

Name.....MAHESH AGRAWAL..... Faculty No...19.10.3623..... Class..... Batch.....

JOB PREPERATION :-

Object :- Prepare a job using various operation in fitting lab as per given in drawing.

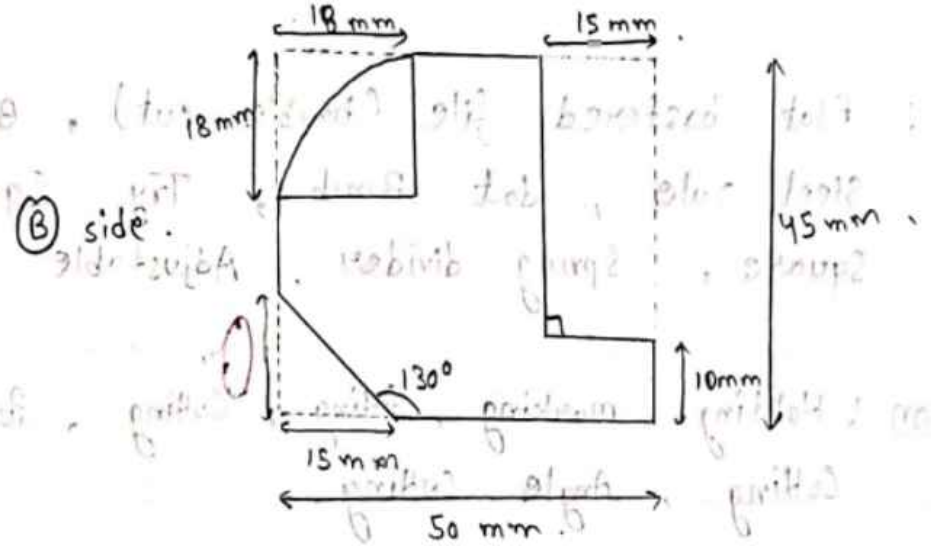
Material :- M.S. flat (45 X 50 X 6 mm)

Tool :- Flat bastered file (bouble cut), Bell pen hammer, steel rule, dot Punch, Tri Square, Bevel Square, Spring divider, Adjustable hack Saw.

Operation :- Holding, marking, fitting, Cutting, Punching, Radius cutting, Angle cutting.

Procedure :-

1. A metal job of mild Steel is given to us.
2. Let the bigger length edge as 'A' and Smaller length edge as 'B'
3. Now 'A' Side is to be firmly held on Bench vice & file it using a file.



(B) side.

(A) Side.

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4) Now make it flat by filling & mark with the divider, Scale, Scriber, hammer & punch the colour.

5.) Now 'B' Side is to be firmly held on bench vice & file it using a file.

6.) make the 'B' Side Smooth & rust & corrosion free.

7) Now take the upper layer (Surface) Containing 'A' Side view Side & 'B' Side in left hand side & file it to make it smooth as well as rust and corrosion free.

8.) Make the adjacent edges perpendicular to each Side with the help of file & try Square.

9.) Now rub the half chowk on that Surface & allow it to dry up to give a plain white Surface easy for marking.

Date..... Experiment No..... P No. 12

Name NIRISH ... Faculty No. 13/12/162 Class..... Batch.....

10) Now mark all the dimensions using Scale & Vernier height gauge, according to diagram as given above & with the help of surface plate too.

11) Now using Scale & Scriber mark margin lines of approx 1 mm length, So that it may help us to make a proper & good looking job & also to remove errors while cutting the job using hacksaw.

12) Now Using Punch & hammer mark points on the lines which we have plotted as our Correct dimension as given in diagram above.

13) Now using hacksaw, at the job using the margin lines.

14) Now, after the process of cutting the job using hacksaw, the unused metal job, Pieces are then removed together.

15) Now finish the job with the help of file & other instruments.

16) Now our job is ready.

Precautions :-

1) The job (M.S. flat) is firmly held on bench vice.

2) The teeth of the hacksaw should be facing forward.

3. Marking should be done with great care.

4. While sawing allowances should be made for filling.

5. While filing, caution should be taken that the file move in straight strokes & not standing in any conditions.

6) All the edges should be smooth.

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Name. NARESH KUMAR Faculty No. 19/094/25 Class..... Batch.....

7) While filing, dimension should be checked again. and file should be used so the job is of peroper dimensions is obtained.

8) The job is fixed straight in the jaws of the bench vice otherwise eeeeer in shape might occur.