

GOVERNMENT POLYTECHNIC, BOLANGIR



LARKIPALI, BOLANGIR

ODISHA

State Council Regd. No. F22110005008

Name Tagan Sahu

Roll No. 5008 Semester 4th Session

Batch Group

Subject Auto Engine lab - I

GOVERNMENT POLYTECHNIC, BALANGIR

DEPARTMENT OF



INDEX PAPER

Sl. No.	NAME OF THE EXPERIMEN	DATE	SHEET USED	REMARKS
01. ✓	Safety Precaution in automobile workshop and Identification of different types of tools and Equipments required in an automobile workshop.	15.02.2024	01 to 08	
02. ✓	Study of working principle of petrol Engine.	27.02.2024	09 to 11	
03. ✓	Study of working principle of Diesel Engine.	07.03.2024	12 to 14	
04. ✓	Study of fuel feed system of petrol & Diesel engine.	14.03.2024	15 to 21	
05. ✓	Identification of various units of a vehicle.	21.03.2024	22 to 29	
06. ✓	Study of different types of cooling system used in a vehicle.	04.04.2024	30 to 33	
07. ✓	Assembling engine parts such as F.I. pump, Injector fuel filter & other accessories.	09.04.24	34 to 39	
08. ✓	Study of Air compressors	16.04.24	40 to 43	
09. ✓	Study of lubrication system of a vehicle.	23.04.24	44 to 48	



AIM OF THE EXPERIMENT

Safety precaution in automobile workshop and Identification of different types of tools and Equipments required in an automobile workshop,

APPARATUS REQUIRED

- 1) Double End spanner
- 2) Ring spanner
- 3) Tabular spanner
- 4) Socket spanner
- 5) Adjustable spanner
- 6) Torque wrenches
- 7) Screw Drives
- 8) Hammers
- 9) pliers
- 10) pullers
- 11) Spark plug cleaner
- 12) Filler Gauge
- 13) Valve spring compressors
- 14) Piston Ring compressors
- 15) Piston Ring Expander



THEORY

General safety precaution can be divide 3 sections

- 1) Personal safety (safety for it self)
- 2) Safety for doing jobs
- 3) General safety for tools and machine

(1) SAFETY FOR IT SELF

First of all each worker should take care to protect his body from accidents, in order to ensure personal safety the following safety precaution are described below.

- * At working place one should always wear fit clothes and avoid loose ones.
- * one should not touch any moveable parts of the machine
- * Use of the necktie and mufflers should be avoid.
- * Always wear the recommended shoes, gloves, apron inside the auto engine shop.
- * one should not touch cutting tool chips at the time of the machine.
- * use of the necktie and mufflers should be avoid.

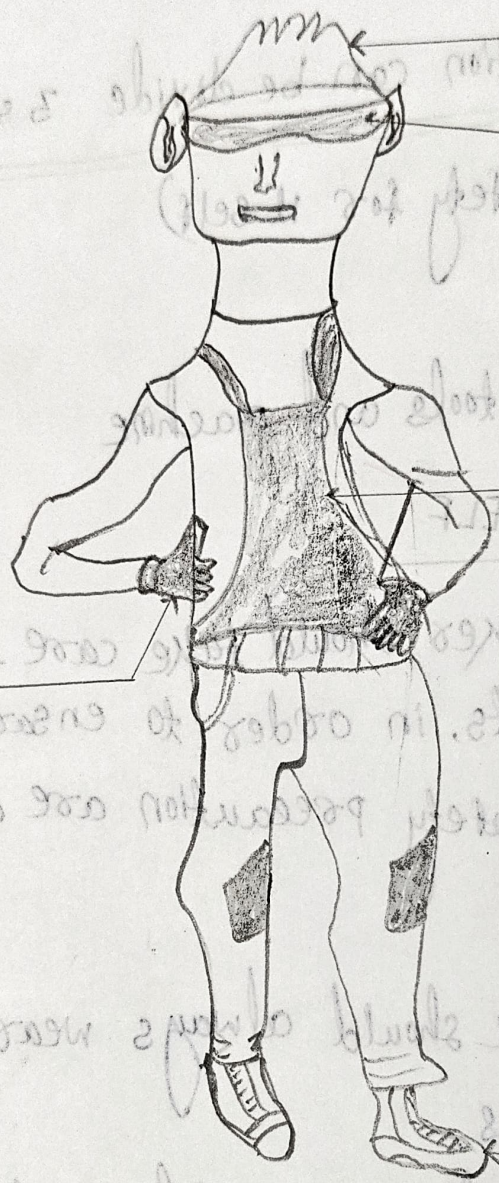
PROTECTIVE HELMNET

SAFETY GOGGLES

APRON

SAFETY GLOVES

SAFETY SHOES





- * Always we the Recommend shoes, gloves, apron inside the auto engine shop.
- * one should not touch cutting tools chips at the time of working condition.
- * we should concentrate on work while working in ^{auto} ~~auto~~ engine shop.
- * Not to operated any machine with at howing knowledge about it.

SAFETY FOR JOB:-

while doing production of job or Repairs of any machine parts due care should be taken otherwise it may cause less of time. Hence the operators should taken safety measures to carry out the job perfectly.

- * After starting any machinary operation, proper assignment should be made to job for first.
- * After marking out the planes and positions then carried accordingly.
- * proper tools with sharp edges should be used for any types of cutting operation.
- * The workshop floors should be kept clean-clear and free from scraps.



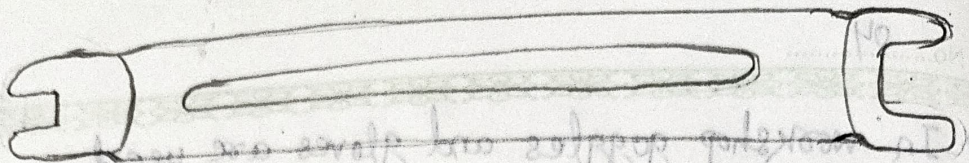
- * In workshop goggles and gloves are used.
- * Coolants and lubricants should be used accordingly to the nature of metal while doing cutting job. There should not much change in its nature of properties.
- * Use proper tools and material for various function.

SAFETY FOR TOOLS AND MACHINE

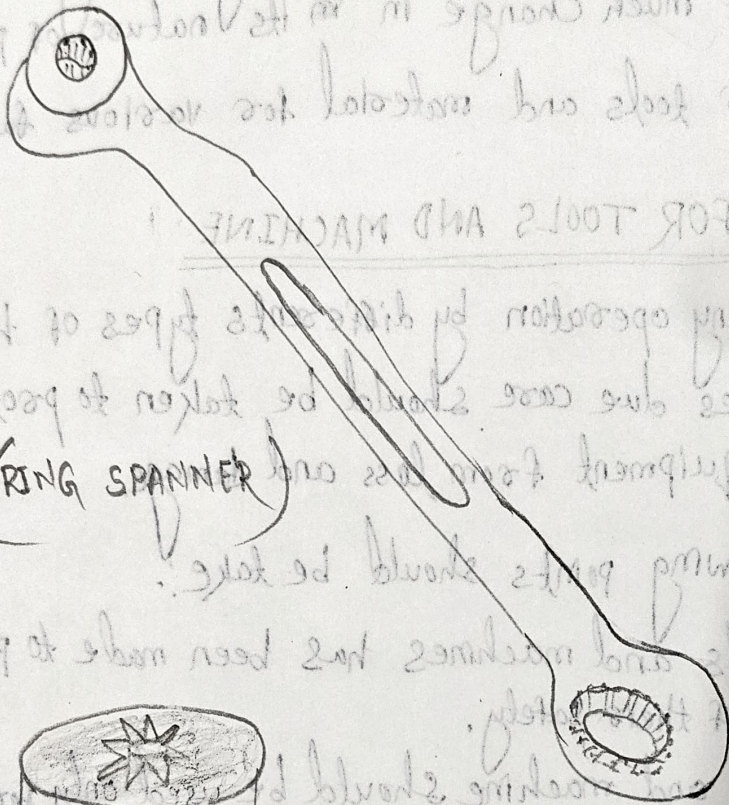
While doing any operation by different types of hand tools and machines due care should be taken to protect these tools and equipment from loss and damage.

The following points should be taken:

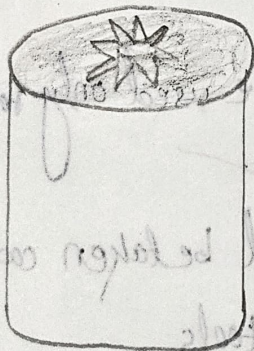
- * Each tool and machine has been made to perform the point of their safety.
- * That tool and machine should be used only for specified purpose for which these are made.
- * Precision measuring tools should be taken carefully and kept separate from cutting tools.
- * Never use a machine whose function is not known to us.
- * The machine should stop immediately if it creates any unused sound.
- * Gears of a running machine should not be changed.



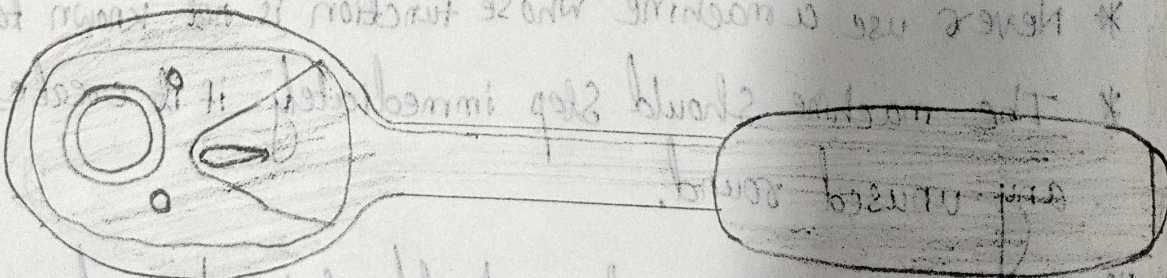
(DE-SPANNER)



(RING SPANNER)



(SOCKET)



(SOCKET WITH

RATCHET HANDLE)



- * After using a machinery tools it should be cleared.
- * Before starting a machine it should be assumed that the guards are properly place.
- * Never keep small tool in the pocket.

DIFFERENT TYPES OF TOOLS AND USED IN AUTOMOBILE WORKSHOP

HAND TOOLS: Many kind types and sizes of tools are used in automobile work.

1. DOUBLE END SPANNER:-

This are the most commonly used types of spanner in a automobile workshop. The opening should be the right size to fit the nut or bolt. These spanners are available are different size Ranging from 6 to 32mm.

2. RING SPANNER:-

This are the most commonly used types of spanner in a automobile workshop. The ring spanner should be the right size to fit the nut or bolt.

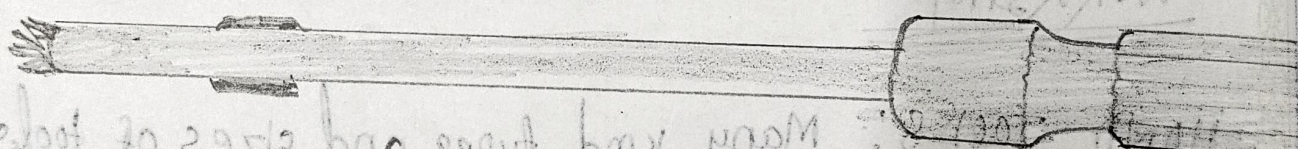
3. TUBULAR SPANNER:-

These are also used for the same purpose in ring spanner. It will be like a long tube having hexagonal ends at each

(EXTENSION ROD)

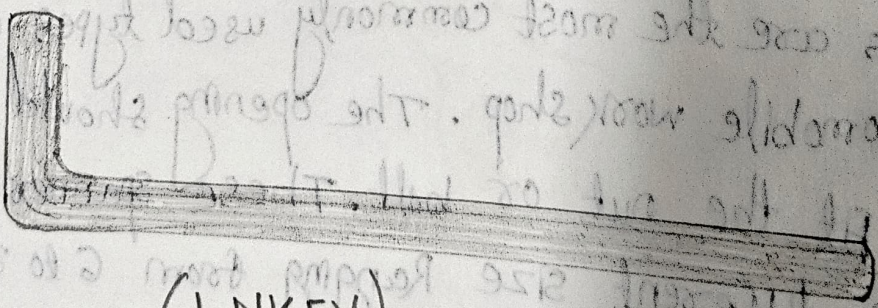
* Never keep small tool in the bucket.

DIFFERENT TYPES OF TOOLS AND USED IN AUTOMOBILE



(SCREW DRIVER)

1. DOUBLE END SPANNER:



(LNKEY)

2. KING SPANNER:

This one the most commonly used types of spanner in a automobile workshop. The end spanner should be the right size to fit the nut or bolt. These spanners are available in a range of sizes from 6 to 32mm.



end of different size. These spanners are available in size 8mm to 32mm.

4. SOCKET SPANNER:

These types of spanners are useful in restricted spaces where common types of spanners can't be used. They consists of sockets of different sizes which can be used with various types of handles.

5. ADJUSTABLE WRENCHES:

This wrenches has jaws that can be adjustable to fit nuts and bolts heads of various sizes. These types of wrenches have advantages that these can be suitable for a large number of nut and bolt head size.

6. TORQUE WRENCHES:-

Important nut and bolt in automobile work have to be tightened with a specified amount of torque because excessive torque may result in their breakage while less torque they will remain loose.

7. SCREW DRIVER:

A screw driver is used to drive the screw. The most common type has a single flat blade for driving screw sloped heads.



8. HAMMERS :-

A medium weight ball pm hammer is the one commonly used in automobile work. It should be gripped on the end of the handle.

9. PLIERS :-

Pliers are a special type of adjustable wrench. The two legs move on a pivot so that items of various sizes can be gripped. There are two types gripping pliers and cutting pliers.

10. PULLERS :-

Pullers come in a variety of types sizes are used to remove wheels. Gears and bearings from shaft from housing. Each pulling operation differs from the others and care must be exercised to prevent damage to the parts being.

11. SPARK PLUG CLEANER :-

For cleaning the spark plug.

12. FEELER GAUGE :-

For measurement such as valve clearance spark plug gap etc. we use feeler gauges which are simply of different thickness.



13. VALVE SPRING COMPRESSOR :

Valve spring compressor or lifters are used to compress the valve Retainers lock or keepers from the valve system.

14. PISTON RING COMPRESSOR:-

Piston ring compressor as the compression is tightened, it presses the piston ring into their grooves on the piston. Then the piston and rod assembly is installed into the cylinders.

15. PISTON RING EXPANDER:-

It is generally used to expand and remove the piston rings from their grooves without breaking.

CONCLUSION:-

From the above study we come to know about study precaution in automobile workshop and identification of different types of tools and equipment required in an automobile workshop.

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Semester:- 4th

Branch :- Automobile

Date :- 15.02.2024



EXPERIMENT NO: - 2

AIM OF THE EXPERIMENT:-

Study of working principle of petrol Engine.

EQUIPMENTS REQUIRED:-

Model of 4 stroke petrol Engine.

THEORY:

Four stroke petrol Engines

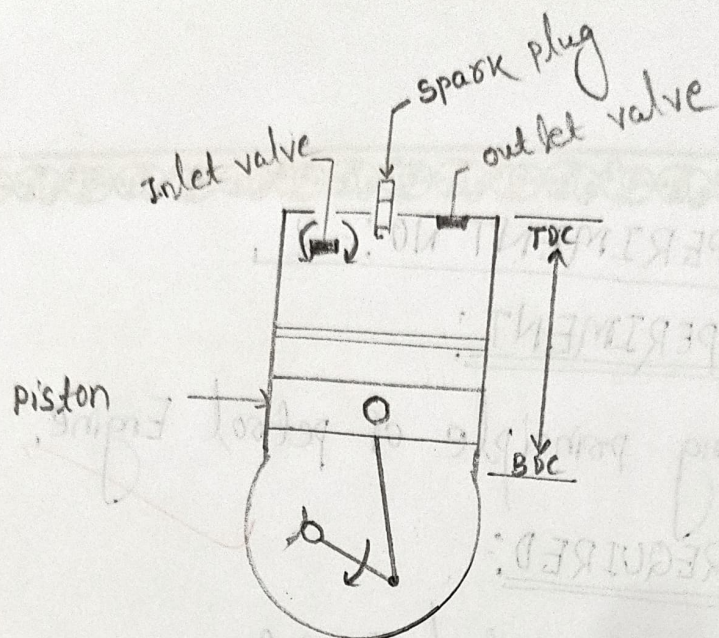
CONSTRUCTION:

- * A piston reciprocates inside the cylinder.
- * The piston is connected to the crank shaft by means of a connecting rod and crank.
- * The inlet and exhaust valves are mounted on the cylinder head.
- * A spark is provided on the cylinder head.
- * The fuel is used petrol.

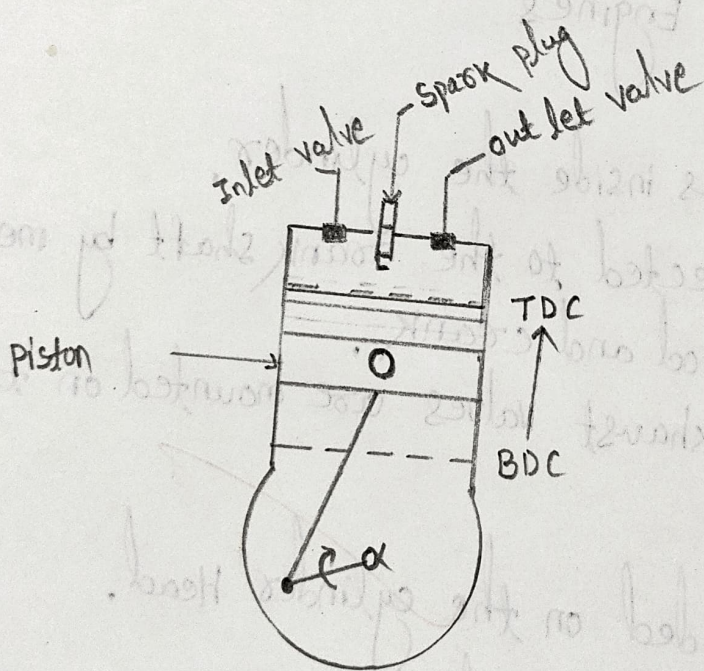
Four stroke petrol Engine working:

a) suction stroke (First stroke of the Engine)

- * piston moves down from TDC to BDC.
- * Inlet valve is opened and the exhaust valve is closed.



Suction stroke



Compression stroke



⊗ pressure inside the cylinder is reduced below the atmospheric pressure.

⊗ The mixture of air fuel is sucked into the cylinder through the inlet valve.

b) Compression stroke:- (second stroke of the piston)

⊗ piston moves up from BDC to TDC.

⊗ Both inlet and exhaust valve are closed.

⊗ The air fuel mixture in the cylinder is compressed.

c) Working or power or Expansion stroke:-

(Third stroke of the Engine)

⊗ The burning gases expand rapidly. They exert an impulse (thrust or force) on the piston. The piston is pushed from TDC to BDC.

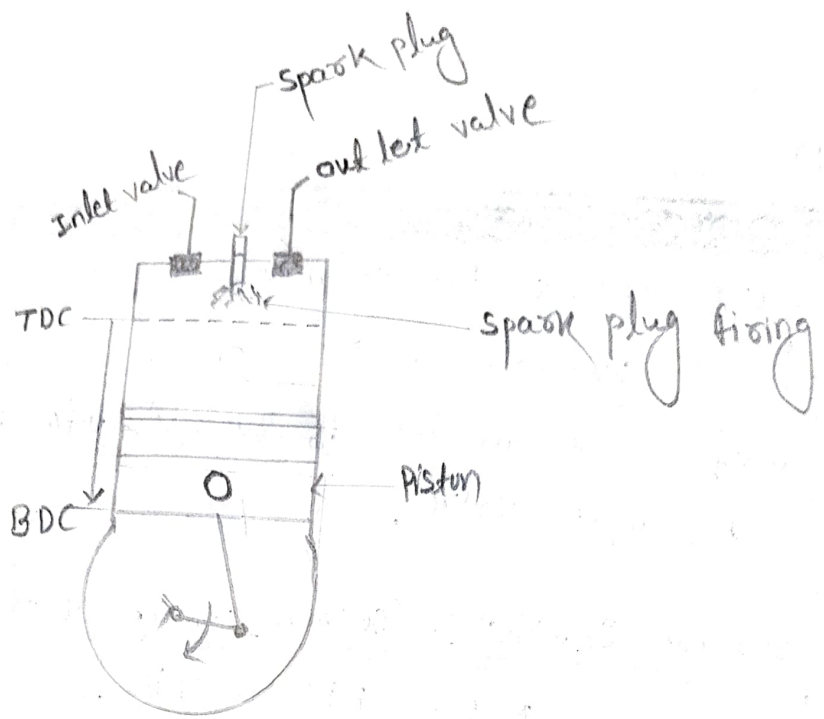
⊗ This movement of the piston is converted into rotary motion of the crank shaft through connecting rod. Both inlet and exhaust valves are closed.

d) Exhaust stroke:- (Fourth stroke of the Engine)

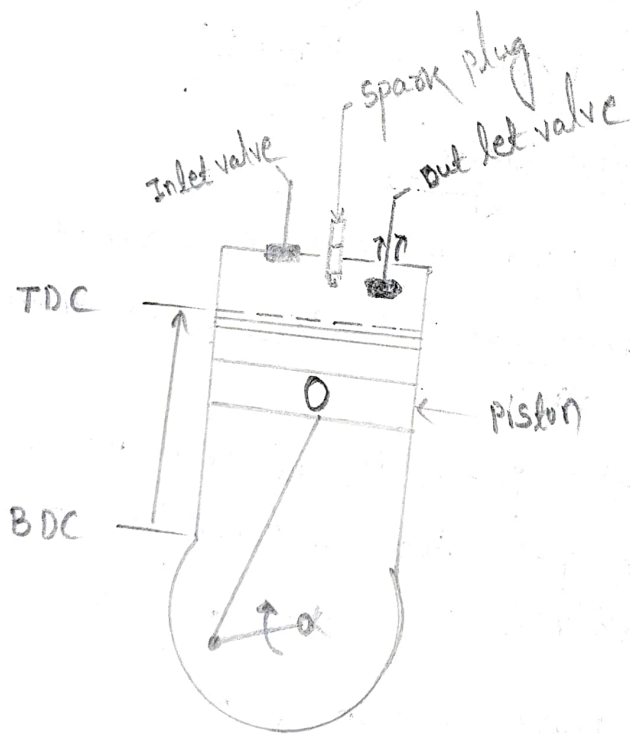
⊗ piston moves upward from BDC.

⊗ Exhaust valve is opened and the inlet valve is closed.

⊗ The burnt gases are forced out to the atmosphere through the exhaust valve (some of the burnt gases



Power stroke



Exhaust stroke



stay in the clearance volume of the cylinder).

- ⊗ The exhaust valves closes shortly after TDC.
- ⊗ The inlet valve opens slightly before TDC and the cylinder is ready to receive ~~fresh~~ charge to start a new cycle.

CONCLUSION:-

From the above study we learnt about of working principle of petrol Engine.

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GOVERNMENT POLYTECHNIC, BOLANGIR



LARKIPALI, BOLANGIR

ODISHA

State Council Regd. No..... F22110005008

Name..... Jagan Sahu

Roll No. 5008 Semester..... 4th

Batch..... Automobile Group..... 01

Subject..... Work Shop - (III)

GOVERNMENT POLYTECHNIC, BALANGIR

DEPARTMENT OF



INDEX PAPER

Sl. No.	NAME OF THE EXPERIMENT	DATE	SHEET USED	REMARKS
01	To make a drilling and boring.	✓	01 to 12	✓ Completed 12/11/19
02	To make a splined shaft by using shaper machine.	✓	13 to 20	✓ Completed 14/11/19
03	Study about milling machine.	✓	21 to 23	✓ Completed 15/11/19



SECTION : _____

JOB NO. 01

DATE OF STARTING _____
DATE OF FINISHING : _____
DATE OF DEPOSIT : _____
GRADE AWARD OF _____

1. NAME OF THE JOB :

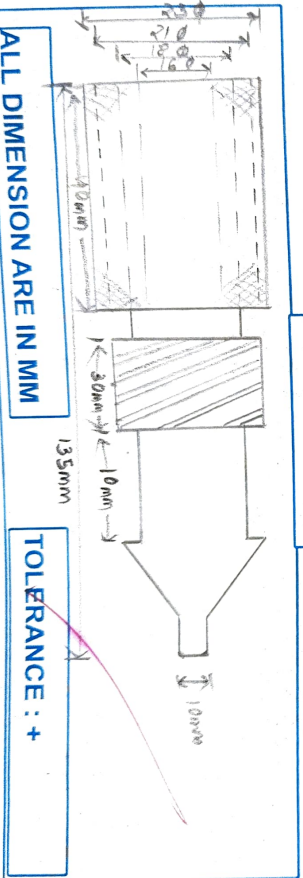
To make a drilling and boring.

2. RAW MATERIAL REQUIRED :

Single piece of M.S Round bar 140mm x 25mm

3. JOB PERFORMANCE :

JOB SKETCH



TOOL'S AND EQUIPMENT REQUIRED

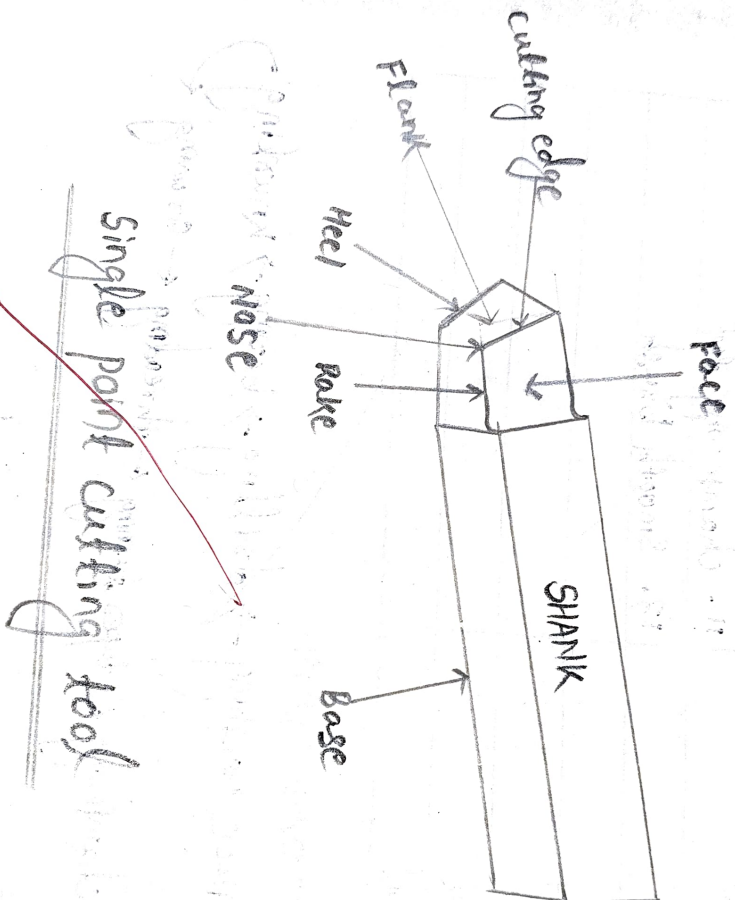
1. Vernier caliper	9. Boring tool
2. Surface gauge	10. drill bit
3. Spanner	11. Chamfering tool
4. Facing tool	12. Smooth brush
5. Turning tool	
6. Grooving tool	
7. Knurling tool	
8. Threading tool	

4. SEQUENCE OF OPERATION

Facing → Surface finishing → ~~drilling~~ → boring → knurling
 Chamfering ← taper turning ← threading ← grooving

4. PROCEDURE

- (*) Firstly select the Right Raw material.
- (*) Draw a sketch of the Job to work.
- (*) Find the centre on each end of the Job.
- (*) Clamp the Job in the lathe machine.
- (*) Find the centre of the Job that clamped on the lathe machine.
- (*) Adjust the tool Rest.
- (*) Turn on the lathe machine
- (*) Start Roughing



Single point cutting tool



INTRODUCTION:-

The workshop is a place or area where the work is going on with the raw materials by man and machine.

Workshop provides the basic knowledge of the production and properly of different material used in industry, it also employ the use of different tools equipments machinery technique manufacture which ultimately facilitated packing of this material into very useable forms.

ENGINEERING METALS:-

The engineering always play an important role in an industry or workshop because the process of all manufacturing tool of raw materials. The material can be used in the shops are metals which may be divided into two groups.

① Ferrous metals:-

The metal which contain iron as their chief constituent called ferrous metals, numbers of the various ferrous metals used in industry pig iron, cast iron, wrought iron, steel etc.

② Non-Ferrous metals:- The metal which contain other than iron as their chief constituent are called non-ferrous metal. The various non-ferrous metals is industrial are aluminium, copper, zinc, lead, tin, etc.



Classification of manufacturing process:-

The manufacturing play an important role in engineering because its changes from size and shape of material into small products. The various process use in manufacturing are classified into 5 groups.

① Primary shaping process:-

The following primary shaping process are commonly used in engineering practices.

- ① casting ② Forging ③ Rolling
- ④ Bending ⑤ shearing ⑥ Drawing

② machinery process:-

The machinery process are performed on casting rolling and forgings in order to obtain the designed accuracy and shapes.

The following machinery operation are used for this

process purpose,

- ① Facing ② Turning ③ turning ④ slotting ⑤ Threading ⑥ Tapering
- ⑦ Chapering ⑧ Bore turning ⑨ Drilling ⑩ Boring ⑪ Sawing ⑫ grinding

③ surface finishing process:-

These process are used efficiency to provide good surface filling to the metal surface of the product in a surface filling process either a negligible amount of metal is removed or a small amount of materials.



add to the surface of the product. There is a number applicable change in dimension by the surface finishing process.

④ Joining process :-

These process are used for joining two or more pieces of metal parts. The following process are used for joining the metal parts.

- ① welding
- ② soldering
- ③ screwing
- ④ Riveting
- ⑤ pressing

⑤ Process effecting change in properties :-
These process used impart certain specific to the metal parts specific condition of used the following process are commonly used for such purpose :-

- ① Heat treatment
- ② Hot working
- ③ cold working

⑥ Accident :- An accident which cause some injury to the person, damage to machine tools and equipment which Resulting loss of production the accident may be minor serious and fatal.

Common causes Accident :- The following are common causes of a accident.

- ① Poor house keeping
- ② lack of skill
- ③ In sufficient working space
- ④ Carelessness of the worker
- ⑤ Improper or different tools.
- ⑥ loose clothing of the worker.
- ⑦ poor working conditions such as lighting.
- ⑧ unguarded machinery.
- ⑨ Im proper maintenance of machine.
- ⑩ over loading of machine.



LATHE MACHINE:-

Working principle:- The lathe is a machine tool which holds the workpiece between two rigid and strong supports called centers or in a chuck or face plate which revolves. The cutting tool is rigidly held and supported in a tool post, which is fed against the revolving work. The normal cutting operations are performed with the cutting tool feed either parallel or at right angles to the axis of the work. The cutting tool may also be fed at an angle relative to the axis of work for machining tapers and angles.

Construction:- The main parts of the lathe are the bed, head stock, quick changing gear box, carriage and tail stock.

1. Bed:- The bed is a heavy, rugged casting in which are mounted the working parts of the lathe. It carries the headstock and tail stock for supporting the workpiece and head stock and tail stock for supporting the workpiece and provides a base for the movement of carriage assembly which carries the tool.

2. Legs:- The legs carry the entire load of machine and are firmly secured to floor by foundation bolts.

3. Head stock:- The headstock is clamped on the left hand side of the bed and it serves as housing for the driving pulleys.



back gears, head stock, spindle, live centre and the feed reverse gear. The head stock spindle is a hollow cylindrical shaft that provides a drive from the motor to work holding devices.

4. Gear Box:- The quick-change gear-box is placed below the headstock and contains a number of different sized gears.

5. Carriage:- The carriage is located between the headstock and tailstock and serves the purpose of supporting guiding and feeding the tool against the job during operation. The main parts of carriage are:

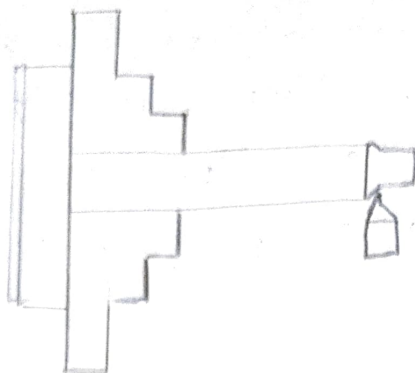
(a) The saddle:- is an H-shaped casting mounted on the top of lathe ways. It provides support to cross-slide, compound rest and tool post.

(b) The cross slide:- is mounted on the top of saddle, and it provides a manual or automatic cross movement for the cutting tool.

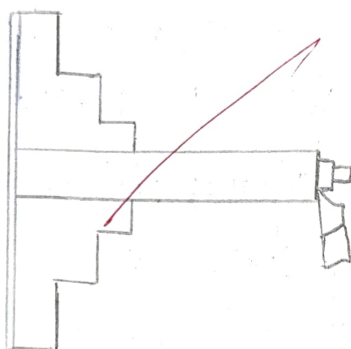
(c) The compound rest:- is fitted on the top of cross slide and is used to support the tool post and the cutting tool.

(d) The tool post:- is mounted on the compound rest and it rigidly clamps the cutting tool or tool holder at the proper height relative to the work centre line.

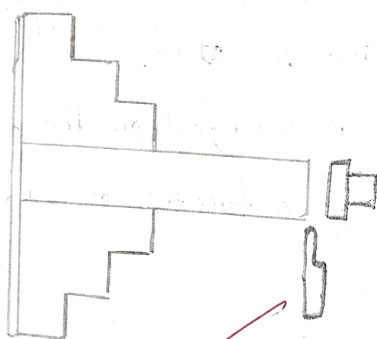
① Plain Turning:



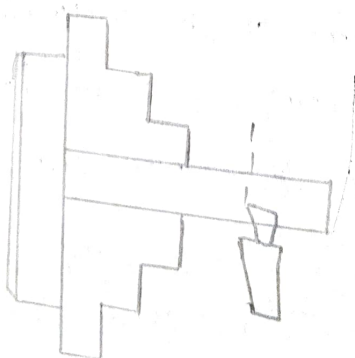
② Steep Turning:



③ Facing:



④ Parting:





(e) The apron:- is fastened to the saddle and it houses the gears, clutches and levers required to move carriage or cross slide. The engagement of split nut lever and the automatic feed lever at the same time is prevented the carriage along the lathe bed.

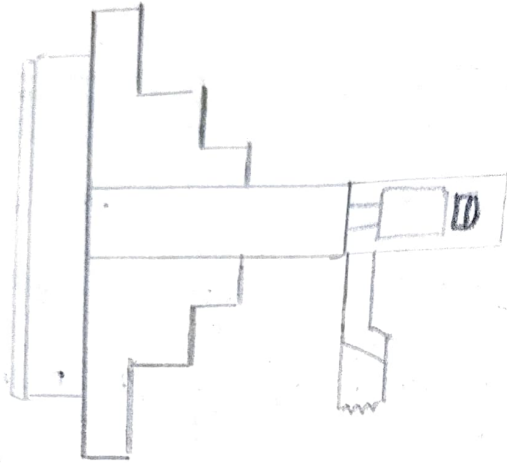
6. Tail stock:- The tail stock is a movable casting located opposite the headstock on the ways of the bed. The tailstock can slide along the bed to accommodate different lengths of work piece between the centers. A tail stock clamp is provided to lock the tail stock at any desired position. The tail stock spindle has an internal taper to hold the dead center and the tapered shank tools such as reamers.

LATHE OPERATIONS:-

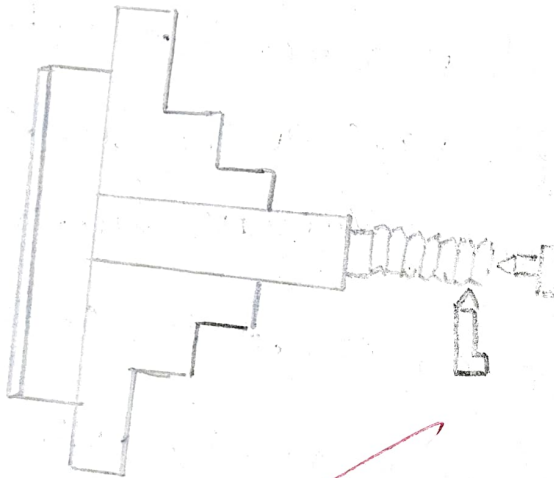
The engine lathe is an accurate and versatile machine on which many operations can be performed. These operations are

- | | |
|----------------------------------|------------------------|
| ① Plan Turning and steel Turning | ⑪ Chamfering |
| ② Facing | ⑫ Filing and polishing |
| ③ Parting | ⑬ Taper Turning |
| ④ Drilling | |
| ⑤ Reaming | |
| ⑥ Knurling | |
| ⑦ Boring | |
| ⑧ Grooving | |
| ⑨ Threading | |
| ⑩ Forming | |

⑨ Grooving:



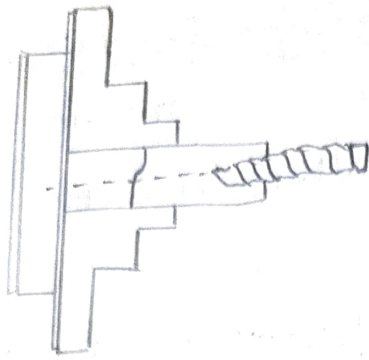
⑩ Threading:



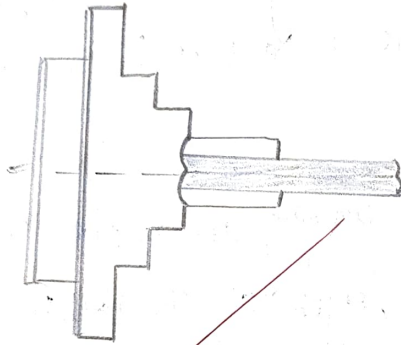


- ① Plain Turning:- Plain turning is the operation of removing excess amount of material from the surface of a cylindrical job.
- ② Step Turning:- Step turning produces various steps of different diameters.
- ③ Facing:- The facing is a machining operation by which the end surface of the workpiece is made flat by removing metal from it.
- ④ Parting:- The parting or cutting off is the operation of cutting away a desired length of the workpiece i.e. dividing the workpiece in two or more parts.
- ⑤ Drilling:- Drilling is the operation of producing a cylindrical hole in the workpiece.
- ⑥ Reaming:- The hole that are produced by drilling are rarely straight and cylindrical in form. The reaming operation finishes and sizes the hole already drilled into the work piece.
- ⑦ Boring:- The boring operation is the process of enlarging a hole already produced by drilling.
- ⑧ Knurling:- The knurling is a process of embossing (impressing) a diamond-shaped or straight line pattern into the surface of work piece. Knurling is essentially a roughening of the

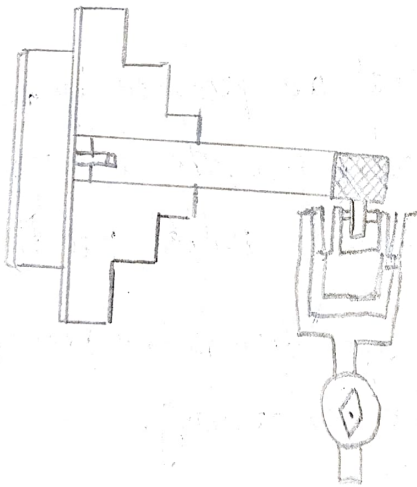
⑤ Drilling:



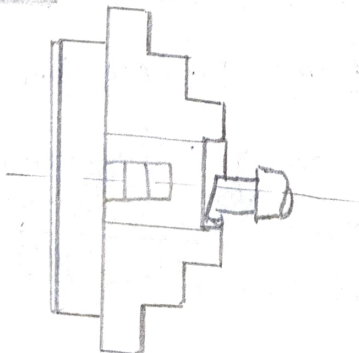
⑥ Reaming:



⑦ Knurling:



⑧ Boring:





Surface and is done to provide a better gripping surface.

⑨ Grooving:- Grooving is the act of making grooves of reduced diameters in the workpiece.

⑩ Threading:- Threading is the act of cutting of the required form of threads on the internal or external cylindrical surfaces.

⑪ Forming:- The forming is an operation that produces convex, concave or any irregular profile on the workpiece.

⑫ Chamfering:- Chamfering removes the burrs and sharp edges, and thus makes the handling safe. Chamfering can be done by a form tool having angle equal to chamfer which is generally kept at 45° .

⑬ Filing and polishing:- The filing is the finishing operation that removes burrs, sharp corners and feed marks from the workpiece. After filing the surface quality is the workpiece improved by the polishing operation with the help of emery cloth or fine grades.

⑭ Taper Turning:- The taper turning is an operation of producing a conical surface by gradual workpiece.



SAFETY POINTS

SAFETY FRECAUTIONS :

- Think your safety and careful any time.
- Follow the safety rule and frecautions that can protect you.

PARSONAL SAFETY RULES :

- while in the workshop discipline should be maintain.
- Always proper safety ation, gloves, shoes maintain in your workshop.
- Don't think about other things while working position, concentrate only that.

WORK SHOP SAFETY RULES :

- Never used work shop floor the floor should dry and clean.
- if any electrical dispuist in the on work shop don't be solved it immidiatly inform to the instructor.

HAND TOOL'S SAFETY RULES :

- The hand tools like vernier calliper, spanner, hand handel should be properly handled & mantained.
- Don't used tools which have no handles.



MACHINE SAFETY RULES :

- While you start the machine it should be checked properly.
- Before starting a machine you know the proper knowledge about it.
- Avoid all fire catching material from the forge.

JOB SAFETY RULES :

- Job should be proper in case.
- Give proper cover to the job.

6. CONCLUSION

A lathe is a machining tool that features a rotating workpiece and a stationary cutting tool.

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GROUP

Juelhas
16/3/27

SIGNATURE OF THE (WORKSHOP) LECTURER / ASST. LECTURER

GOVERNMENT POLYTECHNIC, BOLANGIR



LARKIPALI, BOLANGIR

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State Council Regd. No. F22110005008

Name Jagan Sahu

Roll No. 5008 Semester 4th Session

Batch Automobile Group

Subject Auto Machine shop-I

GOVERNMENT POLYTECHNIC, BALANGIR
DEPARTMENT OF



INDEX PAPER

Sl. No.	NAME OF THE EXPERIMEN	DATE	SHEET USED	REMARKS
01)	checking flatness and squariness using a try square and filling the same if not levelled.	09.02.2024	01 to 06	Suehasi 9/2/24
02)	sharpening of cutting tools like chisels, twist drill bit and punch through double ended ganders.	19.02.2024	07 to 14	Suehasi 19/2/24
03)	Internal threading of through hole / blind holes using hand taps.	8/4/24	15 to 19	Suehasi 8/4/24
04)	Measurement of hole and slots using telescope gauges and inside micrometer.	12.04.2024	20 to 23	Suehasi 12/4/24
05)	Study about valve refuelling machine.	15.04.2024	24 to 25	Suehasi 15/4/24
06)	Study about cylinder honing machine.	19.04.2024	26 to 27	Suehasi 19/4/24
07)	Study about crankshaft Grinding machine.	22.04.24	28 to 29	Suehasi 22/4/24
08)	Study about cylinder Boring machine.	22.04.24	30 to 32	Suehasi 22/4/24



EXPERIMENT NO - 01

AIM OF THE EXPERIMENT

checking flatness and squareness using a try square and filling the same if not leveled

APPARATUS REQUIRED:-

- (1) Try square
- (2) Specimen (different geometrical shape)
- (3) Different type of file.

THEORY:

Parts of a file:-

Tip or point: The end opposite to tang

Face or side: The broad part of the file with teeth cut on its surface.

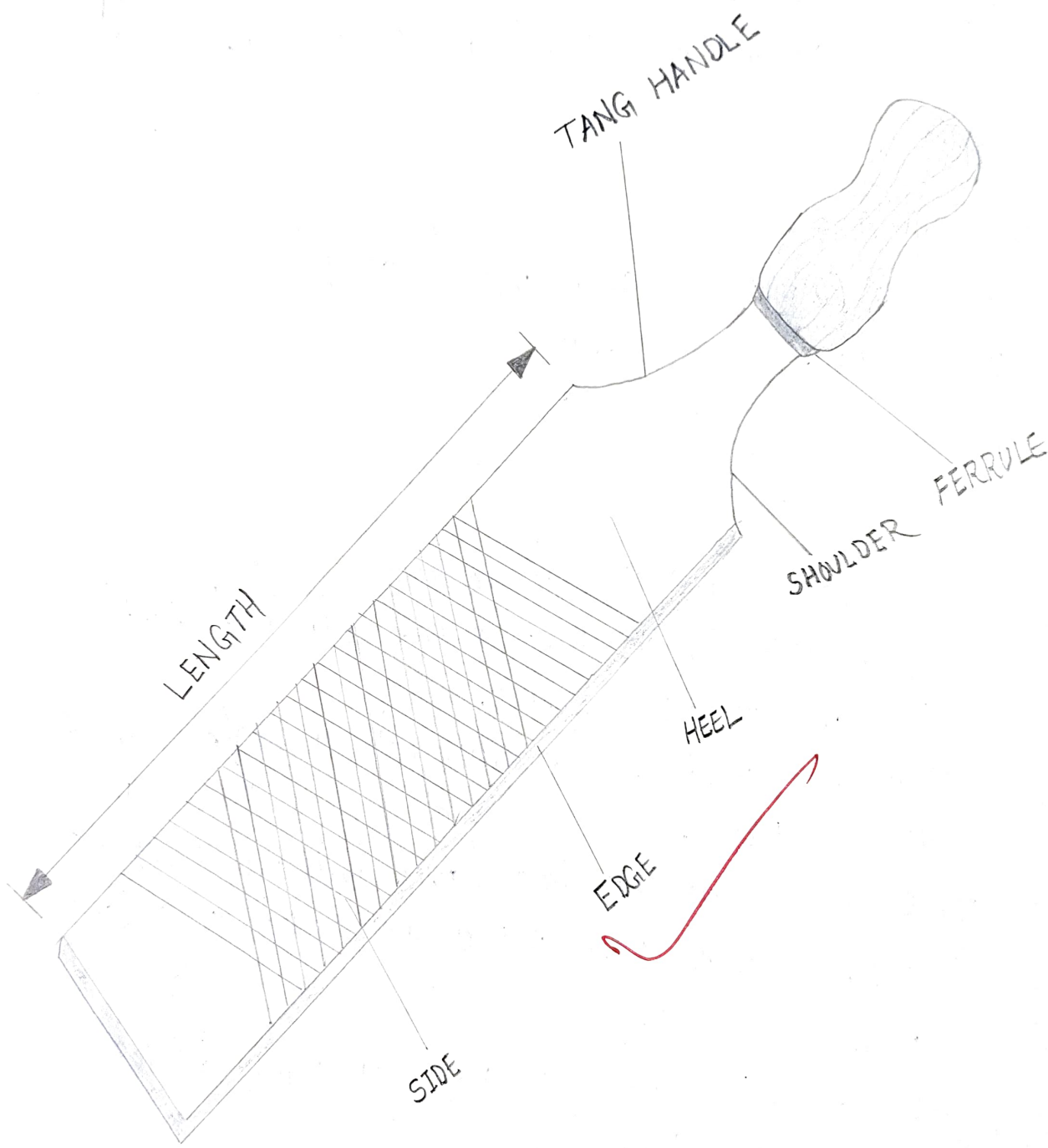
Edge: The thin part of the file with a single row of parallel teeth.

Heel: The portion of the broad part without teeth.

Shoulder: The curved part of the file separating tang from the body.

Tang: The narrow and thin part of a file which fits into the handle.

Handle: The part fitted to the tang for holding the file.



Tip or point



Ferrul:- A protective metal to prevent cracking of the handle.

Material:- Generally files are made of high carbon or high grade cast steel.

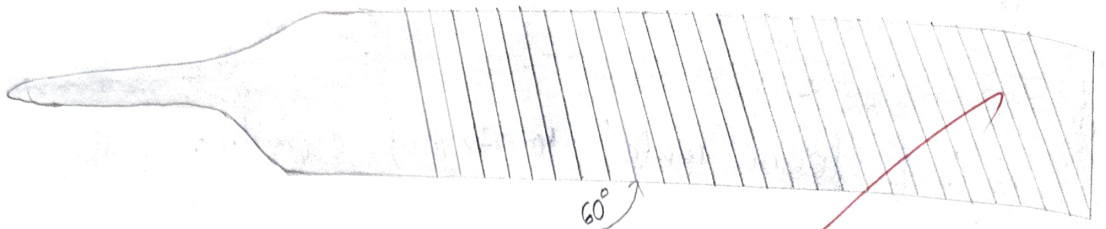
Types of cut: Basically there are four type single cut, Rasp cut and curved cut.

single cut file:- A single cut file has rows of teeth cut in one direction across its face. The teeth are at an angle of 60° to the centre line. It can cut chips as wide as the cut of the file. Files with these cut are useful for filing soft metals like brass, aluminium, bronze and copper. Single cut files do not remove stock as fast as double cut files.

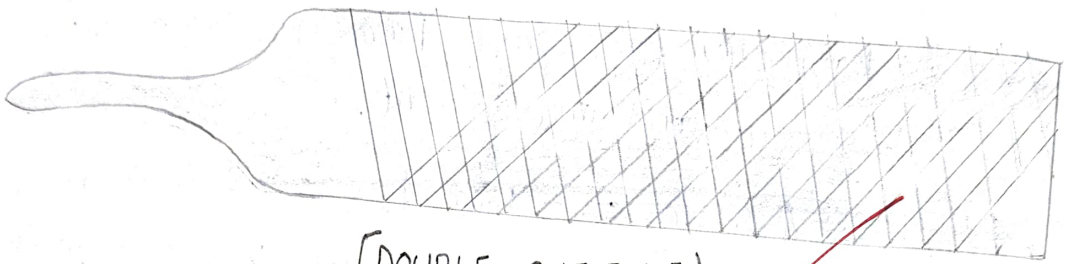
Double cut file:- A double cut file has two rows, cut diagonal to each other. The first row of teeth is known as over cut and they are cut at an angle of 70° . The other cut, made diagonal to this is known as up cut and is at an angle of 51° . These remove stock faster than the single cut file.

Rasp cut file:-

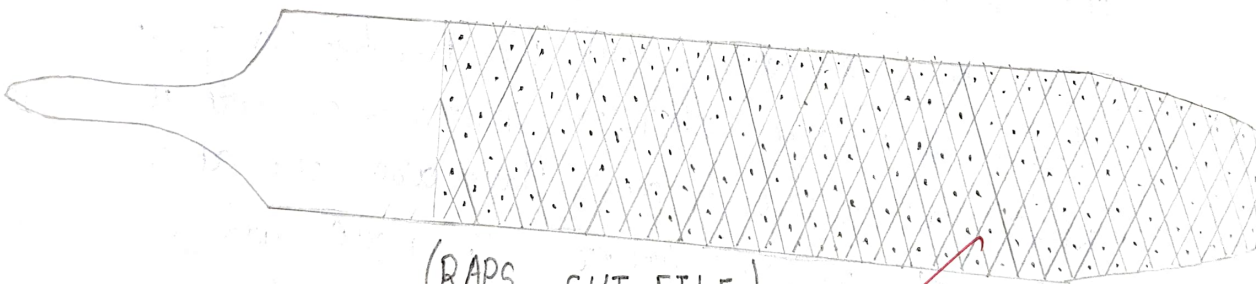
The rasp cut file has individual, sharp pointed teeth in a line and useful for filing wood, leather and



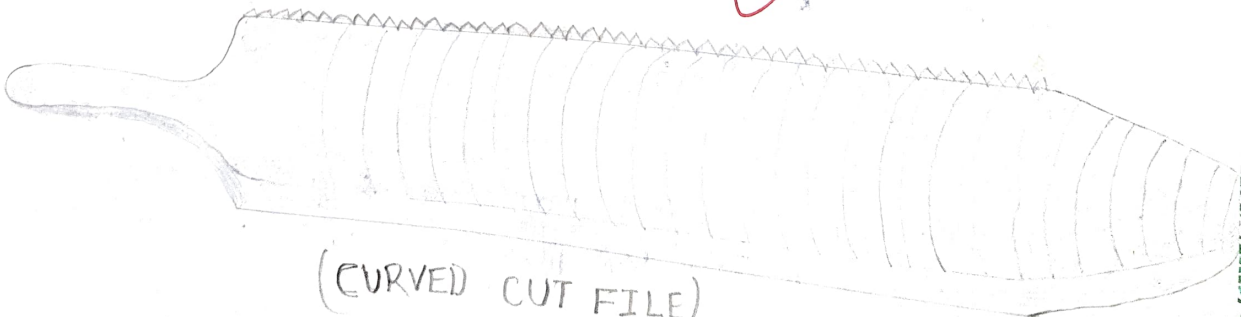
(SINGLE CUT FILE)



(DOUBLE CUT FILE)



(RAPS CUT FILE)



(CURVED CUT FILE)



other soft material these files are available only half round shape

curved cut file:- These files have deeper cutting action and are useful for filing soft materials like: aluminium, brass copper and plastic.

File specification and grades:-

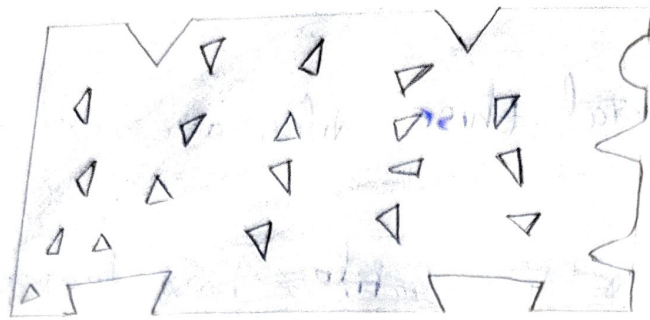
Files are manufactured in different type and grades to meet the various needs. Files are specified according to their length, grade, cut and shape. Length is the distance from the type of file to the heel. File grades are determined by the spacing of the teeth.

Rough file:- Is used for removing rapidly a larger quantity of metal. It is mostly used for trimming, rough edges of soft metal casting.

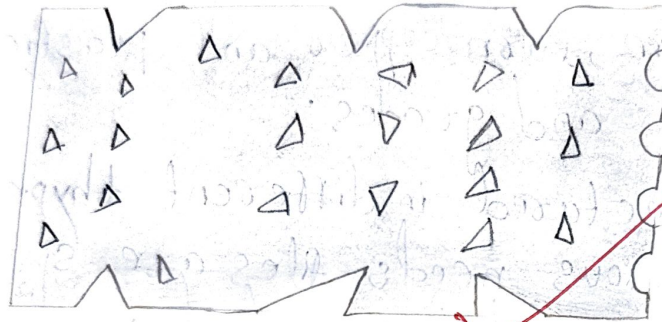
A bastard file:- It used in cases where is a heavy reduction of material.

A second cut file:- Is used to given a good finish on metals. It is excellent to file hard metals. It is useful for bringing the jobs close to the finishing size.

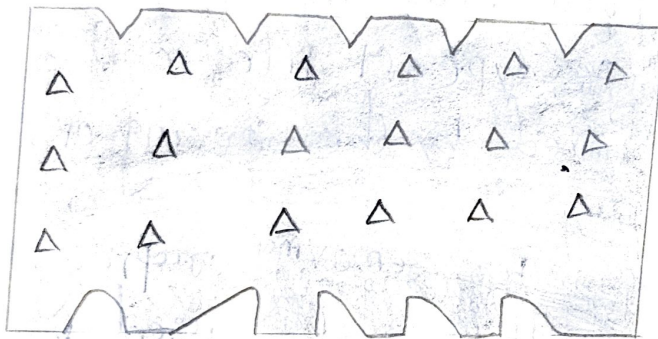
A smooth file:- Is used to bring to accurate size with a high degree of finish.



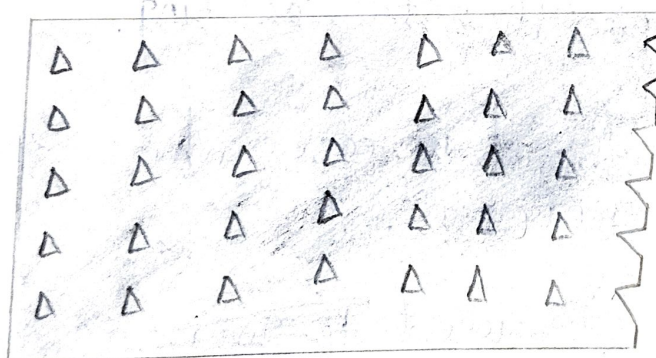
(ROUGH FILE)



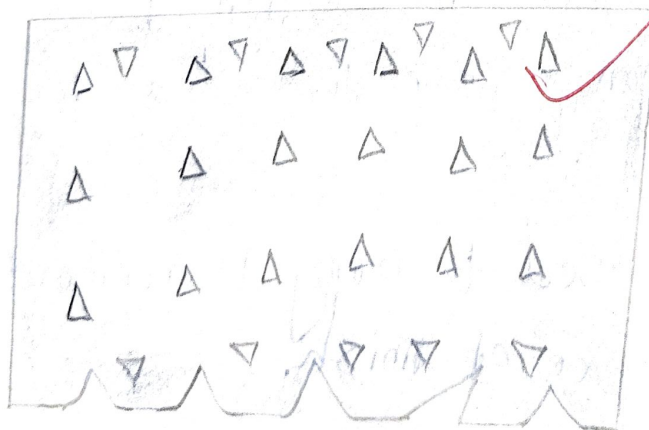
(BASTARD FILE)



(SECOND CUT FILE)



(SMOOTH FILE)



(DEAD SMOOTH FILE)



04

No.

The most used grade of files are bastard second cut, smooth and dead smooth. These are the grades recommended by the Bureau of Indian Standards (BIS).

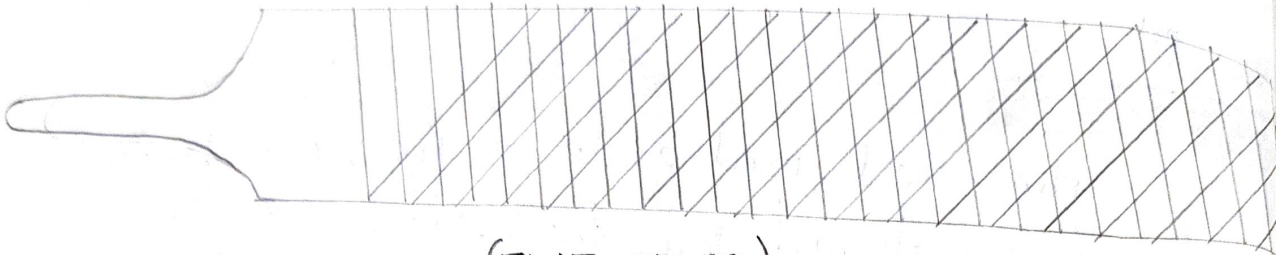
File shape:- Files are made in different shape so as to be able to file and finish components to different shapes.

The shape of the files is usually specified by their cross section.

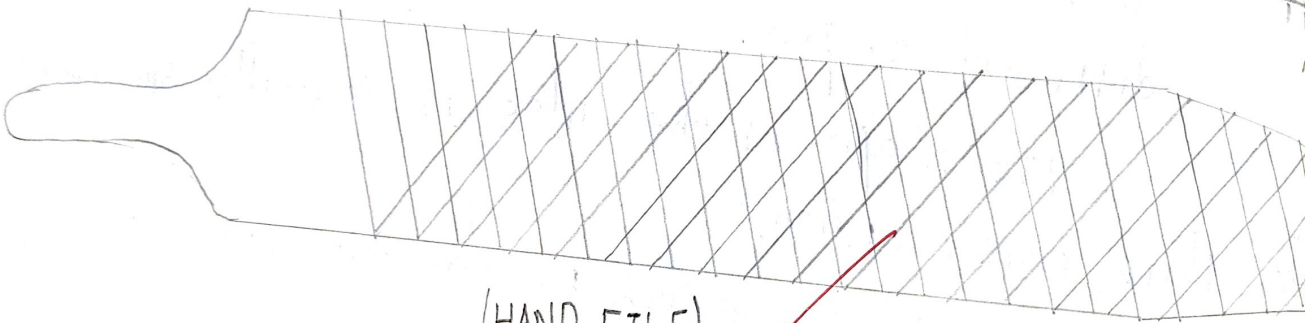
The files use full for this exercise are flat files and hand files.

Flat files:- These files are of a rectangular cross section. The edges along the width of the length and then they taper to wards the point. The faces are double cut, and the edges single cut. These files are used for, generally purpose work. They are useful for filing and finishing external and internal surface.

Hand file:- These files are similar to the flat files in their cross section. The edges along the width are parallel throughout the length. The faces are double cut, one edge is single cut. Where as the other is safe edge. Because of the safe edge they are useful for filing surfaces which are at right angle to surface at ready finished.



(FLAT FILES)



(HAND FILE)



Flat files are general files. They are available in all grades. Hand files are particularly used for filing at right angle to a finished surface.

LENGTH MEASUREMENT:

Steel rules: Steel rules are made of spring steel or stainless steel. The edges are accurately ground to form straight edges. The surface of the steel rules is stain chrome finished to reduce glare and to prevent rusting.

Size of steel rules

Steel rules are available in different lengths. The common sizes being 150 mm, 300 mm and 600 mm, 1 mm and 0.5 mm. The reading accuracy of the steel rule is 0.5 mm.

Try square: The try square is a precision measurement which is used to check squareness (angle of 90°) of a surface.

The accuracy of measurement by a try square is about 0.002 mm per 10 mm length, which is accurate enough for most workshop purposes. The try square has a blade with parallel surface. The blade is fixed to the stock at 90° .



uses:- The try square is used to check the squareness of ~~machined~~ ^{mark and} or filed surfaces, check flatness of surfaces, mark lines 90° to the edges of workpieces, set workpieces at right angles on work-holding devices

conclusion:-

Hence we study in this instrument, which is used in try square for measure flatness and squareness of metal.

✓
Sukrabi
9/2/24

Submitted by

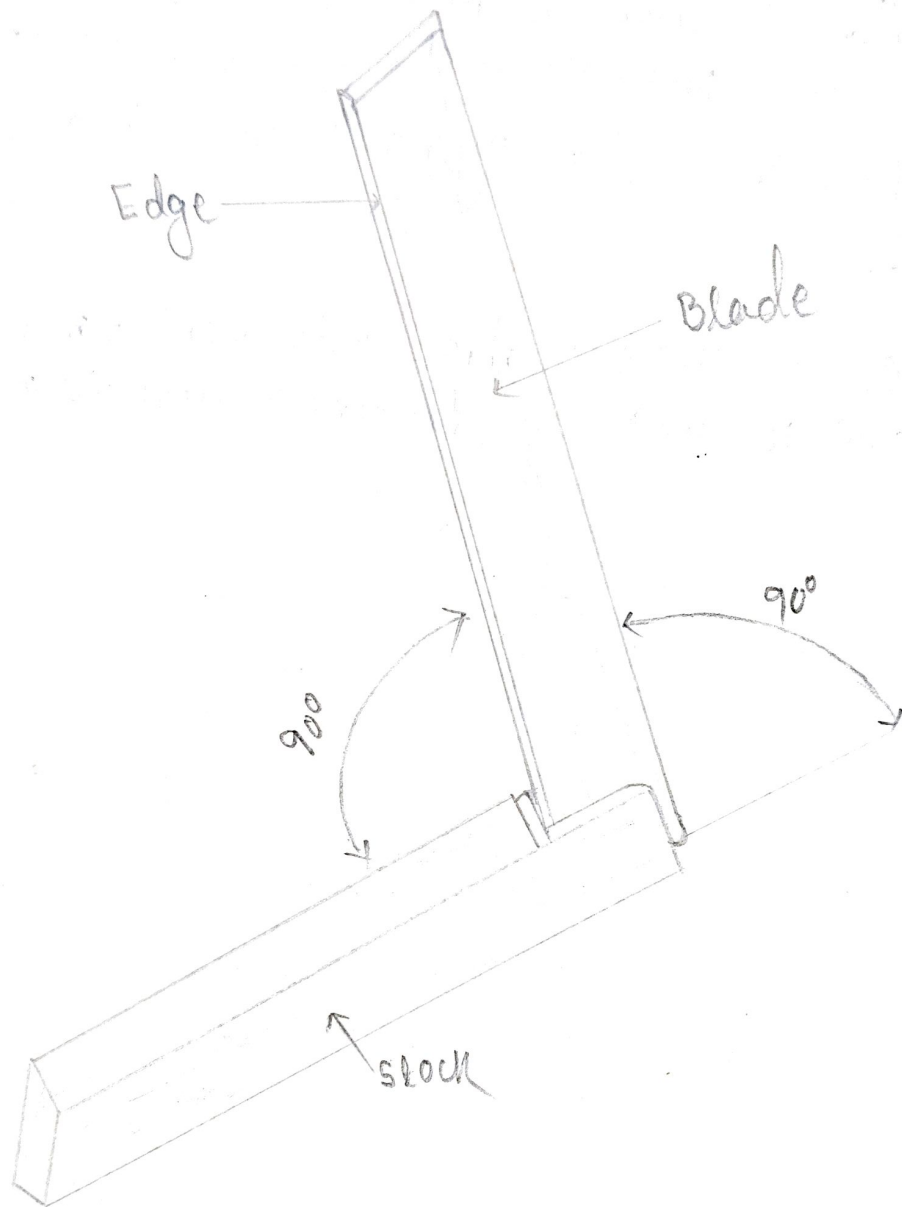
Name:- Jagan Sahu

Regd No:- P22110005008

Branch:- Automobile

Semester:- 1st

Date:-



TRY SQUARE



EXPERIMENT-2

AIM OF THE EXPERIMENT:-

Sharpening of cutting tools like chisels, twist drill bit and punch through double ended grommets.

Apparatus Required

- 1) Chisels
- 2) Twist
- 3) Drill bit
- 4) Punch
- 5) Double ended grommets

Theory:-

Punch:- punches are used in order to make certain diametrical features of the lay at permanent. There are two types of punches, they are centre punch and prick punch.

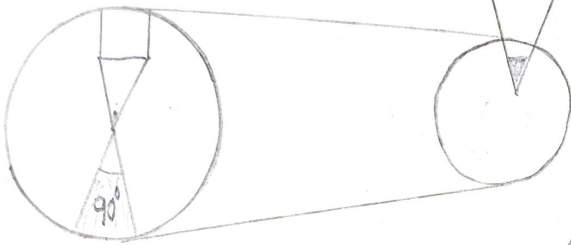
Centre punch:- The angle of the points is 90° in a centre punch. The punch mark made by this is wide and not very deep. This punch is used for locating holes. The wide punch mark gives a good seating for starting the drill.

Prick punch:- The angle of the prick punch is 30° , 60° the point is used marking light punch marks needed to position dividers. The dividers leg will get a proper seating in the punch mark.

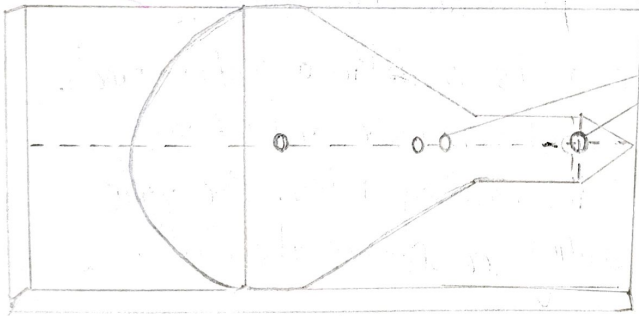
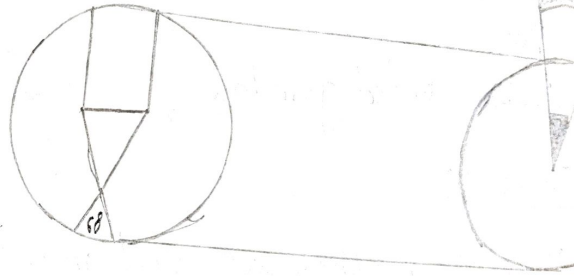
Hack saw frame and blade:-

The hand hacksaw is used along with a block the cut

(center punch)



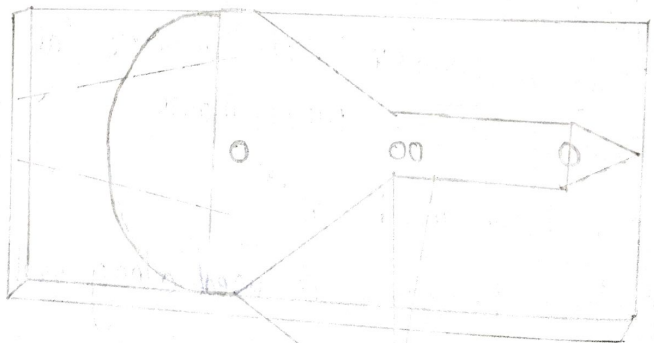
(prick punch)



(center punch mark on 90° angle)



(prick punch mark on 30° angle)



WITNESS MARK



materials of different section. It is also used to cut slots and locks.

Types of Hacksaw frame

The two different types of hacksaw frames are solid frames and adjustable frames.

Solid frames:- only a particular standard length of length can be fitted to this frame.

Adjustable frame (flat type):- Different standard lengths of blades can be fitted to this frame.

Adjustable frame (Tubular type):-

This is the most commonly used type it gives a better grip and control, while teeth and two pin holes at the ends.

Types of Hacksaw Blades:-

Two types of hacksaw blades are available all hand blades and flexible blades.

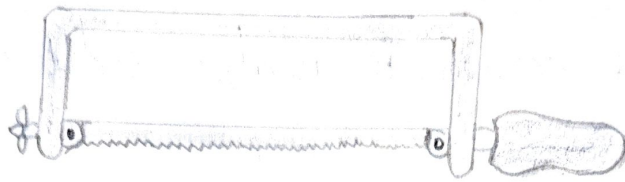
All Hand blades:-

These are hardened to the full length between the pin holes.

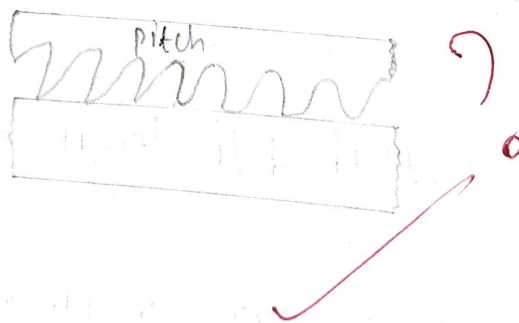
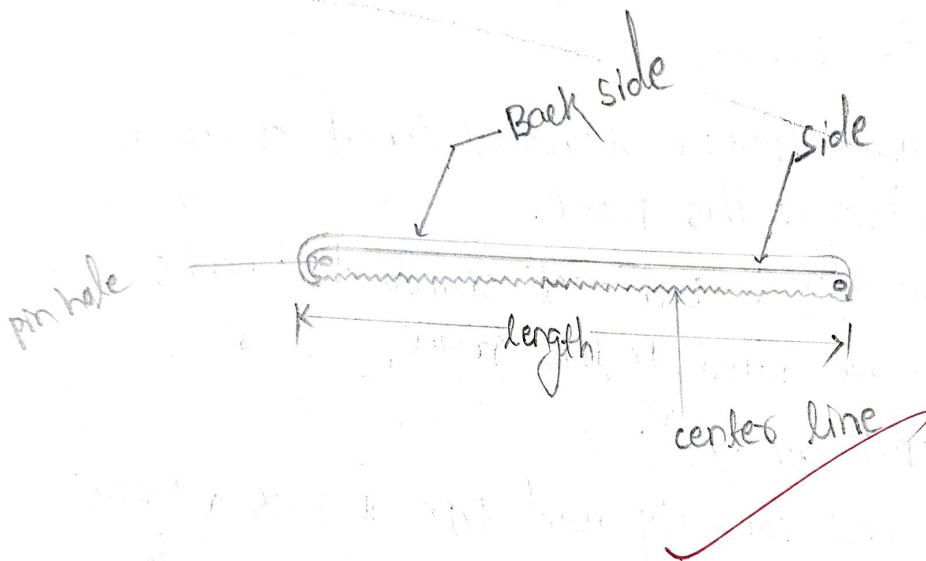
Flexible blades:- For these types of blades only the teeth.

Pitch of the Blade:-

The distance between adjacent teeth is known as the 'Pitch' of the blade.



Hacksaw





Classification	
coarse	Pitch
medium	1.8 mm
fine	1.4 mm 81.0 mm
	0.8 mm

BENCH VICE:-

Vice are used for holding work pieces. They are available in different types. The vice used for bench work is the bench vice.

(Engineer's vice)

A bench vice is made of cast iron or cast steel and it is used to hold work for filing, sawing, threading and other hand operation.

The size of the vice is stated by the width of the jaws.

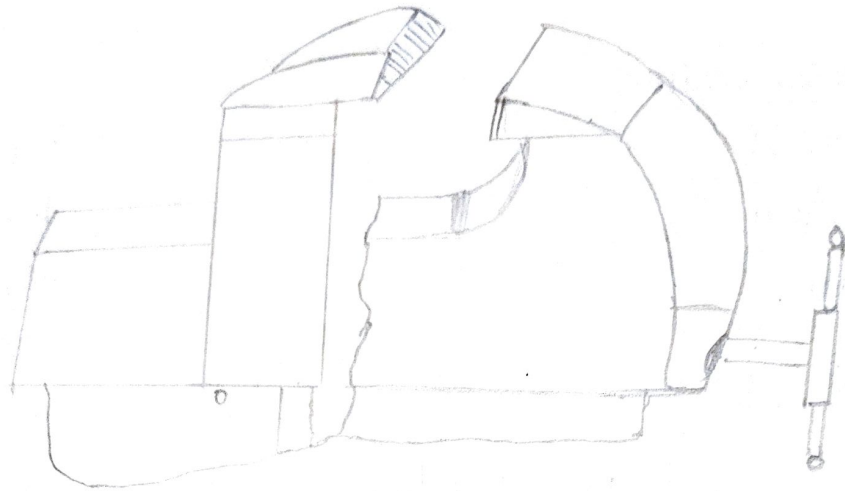
Parts of Bench vice:-

The following are the part of a vice: Fixed jaw, movable jaw, Hard jaw, spindle, Handle box nut and Spring.

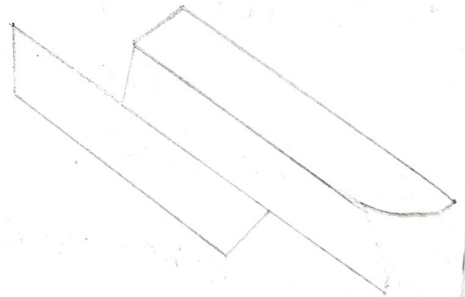
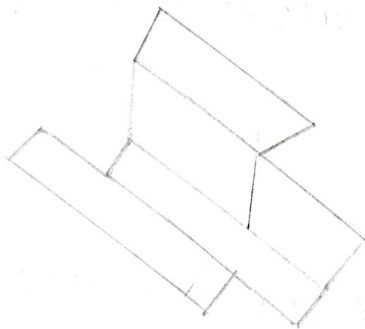
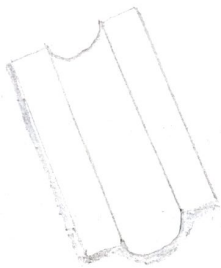
The box nut and the spring are the internal parts.

Vice clamps or soft jaw:

To hold a finished work use soft jaws (vice clamps) made of aluminium over the regular hard jaw. This will



Bench vice



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protect the work surface from damage.

CHISEL: The cold chisel is a cutting

operation tool used by fitted for chipping cutting of operation.

chipping is an operation of removing excess metal with the help of a chisel and hammer chipped surfaces being rough, they should be finished by filing.

parts of a chisel: A chisel has the following parts head, Body point or cutting edge.

chisels are made from high carbon steel or chromium vanadium steel.

common type of chisels:

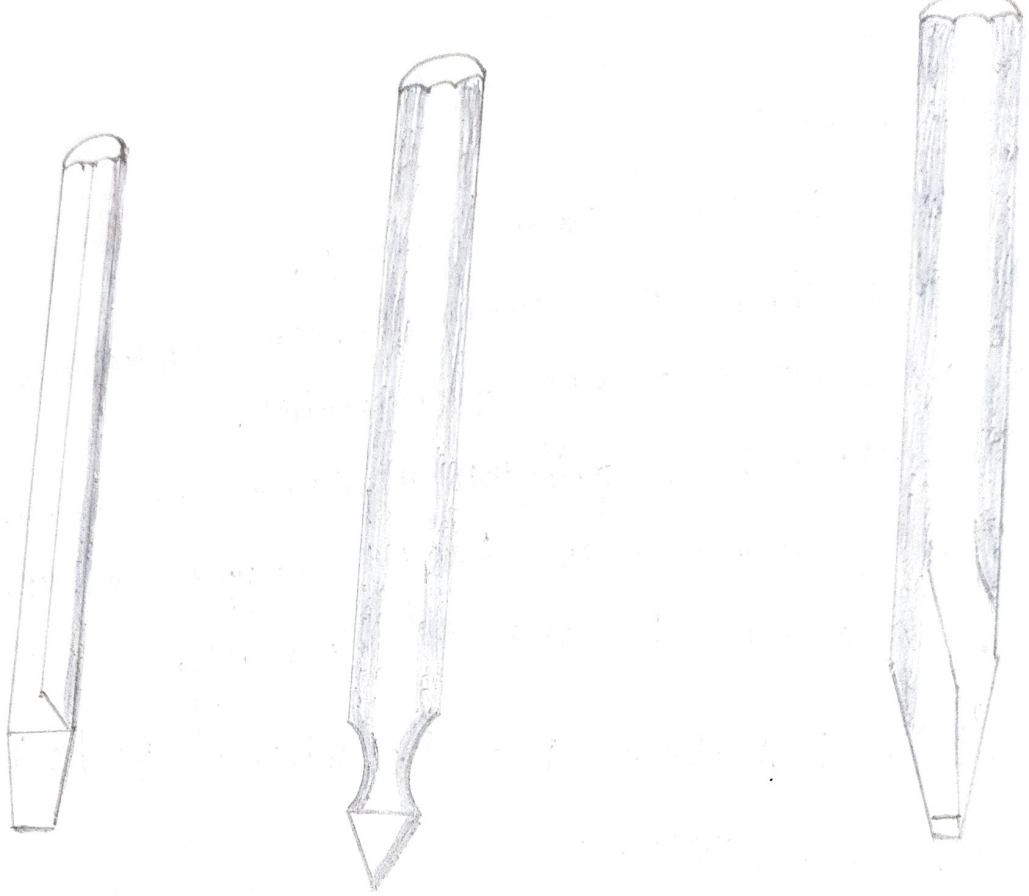
There are four common type of chisels :-

- 1- flat chisel
- 2- cross-cut chisel
- 3- Half-round chisel
- 4- Diamond point chisel

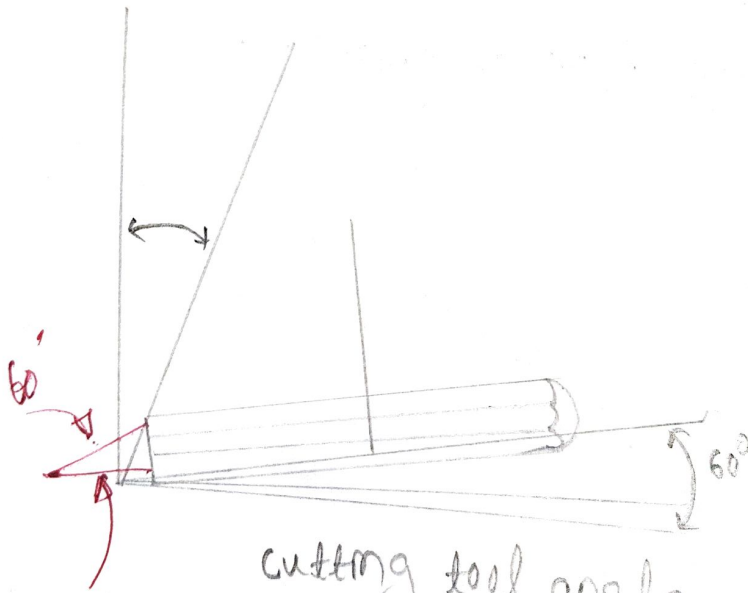
Flat chisels

They are used to remove metal from large joint and casting.

Cross-cut or cape chisels: These are used for cutting key ways grooves and slots.



cutting Tool



cutting tool angle



Half round nose chisel:- They are used for cut curved grooves (oil grooves).

Diamond point chisels:- These are used for squaring materials of the corners.

Angle of chisels:- The current point cutting angle (ϕ) of the chisel depend on the material to be chipped. Sharp angles are given for soft materials and wide angles for hard materials.

The correct point angle and angle of inclination generate the correct rake and clearance angles.

Rake angle:- Rake angle (α) is the angle between the top face the cutting point and normal to the work surface at the cutting edge.

Clearance angle:- Clearance angle between the bottom face of the point and tangent to the work surface originating of the cutting edge.

If the clearance angle is too low or zero the rake angle increases. The cutting edge cannot penetrate into the work. The cut progress increases.



Material to be cut	Point angle	Angle of Inclination
High carbon steel		
Cast iron	65	39.5°
Mild steel	60	37°
Brass	55	34.5°
Copper	50	32°
Aluminium	45	29.5°
	35	22°

DRILL PARTS (AND FUNCTION)

Drilling is a process of making holes on work pieces. The tool used is a drill for drilling, the drill is rotated with a down ward pressure causing the tool to penetrate into the material. The various parts of a drill can be identified from - pg.

Point:- The cone shape end which does the cutting is called the point. It consists of a dead centre lips for cutting edge and a heel.

Shank:- This is the lower end of the drill which is fitted on to the machine. Shank are of two types. Tapper shank used for larger diameter drills.

Tang:- This is a part of the tapper shank drill which fits into the slot of the drilling machine spindle.

Body:- The portion between the point and the shank is called the body of drill.

Flutes:- Flutes are the spiral grooves which run to the length



of the drill. The flutes help to form the cutting edge.
margin :- The margin is the narrow strip which extends to the entire length of the flutes.

Body clearance :- Body clearance is the part of the body which is reduced in diameter to cut down.

wed :- wed is the metal column which separates the fluted.

Drill holding device :- For drilling holes on materials the drills are to be held accurately and rigidly on the machine.

Drill chuck :- It rotating shank drills are held in drill chuck. For fixing and moving drills the chucks. For fixing and moving drill the chucks are provided either with a pinion and key or a sun and ring.

The drill or a sun and ring and held on the machine spindle means of an arbor fitted on the drill chuck.

Grinding :- off-hand grinding is the operation of removing material which does not require great accuracy in size or shape this is coarse cut by pressing the work piece by hand against a grinding wheel.

off-hand grinding is performed for rough grinding of sub. and reshaping of :-

scissors

punches

chisels

twines drill single point cutting tool.



Bench grinder:- Bench grinders are mounted on a base (pedestal), which is fastened to the floor. They are used for heavy duty work.

These grinders consist of an electric motor and two spindles for mounting grinding wheels. On the spindle fine grained wheel is fitted and on the other, a fine grained wheel for safety, while working wheel guards.

CONCLUSION:-

We study in this instrument which is used in sharpening of cutting tools like twist drill bit and punch through double ended grinder.

Due Date
19/2/21

Submitted by

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Semester:- 1st