GOVERNMENT POLYTECHNIC, BALANGIR

LARKIPALI, BALANGIR

State Council Regd. No. F2311000 4036

Name Nikhil Nanda

Roll. No. 36 Semester 3rd Session 2024(W)

Branch Mechanical Group

Subject M.E. Lab

GOVERNMENT POLYTECHNIC, BALANGIR

DEPARTMENT OF Mechanical Engineering

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Aim of the Experiment

To determine the end reactions in a simply supported beam using Parallel Force apparatus.

Apparatus Required

(I) different weight (II) graduated scale.

(III) Parallel Force apparatus

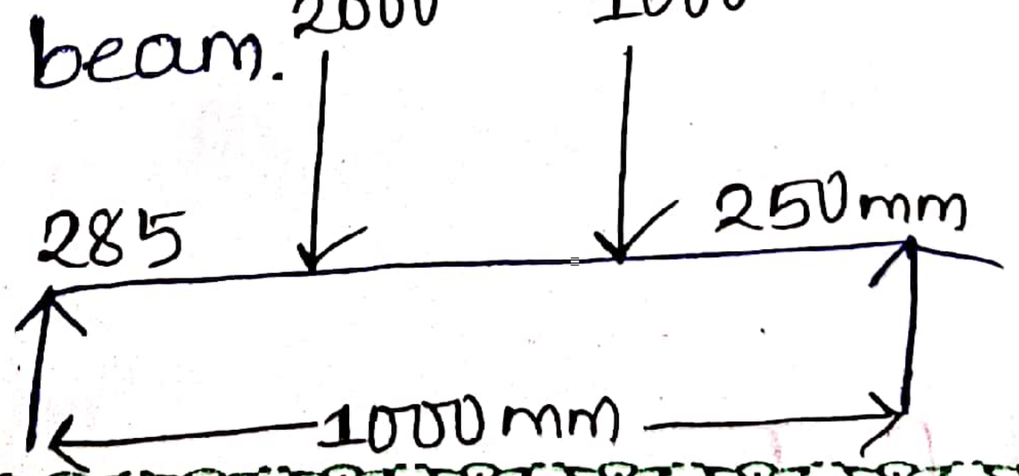
About the apparatus

The Parallel Force apparatus consists of a horizontal beam which is supported by two supported and the beam is also supported by two spring balance. To weighing pan are are introduced in the beam for giving different weight

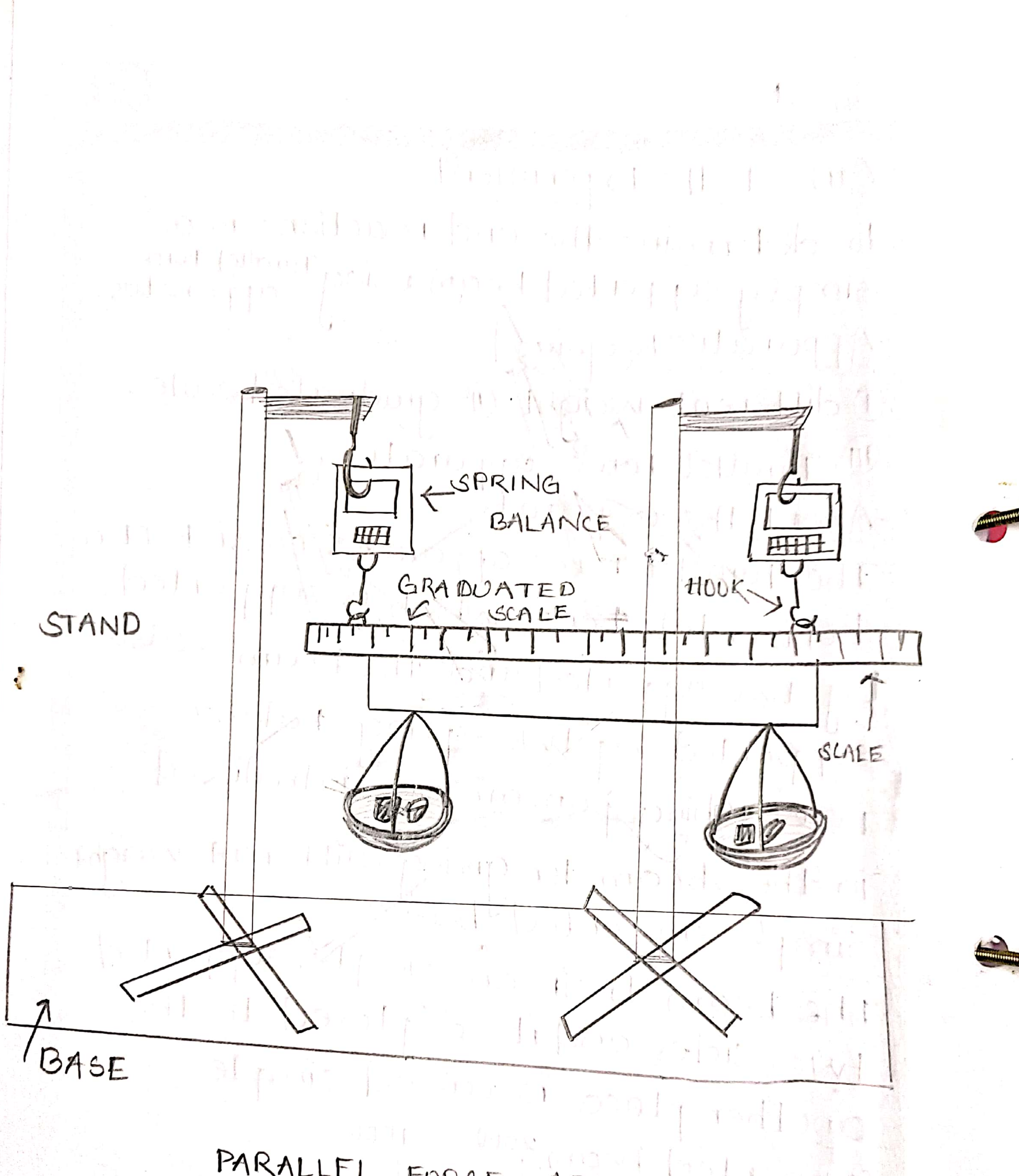
Simple supported beam

The beam their are simple supported two sides and its displased to the another place is called simple supported beam.

Theory



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PARALLEL FORCE APPARATUS

At R_A & R_B be the reactions at A & B respectively.

considering beam is in equillibrium

$$R = 0$$

$$R_A + R_B = 100 + 150$$

$$= 250\ N \quad \text{---} (1)$$

$$\Sigma M = 0$$

∴ Clockwise moment = Anticlockwise moment.

taking moment about point A and equating clockwise moment and anticlockwise moment

$$(2000 \times 285) + (1000 \times 750) = R_B \times 1000$$

$$R_B = \frac{570000 + 750000}{1000}$$

$$R_B = 1320$$

Then, $R_A = 3000 - 1320 = 1680$

Procedure

Firstly the parallel Force aparatus was set.

Two different weight are put on the weighing

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pan.
The reading of the spring balance were noted down.
The above reading showed the end reaction of the support.
Than this equillibrium was verified the critically by equillibrium method.

Conclusion

In the above procedure we found that the end reaction theoritically and practically.

Submitted By

Name: Nikhil Nanda
Regd no: F231100004036
Branch: Mechanical
Semester: 3rd.

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AIM OF THE EXPERIMENT:

To determine the young's modulus of a given wire using searle's apparatus.

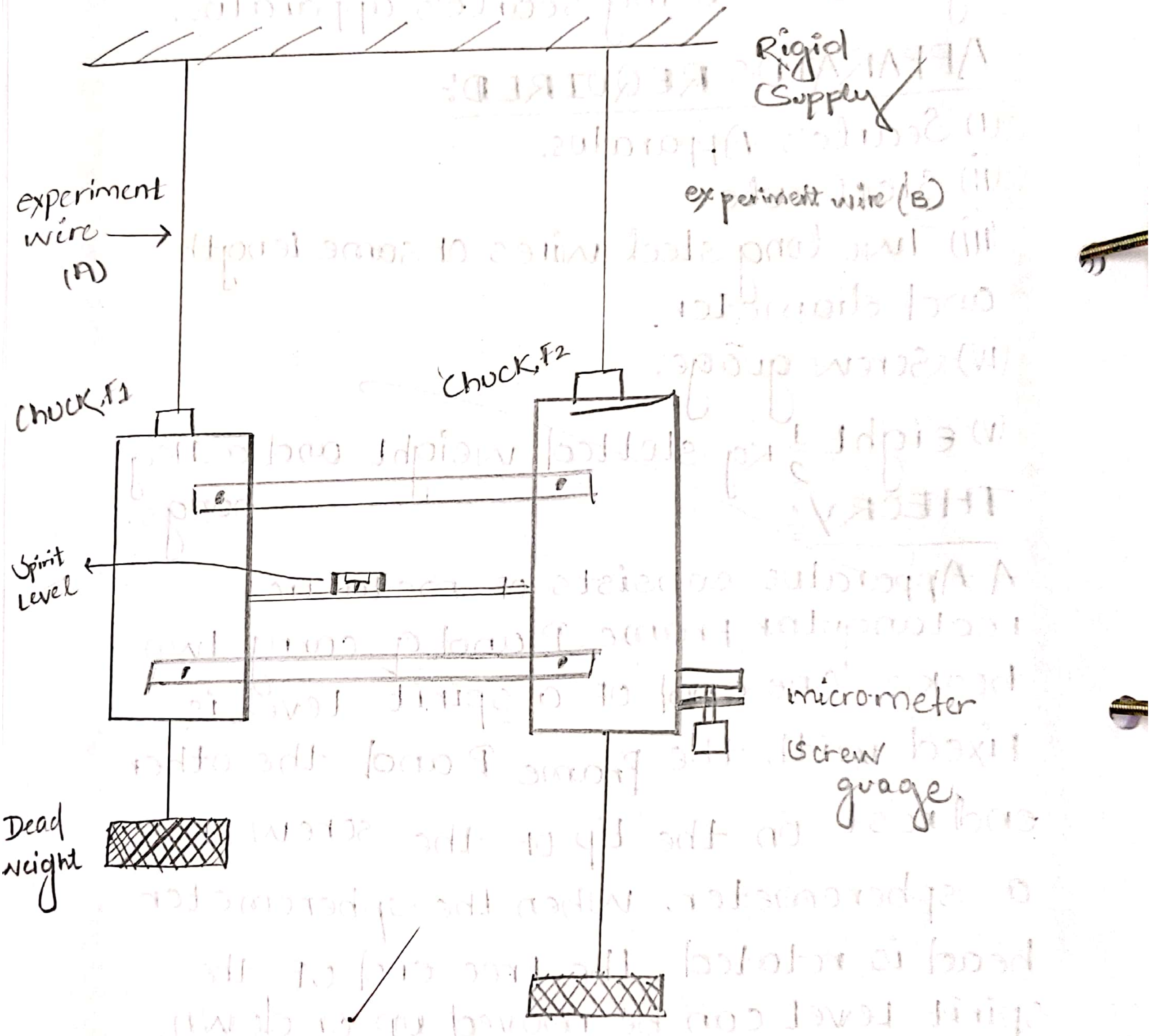
APPARATUS REQUIRED:

(i) Searle's Apparatus.
(ii) Steel rule.
(iii) Two long steel wires of same length and diameter.
(iv) Screw guage.
(v) eight $\frac{1}{2}$ kg slotted weight and a 1kg hangs.

THEORY:

A Apparatus consists of metallic rectangular Frame. P and q carry two hooks. One end of a spirit level is Fixed with the frame P and the other end rest on the tip of the screw of a spherometer. When the spherometer head is rotated, the free end of the spirit Level can be moved up or down. A and B are two long parallel wires, Fixed From the same horizontal Frame at the

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Rigid Support
experiment wire (A)
experiment wire (B)
Chuck, F1
Chuck, F2
Spirit Level
micrometer screw guage
Dead weight

top. W is a dead load suspended From the hook OF P and keeps the wire B Free From kinks. A weight hanger N is attached to the hook OF Q.

When the wire A is loaded its length increases and the Free end OF the spirit level moves down. The head OF the spherometer is rotated to bring the spring level to the horizontal position the distance by which the spherometer is moved gives the extension in the wire For a particular load.

For different Loads the corresponding extensions are obtained by experiment. A graph is drawn between the load (M) along the y-axis and extension (I) along the X-axis suppose the initial Length OF the wire A is L the load applied is M, radius OF the wire is r and increase in Length is I.

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Stress (σ) $= \frac{F}{A} = \frac{mg}{\frac{\pi}{4}d^2}$ and strain (ϵ) $= \frac{\Delta l}{l}$

$$E = \frac{\sigma}{\epsilon} = \frac{mg/\frac{\pi}{4}d^2}{\frac{\Delta l}{l}} \Rightarrow E = \frac{4mgl}{\pi d^2 \Delta l}$$

The load applied should not be more than the elastic limit of the wire. The elastic limit depends upon the nature of the material and radius of wire.

PROCEDURE:

i) The shear apparatus was properly set up by fixing the two wires on the frame and it was ensured that the spirit level watch in right position.

ii) The length of the wire was measured by steel rule in accuracy and also it is seen that the wire is kept without any curl.

iii) Before fixing the wires, the diameter of the wire was measured by screw guage.

iv) Then the hanger weight was put in the

experimental wire and elongation was measured by the help of spherometer Fixed in the apparatus.

v) then young modulus was Found using the Formulat

$$\frac{4mg \times l}{\pi d^2 \times \Delta l}$$

vi) the above procedure repeated 4-5 times by applying different hanger weights.

vii) The linear scale of micrometer was standardized by the steel rule

n = no. of circular scale division = 50

Pitch

1 div = 1mm

10 rotation = 5mm

Pitch = 0.5mm

Least count = $\frac{\text{Pitch}}{50} = \frac{0.5}{50} = \frac{5}{500} = 0.01mm$

Length = 880 mm * 8 = 888 m

= 0.888 m^2

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Dia of wire = 0.57 mm

$$\text{Area} = \frac{\pi}{4}d^2 = \frac{\pi}{4}(0.57)^2 = 0.255\text{ mm}$$

$$E = \frac{4 \times 3 \times 9.81 \times 0.888 \times 1000}{\pi \times (0.00057)^2 \times 1}$$

$$E = 102\text{ GPa}$$

Sl No.	Pitch in mm	L.C mm	ICSR I	N	FCSR F	C.S.R I.V.F	MSR mm	(I.V.F) x (L.C)	Total observed Reading in mm
1	0.5	0.01	7	1	0	7-0 = 7	0.5	0.07	0.57

Sl NO.	Length of wire (l)	Dia of wire	Δl (in) mm	Mass	Elongation	Average in GPa
1	0.888 m	0.57	1.0	3kg	102×10^9	8.3×10^9
2	0.888 m	0.57	1.5	35kg	79×10^9	83×10^9
3	0.888 m	0.57	2.0	4kg	68×10^9	83 GPa

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CONCLUSION:

From the above experiment Finally young's modulus of elasticity. 83 GPa.

Submitted by

18/9/24

Name: Nikhil Nanda

Regd No: F231100004036

Branch: Mechanical.

Semester: 3rd.

Group:

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AIM OF THE EXPERIMENT:

Determine the young modulus (yield point, Fracture point) from stress, strain curved using universal testing (UTM).

APPARATUS REQUIRED:

→ UTM
→ Vernier Caliper
→ Specimen
→ steel rule
→ Extensometer

THEORY:

→ Stress: It is a opposing force of the body which oppose the externally applied force or when a body is acted upon by same load or external forces, it undergoes deformation which increased gradually during deformation. This internal resistance which the body oftens to meet with the load is called stress.

$$\text{Stress} = \frac{P}{A} = \frac{R}{A}$$

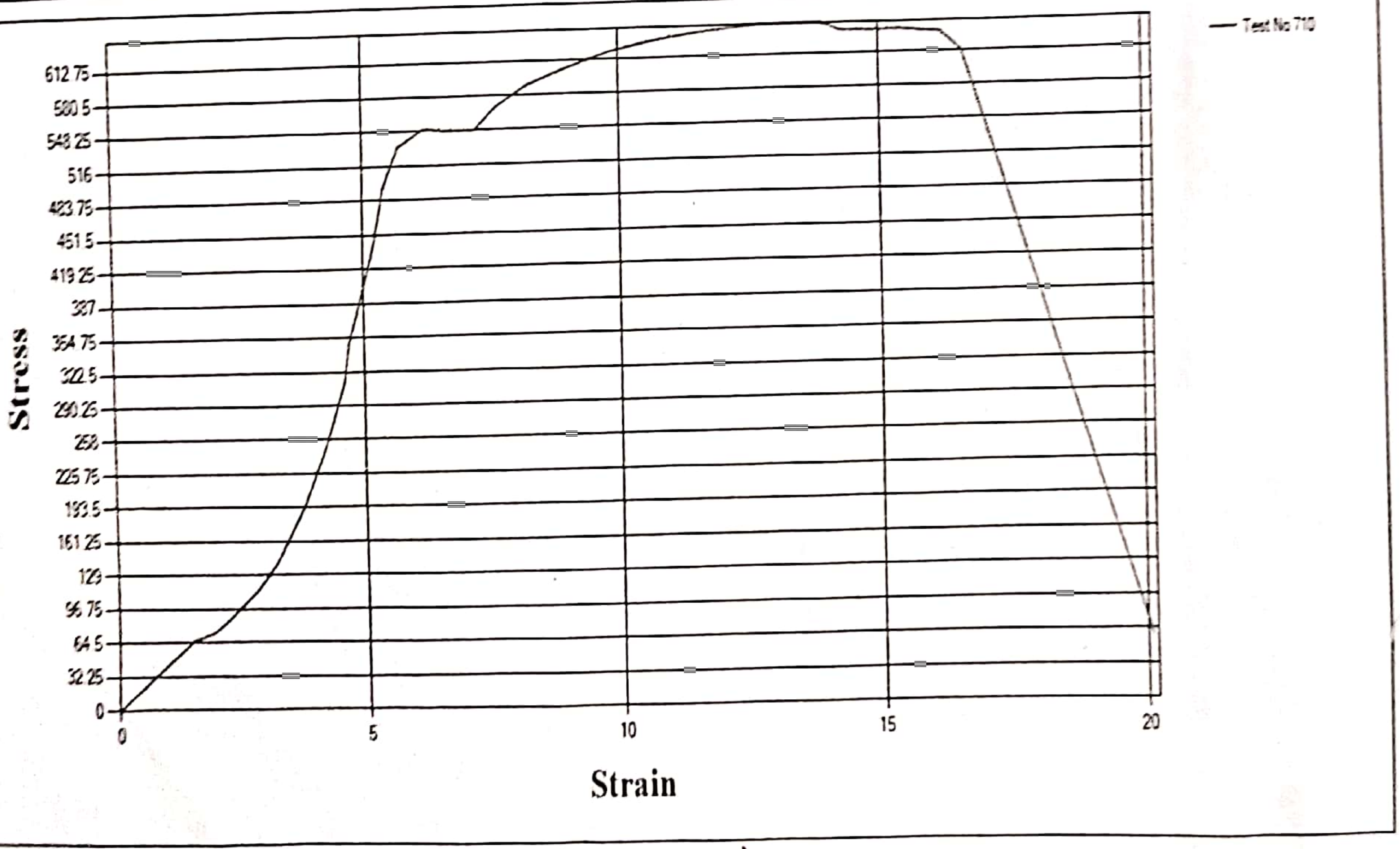
[Where,
P = Applied Force
R = Resistative Force
A = Cross-section Area]

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Universal Testing Machine

TEST REPORT

Input Parameters		Final Calculated Values	
t Number	710	Ultimate Load (kN)	129.00
t Type	TENSILE	Breaking Load (kN)	12.00
erial Type	M19	Yield Load (kN)	110.30
nt Name	MECHANICAL 3RD SEM 202	Ultimate Strength (N/mm Sq)	641.47
nperature Dec C	27.00	Breaking Strength (N/mm Sq)	59.67
mple ID / Code	16D	Yield Strength (N/mm Sq)	548.50
ference Name	SHYAM	Disp.@Peak Load (mm)	12.90
mple Type	ROD	Disp@Brk Load (kN)	19.10
ight (gms)	1524.00	Elongation (Total) %	4.00
ngth (mm)	1000.00	Elongation G/L %	-60.00
ameter (mm)	16.00	Reduction in Area %	43.80
ea (mm sq.)	201.10	Avg Test Speed (kN/Sec)	3.70
tial Guage Length (mm)	100.00	Start / Stop Time (sec)	12:10:14 // 12:10:55
nal Length	1040.00	Test Duration (sec)	35.00
nal Gauge Length (mm)	40.00		
nal Diameter (mm)	12.00		



Tested By

Checked By

Verified By

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Strain: The ratio between change in length From original length.

$$\text{Strain} = \frac{\delta l}{l}$$

δl = Change in length
l = original length

Elasticity: It is properties of a material by virtue of which elogoded object come back to its original shape.

Young Modulus: It is an constant value for one type proof material and ratio between stress and strain as known as young modulus.

$$E = \frac{\sigma}{e} = \frac{P/A}{\delta l/l} = \frac{P.l}{\delta l.A}$$

PROCEDURE:

→ First of all we fixed the speciman on UTM and extensometer will be attached to it.

→ Then data are enter in software and hydrolic valve is closed.

→ Then pannel board is set up and pump will be switched ON.

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UNIVERSAL TESTING MACHINE

PROCEDURE :

→ All the specimen on UTM are Fixed and Extensometer will be attached to it.

→ Then data are enter in SOFTWARE and hydroilic valve is closed.

→ Then pannel board is setup and pump will be switches on.

→ Force will be automatically increases upto a certain limit when the specimen will break.

→ Immediate after breaking OF Specimen the running up SOFTWARE will be stop and switch OFF the pump.

→ The broken piece is remove and the rod valve is open to relised the Load.

→ Then we will take the graph From the computer.

→ From graph we will take stress valve and cross pending strain valve with will the within the elastic limit.

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CALCULATION

From Graph,

$$\text{Stress}(\sigma) = \frac{P}{A} = \frac{R}{A}$$

where,

P = applied Force

R = resistative Force

A = cross-sectional area

$$\text{Strain}(\epsilon) = \frac{\Delta l}{l}$$

where, Δl = change in length

l = original Length.

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CONCLUSION:

From the above experiment the young modulus of the specimen.

Submitted By

Name: Nikhil Nanda

Regd. NO: F231100004036

Branch: Mechanical

Semester: 3rd

Group:

25/9/24

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Aim of the Experiment

To conduct torsion test on mild steel

By using Torsion testing machine.

Apparatus Required

→ A torsion test machine along with angle of twist measuring attachment.

→ Standard specimen of mild steel.

→ Steel rule.

→ Vernier calliper OR a micrometer.

Theory:

For transmitting power through a rotating shaft. it's necessary to apply turning Force the Force is tangentially and in the plane OF transverse cross-section. The torque or twisting movement may be calculated by multiplying two opposite turning movement. it is said to be pure torsion

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and it will exhibit the tendency of shearing off at every cross-section which is perpendicular to the Longitudinal axes.

Torsion Equation

$$\frac{T}{J} = \frac{\tau}{R} = \frac{G\theta}{L}$$

$$G = \frac{TL}{J\theta} = N/mm^2$$

T = Maximum Twisting ~~Torque~~ (N/mm)

J = Polar moment of inertia (mm^4)
$= \frac{\pi d^4}{32}$

τ = Shear stress (N/mm^2)

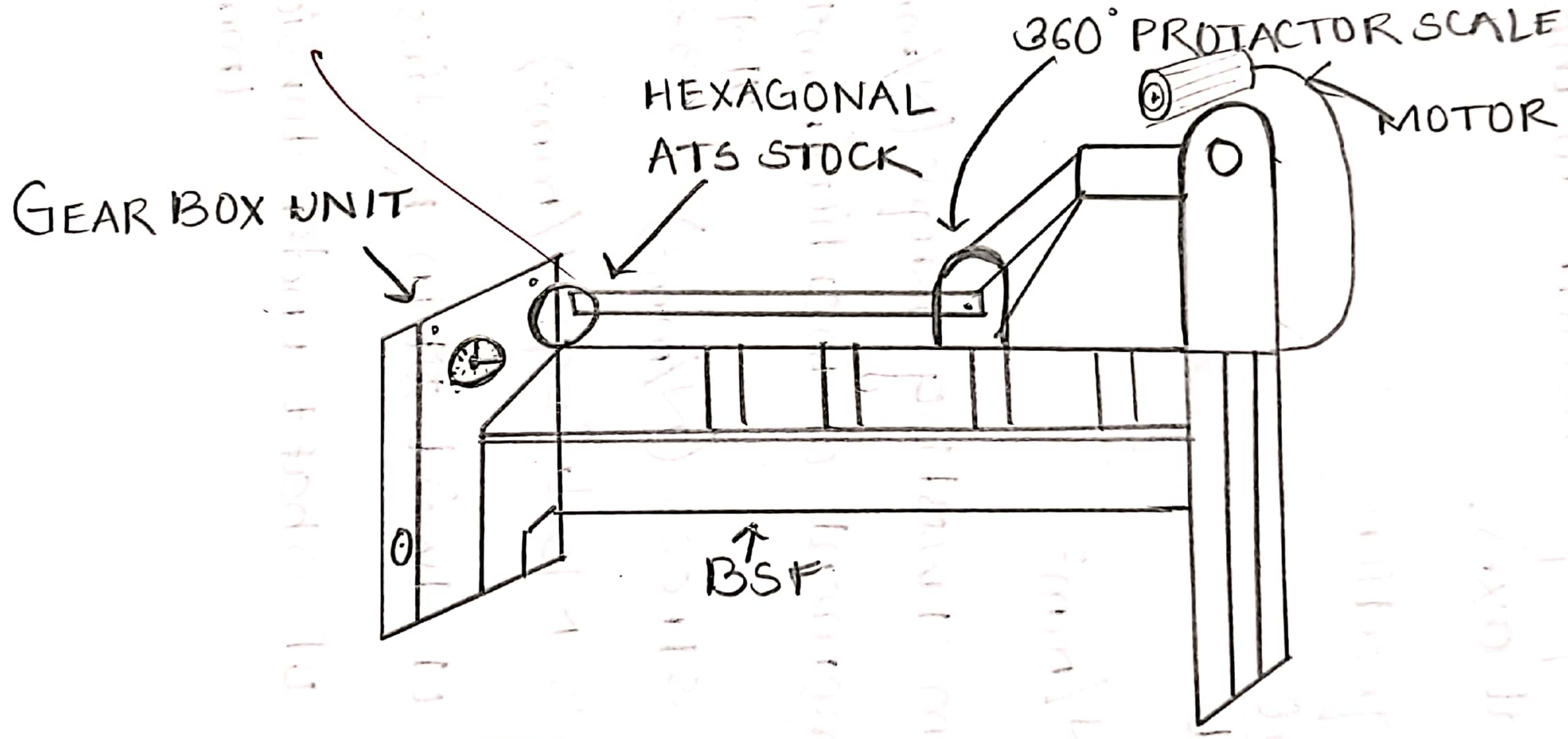
G = Young's Modulus (N/mm^2)

θ = Angle of twist ~~**~~ in Radius

L = length of shaft under torsion (mm)

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$$\frac{T}{J} = \frac{G\theta}{l} = \frac{\tau}{R}$$



TORSION TESTING MACHINE

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Procedure

→ The driving dogs was selected to suit the size of the specimen and clamped it in the machine by adjusting the length of the specimen by means of sliding spindle.

→ The diameter of the rod was measured about three places and the average value was taken.

→ The appropriate range was choosen by capacity change lever.

→ The maximum load pointer was set to zero.

→ The protactor was set to zero For convenience and it was clamped by means of knurled screw.

→ The strain was carried out by rotating the hand wheel in either direction.

→ The machine was loaded in suitable increments.

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→ Then the load was DUT OF Failure as to cause Equal increment of strain reading.

→ A torque twist (J-Q) graph was ploted.

→ The co-ordinates of a ~~on vient~~ convenient point was read OFF From the straight Line portoin of the torque twist (J-Q) graph and the value of G was calculated using relation.

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Precautions

→ Measure the dimension of the specimen carefully.

→ Measure the angle of twist accurately for the corresponding value of torque.

→ The specimen should be properly to get between the jaws.

→ After breaking specimen stop to M/C.

Conclusion:

From the above experiment how to find modulus of rigidity by using the torsion testing machine.

Submitted By

27/10/24

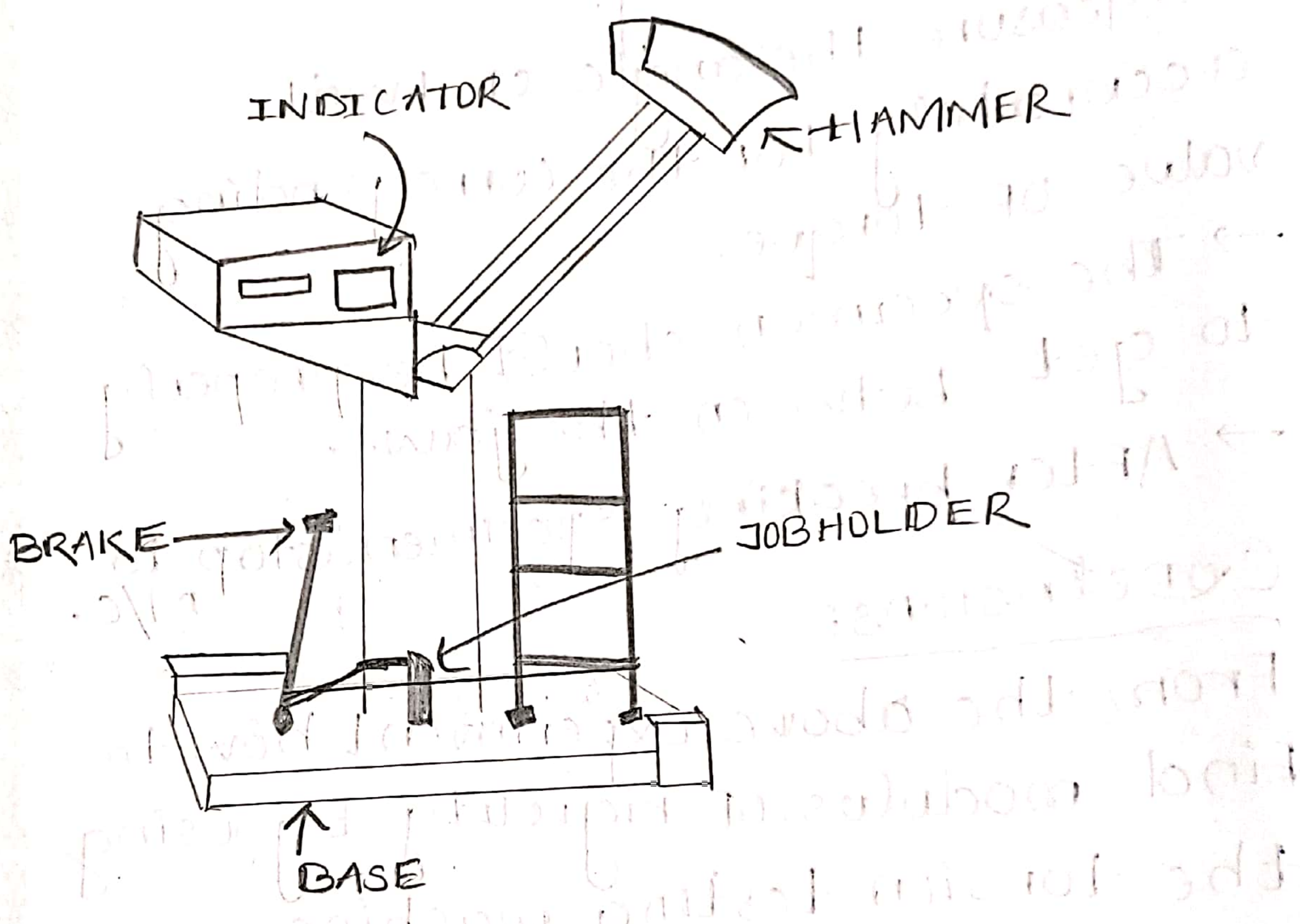
Name : Nikhil Nanda

Regd : F231100040036

Branch : Mechanical

Sem : 3rd

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IMPACT TESTING MACHINE

Aim OF the Experiment:-

To Find the impact resistance OF a M.S speciman.

Apparatus Required :-

(i) impact Testing machine

(ii) M.S. Specimen

Theory

Impact test signifies toughness OF materials that is the abiliity OF a materials to absorb energy during plastic deformation. Toughness take into account both the strength and ductility OF materials.

About Apparatus

Impact testing machine consists OF a pendulam suspended From a short shaft that rotates and swings midway between 2 rigid upright stand suspended on a rigid base near the bottom OF which are

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the specimen supports an vils.
The blow is struck at a Fixed Position on the Facing having the not when the stricker impacts the specimen will begin to undergoes plastic deformation at the notch. the specimen continuous to absorb energy and work harden at the plastic zone, when the specimen can absorb no more energy Fracture taken Place.

Procedure

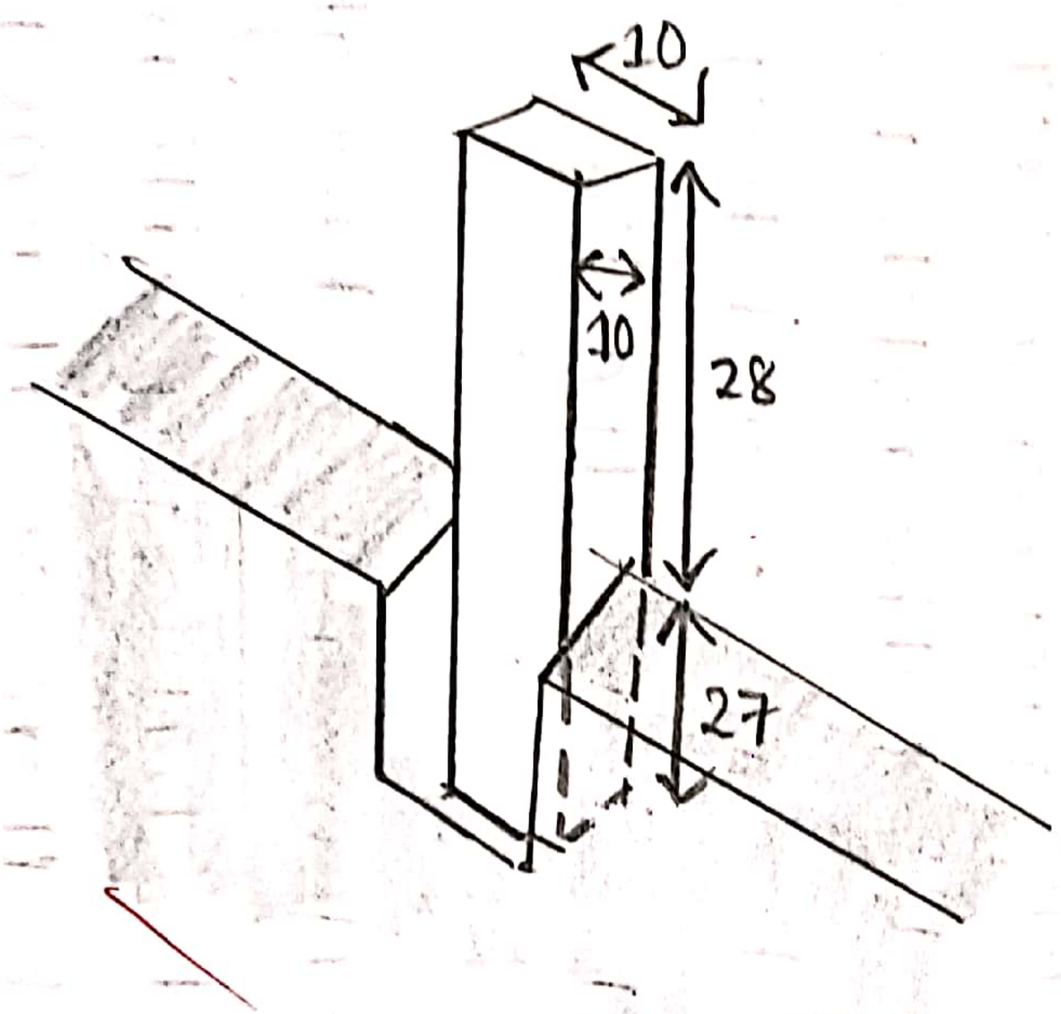
(i) The specimen was held in impact testing machine vice in with the striking hammer in safe Posn in such a way that the notch Face the hammer in such a way and half inside and half above the top surface of vice.

(ii) The striking hammer was brought to its top most striking position when it was already there and it was locked at the position.

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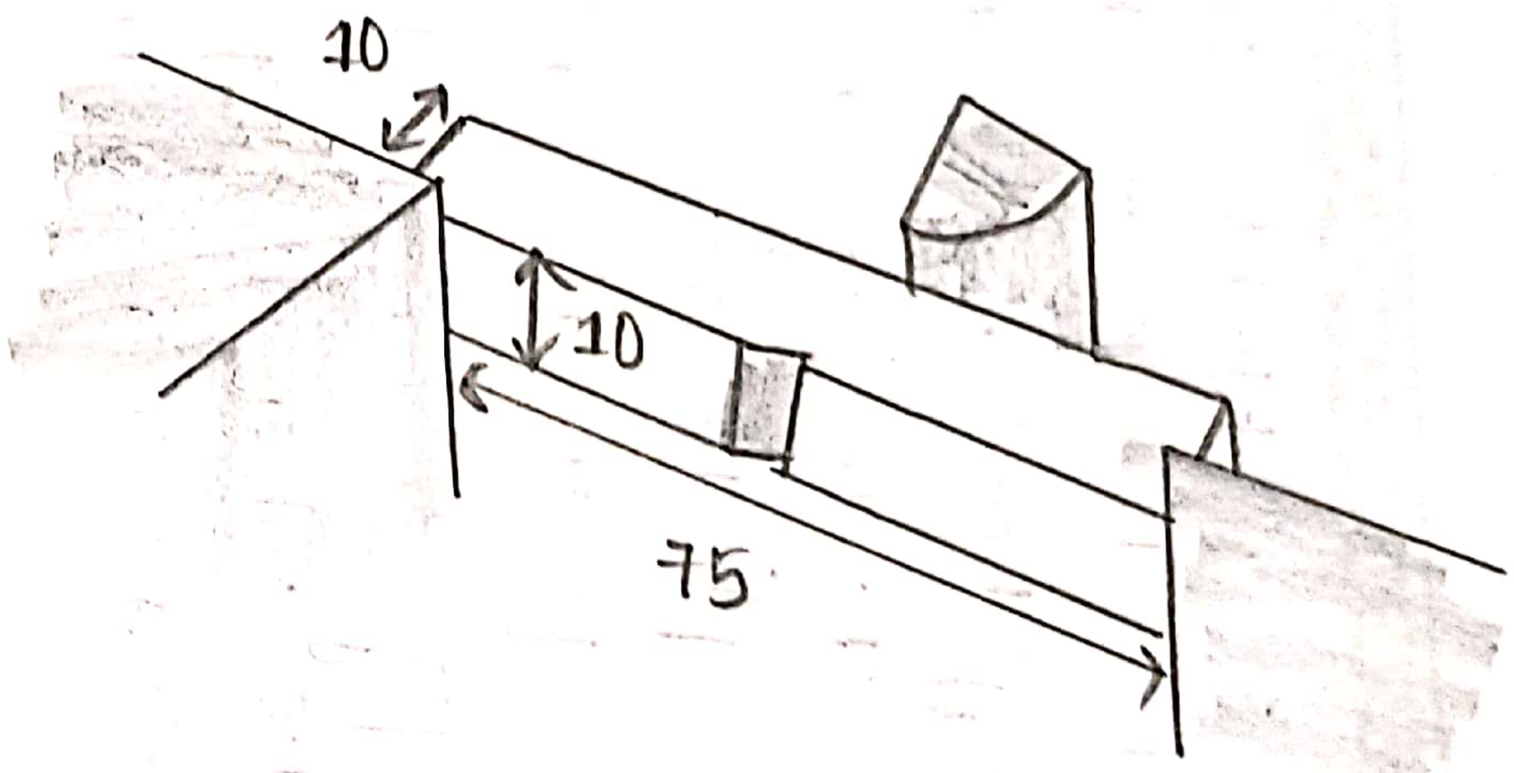
All dimensions are in mm.

SPECIMAN



IZOD

SPECIMAN



CHARPY

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~~Particularly used for riveting~~.

(iii) The indicator of machine was brought to zero.

(iv) The hammer way released it was fell due to gravity and the specimen was broken through its momentum the total energy was not absorbed by the specimen. then it continuous to swing.

(v) After breaking the specimen at its top most height, the indicator was stopped moving while the pendulum fell back.

(vi) The indicator reading was noted at that top most Final Position.

(vii) Again the hammer was brought back to its idle position.

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Tabulation

Sl. No	Charpy Test (Energy absorbed in Joule)	Izod test (Energy absorbed in Joule)
1	157.29 J	213.29 J
2	158.32 J	245.25 J
3	145.90 J	178.31 J
4	139.60 J	189.43 J

Average Mean = 150.29 J Av/Mean = 206.57 J

Conclusion:

From the above experiment we Find that the value of izod test 206.57 J and charpy test value 150.29 J.

Submitted By

Name:- Nikhil Nanda

Regd. No.:- F231100040361

Branch:- Mechanical

Semester:- 3rd

7/11/24

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AIM OF THE EXPERIMENT

To determine the Brinell harolness no. of a given specimen using Brinell Hardness Testing Machine.

APPARATUS REQUIRED

→ Brinell Hardness Testing machine and Brinell Microscope.
→ Ball Indentor of diameter and
→ specimens (mild steel, Brass, Cu, Al)

THEORY

The Brinell Hardness test is used to determine that hardness no. OF hard, moderately hard and soft materials. Eg: Brass, Al, Au and Cu. very Hard material and Brittle cannot be tested Brinell Hardness tester M/c. Brinell Hardness Number (BHN) is obtained by the ratio OF the calculated load and the spherical area OF the identation or impression made OF the specimen by corresponding identor ball In Brinell Hardness test a steel ball OF diameter (D) is Forced under

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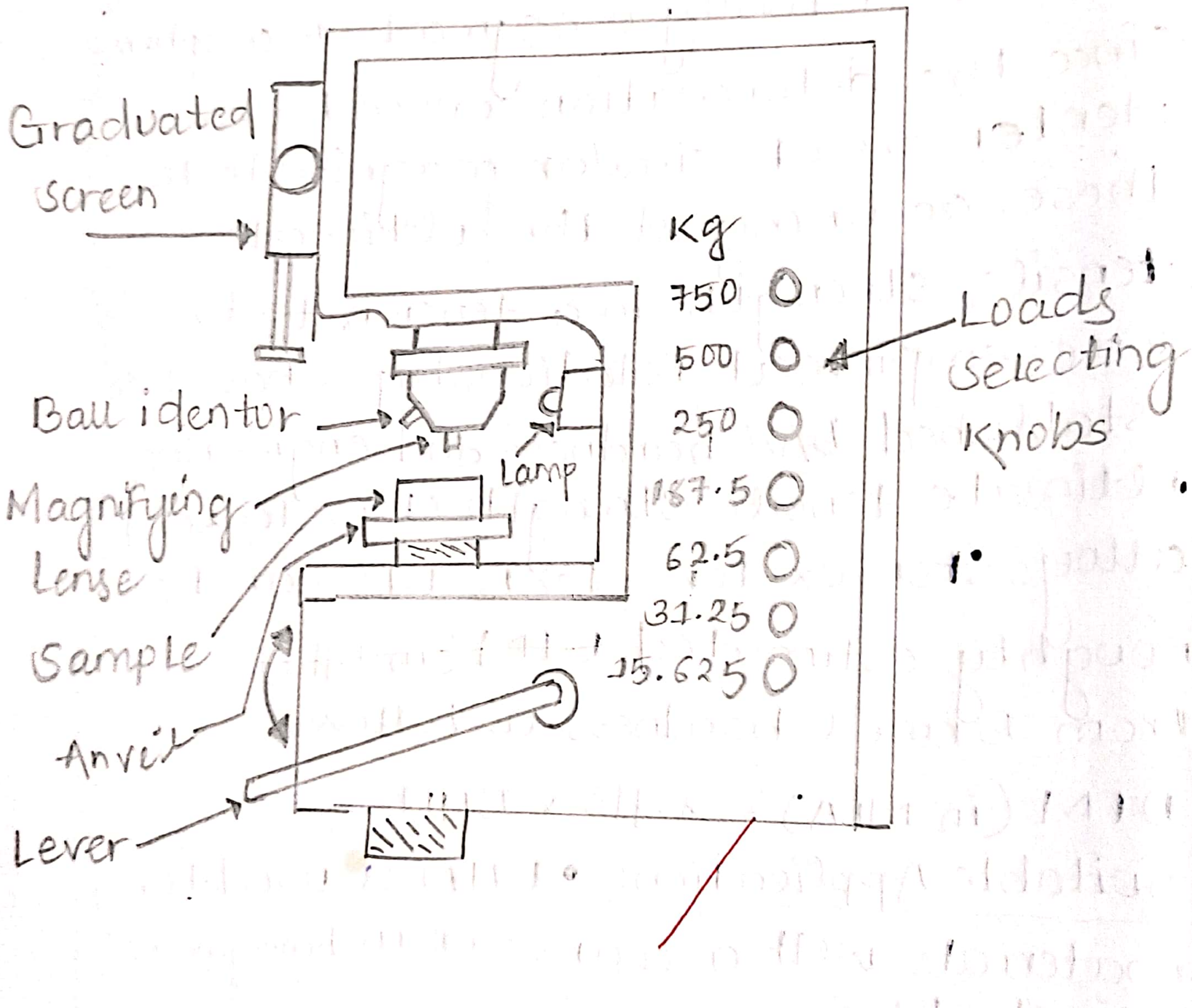
a load (F) on to a surface of the test specimen mean diameter (d) of indentation is measured after the removal of the load (P). The BHN is obtained by diving the applied force, P, in Kg-F, by the curved surface area of the indentation which is actually a segment of a sphere.

Since the deformation caused by an identer are of similar magnitude to those occuring at the ultimate tensile strength in a tension test, some empirical relationships have been established b/w hardness and engineering ultimate tensile strength of metals and alloys. For ex. For steels UTS can be roughly estimated ~~UTM (in MPa)~~ From Brinell hardness as follows.

UTM (in MPA) = 3.45 x BHN

Suitable Application:

- BHM is used for materials with a coarse or in homogeneous grain structure.
- It is used for larger samples.
- It is also suitable for forgings and castings where the structural elements are large.


Graduated screen
Ball identor
Magnifying Lense
Sample
Anvil
Lever
Lamp
Kg
750
500
250
187.5
62.5
31.25
15.625
Loads selecting Knobs

PROCEDURE

(a) The loading and unloading lever should be kept at Position "A", which is the unloading position.

(b) A suitable indenter and weights should be selected according to the scale.

(c) The specimen should be placed on the testing table anvil.

(d) The hand wheel should be turned to raise the job until contact is made with the indenter. Turning should continue until the longer pointer on the dial gauge complete $2\frac{1}{2}$ rotations and stops at zero. Turning should then continue slowly until the small pointer reaches the read spot at "3". This process is for the automatic zero setting of the dial guage.

(e) The lever should be turned From position "A" to "B". i.e, From the unloading position to the loading position, so that the total load is

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applied.

(F) When the longer pointer on the dial guage reaches a steady position, the lever should be returned to unloading position "A". [Avoiding sudden release of the lever].

(g) The job should be removed From the platform, and the diameter of the identation noted using the Brinell Microscope. BHN should be calculated using the appropriate Formula.

(h) Similarly, steps From 'a' to 'h' should be repeated For different trails and different metals.

OBSERVATION AND CALCULATION:-

Type of identor	Total Load(P) KG-F	Suitable For
Ball Identor 2.5mm diameter	187.5	Non-Ferrous soft metals, soft iron, steel casting, cast iron, malleable iron
Ball identar 5mm diameter	250	Light alloys casting / torging alloys die casting alloys

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Sl No.	Specimen	indentor diameter (D) in mm	Total Load(P) KG-F	Diameter OF indention(d) in mm			Average diameter (mm)	BHN
				1	2	3		
1	Mild Steel							
2	Brass							
3	Copper							
4	Aluminium							

$$BHN = \frac{2P}{\pi D\left(D - \sqrt{D^2 - d^2}\right)}$$

Where the BHN is expressed as in N/mm²

D = Diameter OF ball identor in mm,

d = Diameter OF Indentation in mm

P = Load applied in KG F

Least count OF Brinell Microscope = 0.01 mm

PRECAUTIONS

- The specimen should be well cleaned.
- Place the specimen properly.
- Reading must be taken carefully and correctly.
- Remove the load after applying.

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RESULTS

Brinell hardness number of the given specimen is

mild steel = 120

Brass = 10

Copper = 35

Aluminium = 15

CONCLUSION

Based on BHN For mild steel, the Relation b/w the tensile strength and Hardness number is given as Follows.

Tensile Strength of mild steel = ... K*

BHN Forms where K = constant (For types of steel From 3.4 to 3.9)

Submitted by

Name: Nikhil Nanda

Regd no: F231100004036

Branch: Mechanical

Semester: 3rd.

14/11/24

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Aim OF the Experiment:

Determination OF Flash and Fire point OF given oil.

Appcuratus Required:

i) Cleveland appcuratus
ii) Thermometer
iii) Mateh box iv) Test Sample

Theory:

Flash and Fire point is a property OF any oil or Fuel, which is Found out to know the standard OF the oil or Fuel, which show the capable OF Functioning. Flash points OF any oil is the lowest tempera-ture at which instant the oil will Flash when the small Flash is passed over its surFace.

When the oil is heated it reaches a temp. at which Flash across the oil, if a small Flame comes

near its. The Fire point of any lubricating oil should be high so the oil does not burn in service

Construction:

The cleavland apparatus consists of an oil cup provided with a cover. A handle provided for easy hand. Another stand also provided For inserting the thermometer. The oil cup and its cover are made of brass.

Procedure:

Take the required oil sample in oil cup. Place it on electric heater. insert the thermometer in stand and stir the oil continuously. After some time the oil will evaporate and make a Flash i.e instant of burning of oil vapor will occur.

The oil will burn continuously.
Note the thermometer reading
till Fired

Observation:

Sl.No.	Name of Oil	Flash Point in °C	Fire point in °C	Remarks
1	Kerosen	42°C	25°C	
2	Petrol	-43°C	210°C	
3	Diesel	38°C	247°C	
4				
5				

Conclusion:

We have conducted the experiment successfully and the Flash and Fire points of the oil sample.

Submitted By

Name: Nikhil Nanda

Regd No: F231100040 36

Aim OF the Experiment:

Determinations OF mechanical equivalent DF heat by Joule's experiment.

Apparatus Required:

i) Joule's experimental set up
ii) Water
iii) Dead weights.

Theory:

Accurate investigation OF the relation between heat developed and mechanical work spent was taken by the British scientist James prescott Joule. Every time he found that 4186 Joule OF work was spent to produce the same amount OF heat which could raise the temp. OF one kg OF water through 1°C. The constant relation W/H was

represented symbolically by the letter 'J'. J is known as Joule's mechanical equivalent of heat.

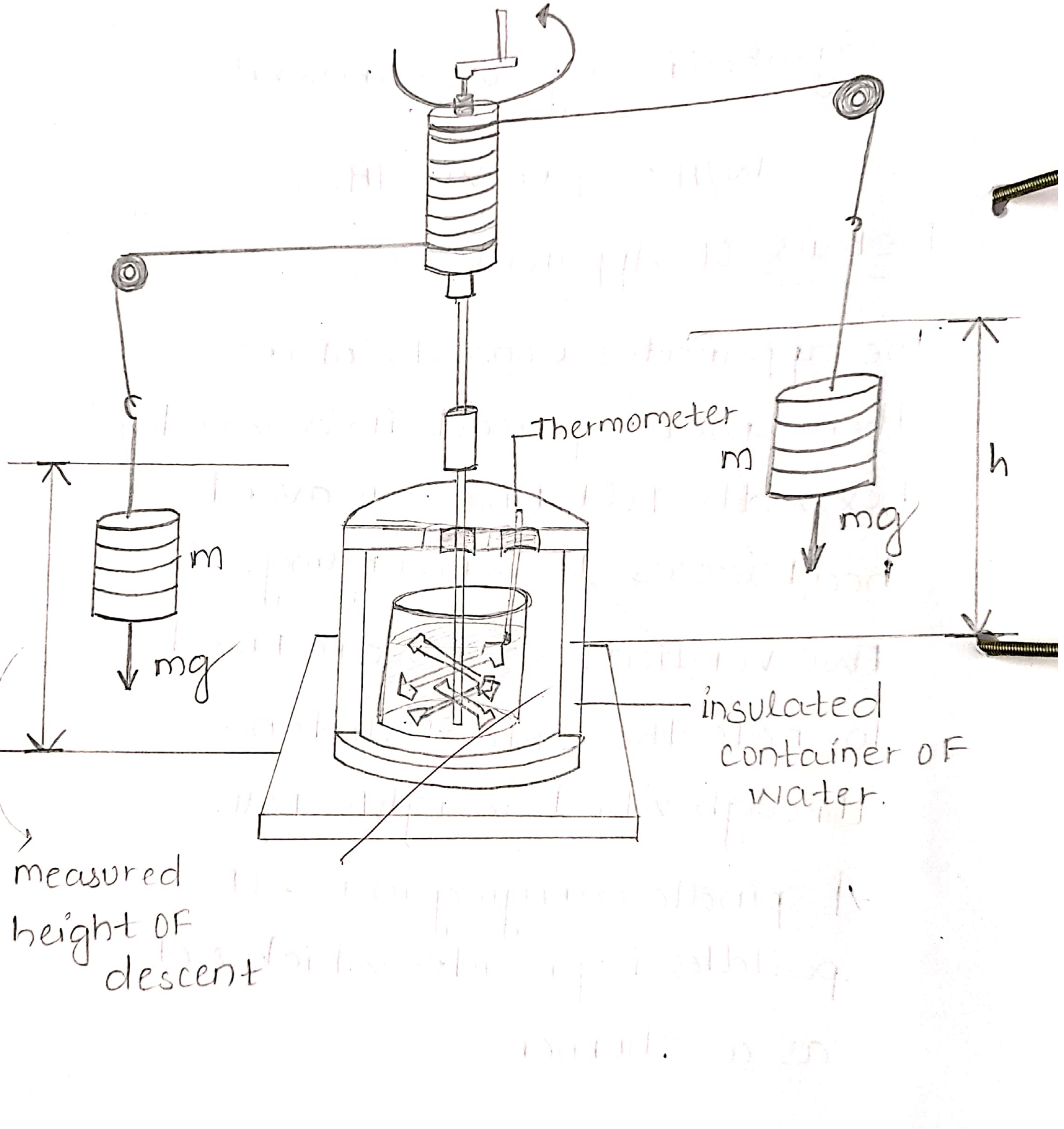
Symbollically, we can write

$$W/H = J \text{ or } W = JH$$

Details Of Apparatus

The apparatus consists of a thermometer placed in a wooden box with Felt Lining to avoid heat losses to surrounding. Two vertical scales are Fixed to note the vertical distance through which weights Fall.

A spindle carrying in no. of paddles is provides which acts as a churner.


Thermometer
m
mg
h
m
mg
insulated
container OF
water.
measured
height OF
descent

Working:

The two weights, W, W are allowed to Fall through a height 'h'. In doing so, they turn the spindle and there by turn the paddles P. P immersed in a known mass(m) of water contained in the calorimeter.

The process is rapidly repeated several time (every time detaching the drum, wrapping the string, tightening the screws and allowing the weights to Fall). such that there is an accurately measurable rise in the temp. OF water.

Tabulation

Sl. No.	Load (W)	Falling height (h)	Initial temp. of water	Final Temp. of Water	Work done (E) W × H	Heat developed (J) $m C_p (T_2 - T_1)$	Joule's Constant $J = \frac{E}{H}$
1	5×10 = 50N	1m	25°C	26.8°C	2×50×1×73 = 7300 J	1×1000 (26.8-25) = 1800 cl	$\frac{7300}{1800}$ = 4.5 J/cl
2	55×10 = 55N	1m	26°C	27°C	2×55×1×75 = 8250	2×100 (27-26) = 2000 cl	$\frac{8250}{2000}$ = 4.125 J/cl

Conclusion

Joule's experiments conclusively established that heat is a Form of energy. It is not material substance like caloric Fluid. Other Alternative ways used by Joule for conversion mechanical work into heat were (i) by mechanically stirring mercury.

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and (ii) by rubbing iron rings together. Every time he found that W/H is a constant quantity i.e, when 4.186 J converted to heat the temp. 1 kg of water will rise by 1°C.

12/12/24

Submitted By

Name : Nikhil Nanda

Regd No: F2311000403G.

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GOVERNMENT POLYTECHNIC, BALANGIR

LARKIPALI, BALANGIR

State Council Regd. No. .....F23110004019.....

Name .....Etishree Pachhan.....

Roll. No. .....Semester .....3rd..... Session ...24-25.....

Branch .....Mechanical..... Group .....

Subject .....Workshop Practical.....

GOVERNMENT POLYTECHNIC, BALANGIR

DEPARTMENT OF mechanical Engg.

A+

INDEX PAPER

Sl. No.	NAME OF THE EXPERIMENT	DATE	SHEET USED	REMARKS
1	'L' fitting copen fitting	01/10/24	1 to 16	4/10/24
2.	preparation of 'T' joint through care welding.	12/11/24	1 to 12	12/4/24
3-	To make a 'T' joint of the required dimension from the given work piece	16/12/24	1 to 8	16/12/24

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SECTION : Fitting

JOB. NO 01

DATE OF STARTING : 3-9-24

DATE OF FINISHING : 1-10-24

DATE OF DIPOSIT : 1-10-24

GRADE AWARD OF :

1. NAME OF THE JOB :

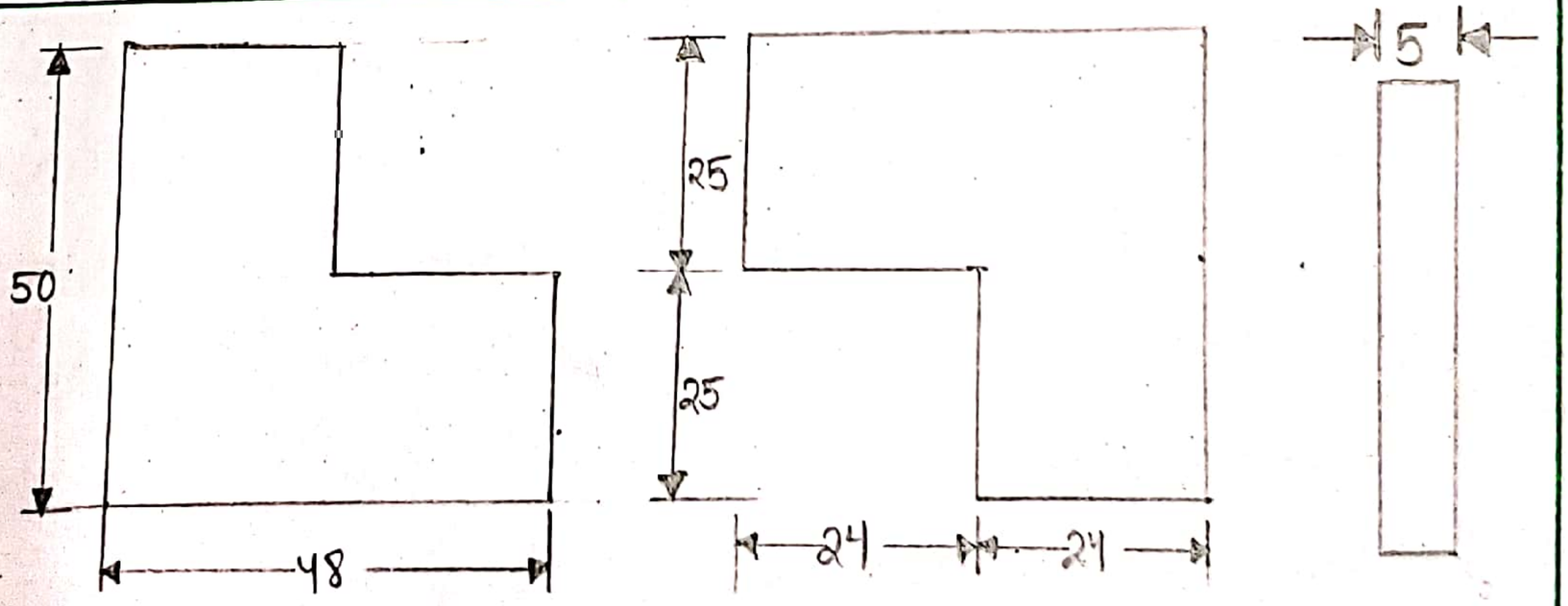
Preparation of 'L' fitting (Male & female)

2. RAW METERIAL REQURED :

Mild steel flat (50x50x05 mm) 2 piece.

3. JOB PERFORMANCE ;

JOB SKETCH



ALL DIMENSION ARE IN MM

TOLERANCE:+

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TOOL'S AND EQUIPMENT REQUIRED

1) Steel rule	9) Punch
2) Hacksaw	10) Hammer
3) Bench vice	11) Angle plate
4) File (smooth & Rough)	
5) Try - square	
6) Vernier	
7) Triangular file	
8) Surface Plate	

4. SEQUENCE OF OPERATION

Measuring → Marking → Cutting → Filling → Finishing → Groving → Filling → Punching

4. PROCEDURE

1) 1st cutting the raw material according to required dimension.
2) Make right angle four side of the job.
3) After making right angle then grooving cutting on 2 job (both male & female) according to sketch.
4) After grooving then fitting the both (male & female) job.

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Introduction :~

Machine tools are capable of producing work at a faster rate, but there are accasions when component which must fit accurately with another component on re-assembly.

This involves a certain amount of hand fitting. The assembly of machine tools; sys. gauges, etc. involves certain amount of bench work. The accuracy of workdone depends open the experience and skill of the fitter.

The term bench work refers to the production of components by hand on the bench, where as fitting deals with assembly of mating parts through removal of metal to obtain the required fit.

Both the bench work and fitting requiresth use of number of simple hand tools and considera ble manual effort. The operation in the above work consist of fitting, chipping, scraping sawing drilling tapping etc.

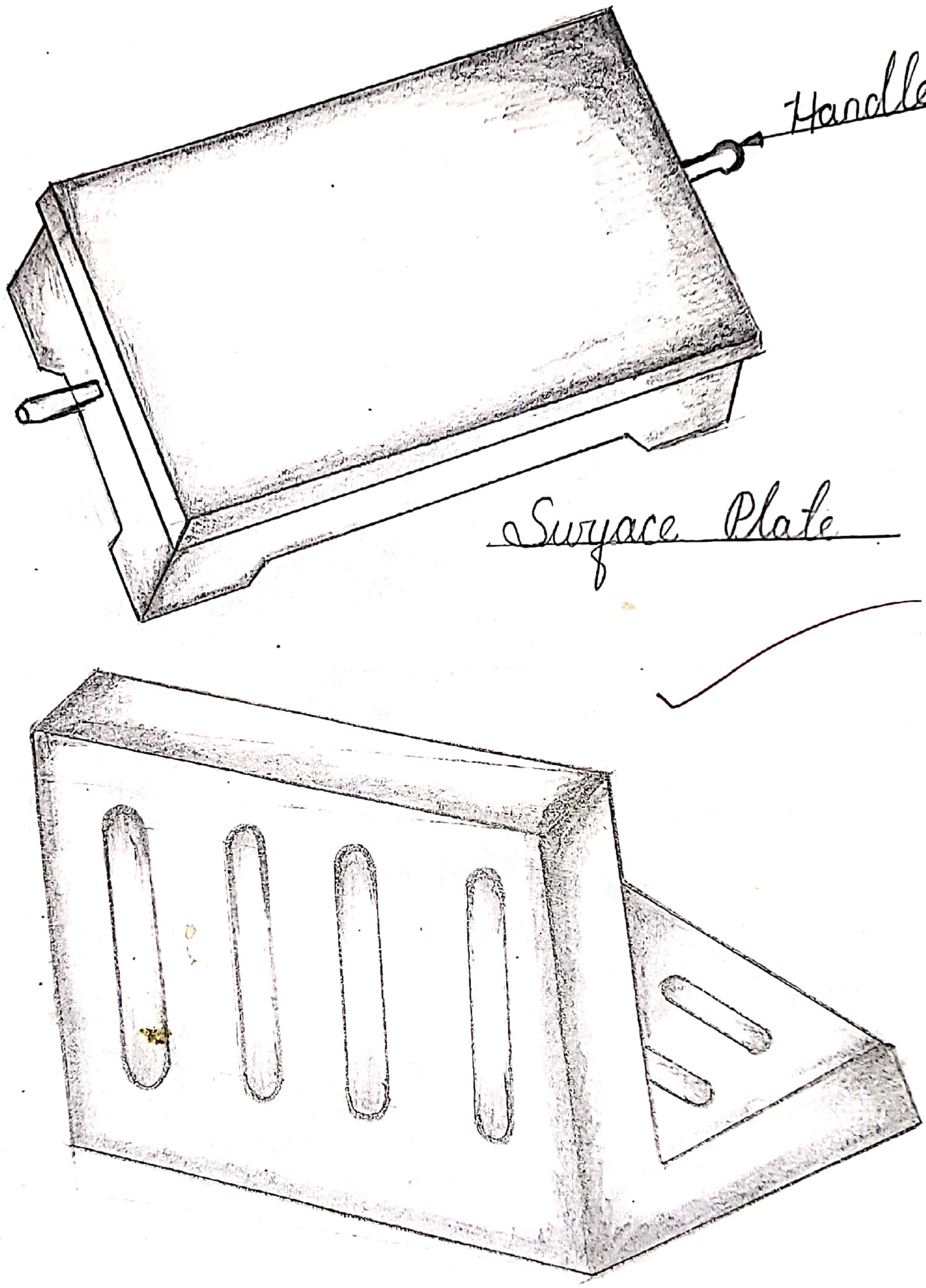
fitting tool :- Holding tools

Benchvice :-

The benchvice is a work holding device. It is the mostcommonly used vice in fitting shop it is -

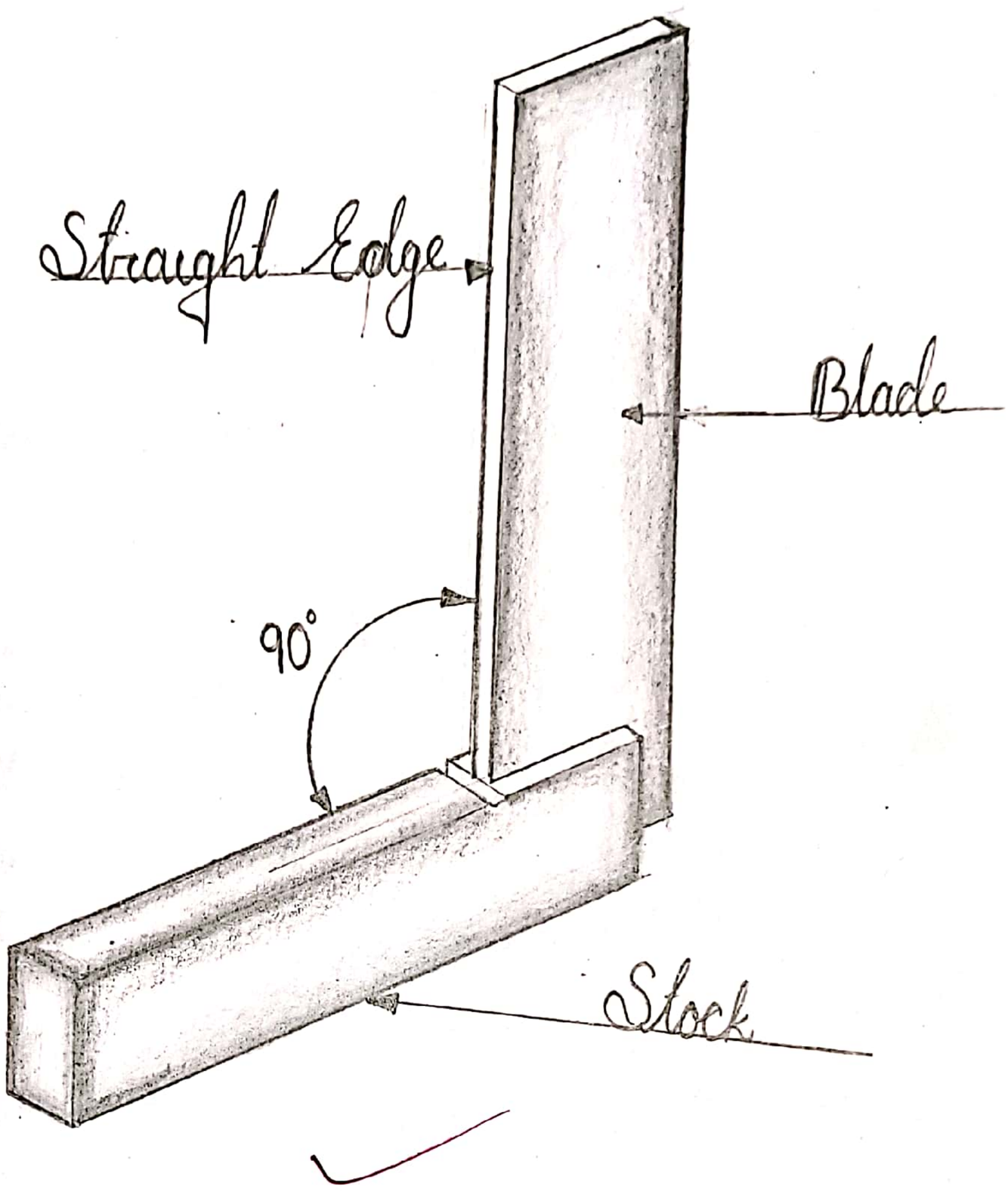
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Page No.....4.....



Surface Plate

Angle Plate



TRY-SQUARE

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fixed to the bench with bolts and nuts the vice body consist of two main parts one is fixed saw and a movable jaw. When the vice handle is turned in a clockwise direction the shifting jaw force the against the fixed jaw. saws are made of hundred steel.

Angle Plate :-

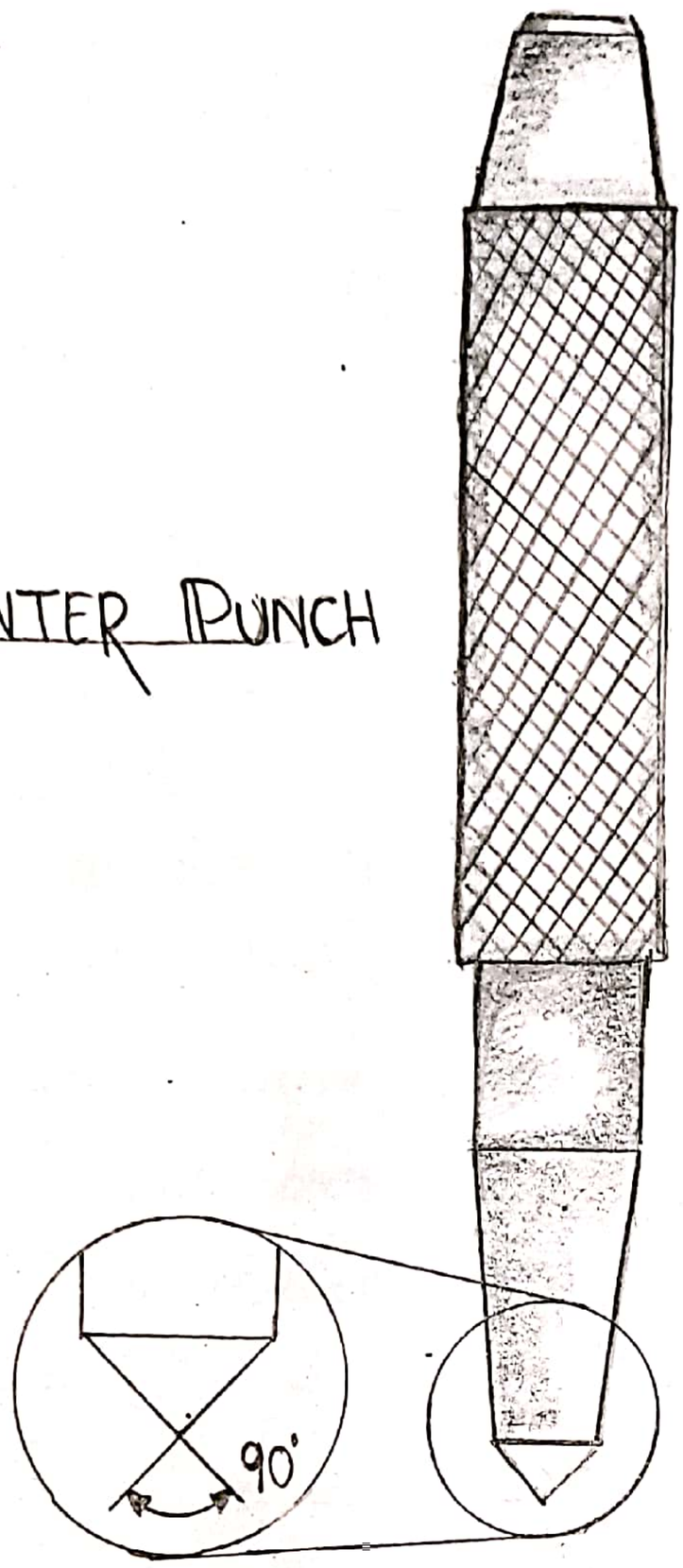
The angle plate is made of cast iron. It has two surface machined at right angle to each other plates and components which are to be marked out may be held against the upright face of the angle plate to facilitate the marking slots are provided on the angle plate to clamp the workin position.

Try - Square :-

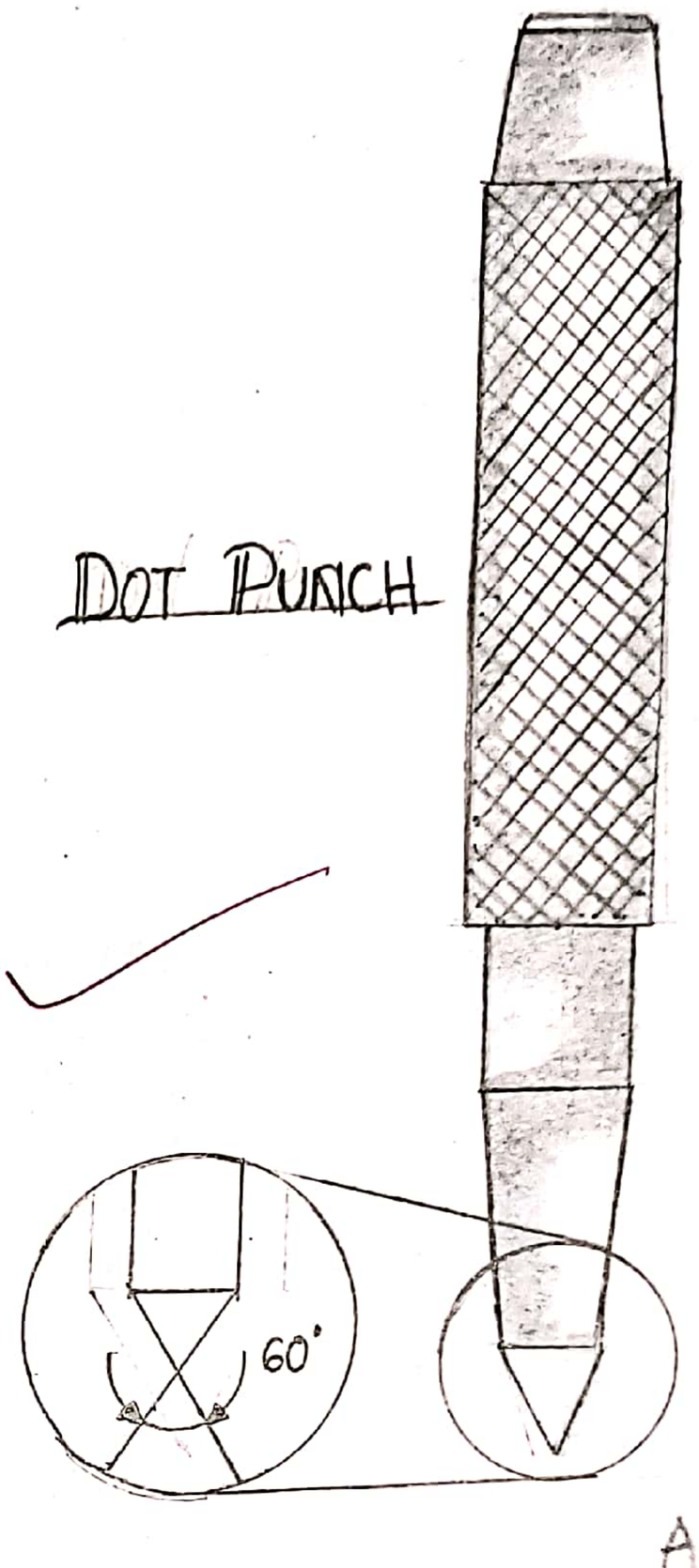
It is a checking and working tool for checking the squareness 90° angle in practice it is used for checking the squareness of many type of small works, when extreme accuracy is not required of hardened steel and the beam of cast iron or steel the size of try - square is specified by the length of the blade.

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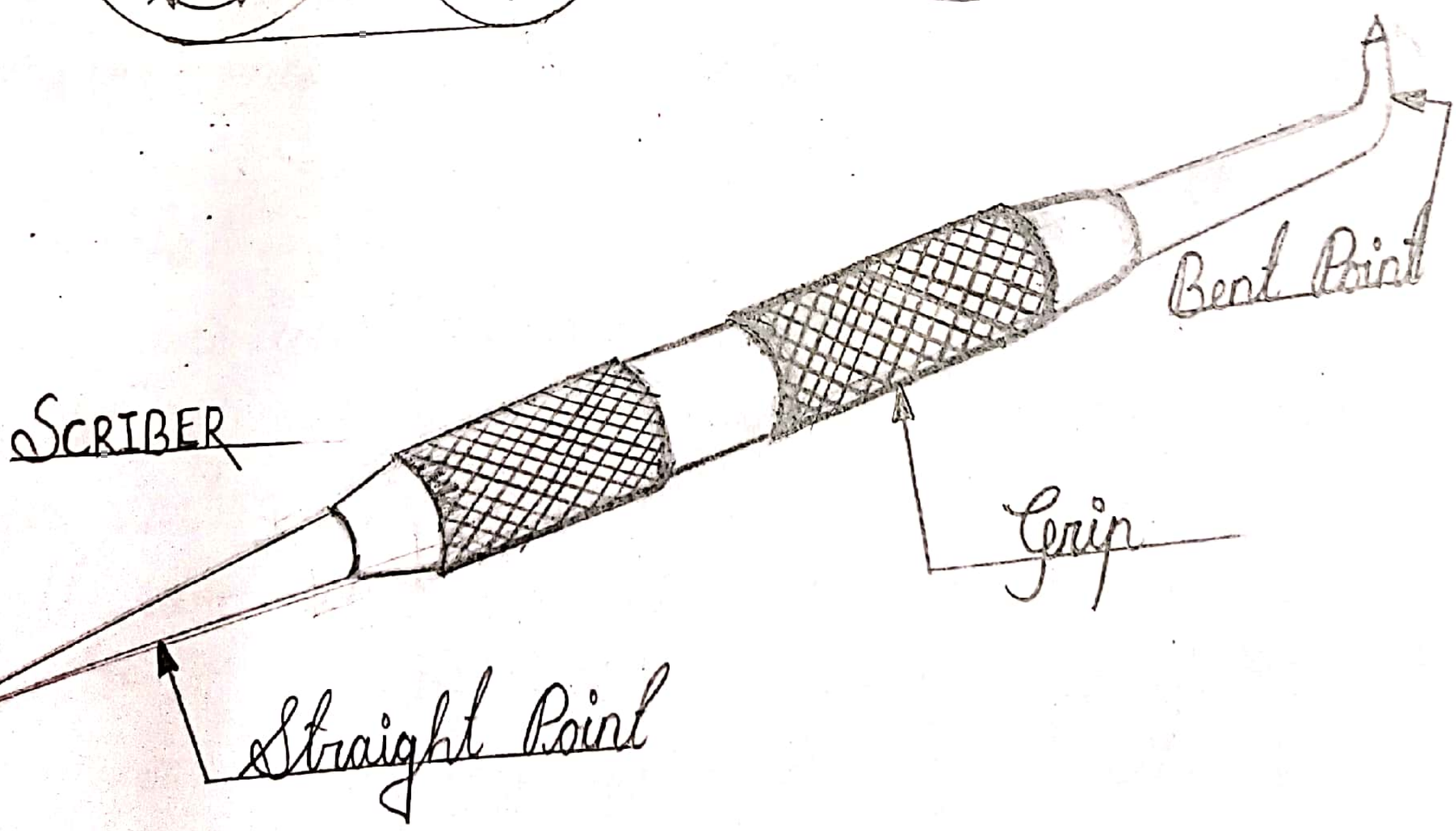
Page No.....



CENTER PUNCH



DOT PUNCH



SCRIBER

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Working and Measuring Tools :-

Surface Plate :-

The surface plate is machined to fine limits and is used for testing the flatness of the work piece. It is also used for marking out small work and is more precise than the marking.

Scriber :-

A scriber is a slender steel tool, used to scriber or mark lines on metal work pieces it is made of hardened and tempered high carbon steel. The tip of the scriber is generally grounded at 12° to 15°. It is generally available in lengths ranging from 125 mm to 250 mm. It has two pointed ends. The bent end is used for marking lines where the straight end can't reach.

Punches :-

These are used for making identations on the scribed line to make themvisiable clearly. These are made of high carbon steel. A punch is specified by it's length and diameter say as 150 × 12.5 mm it consists of a cylindrical knurled body. Which is plain for some length at the top of it. At the

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other end. it is ground to a point.

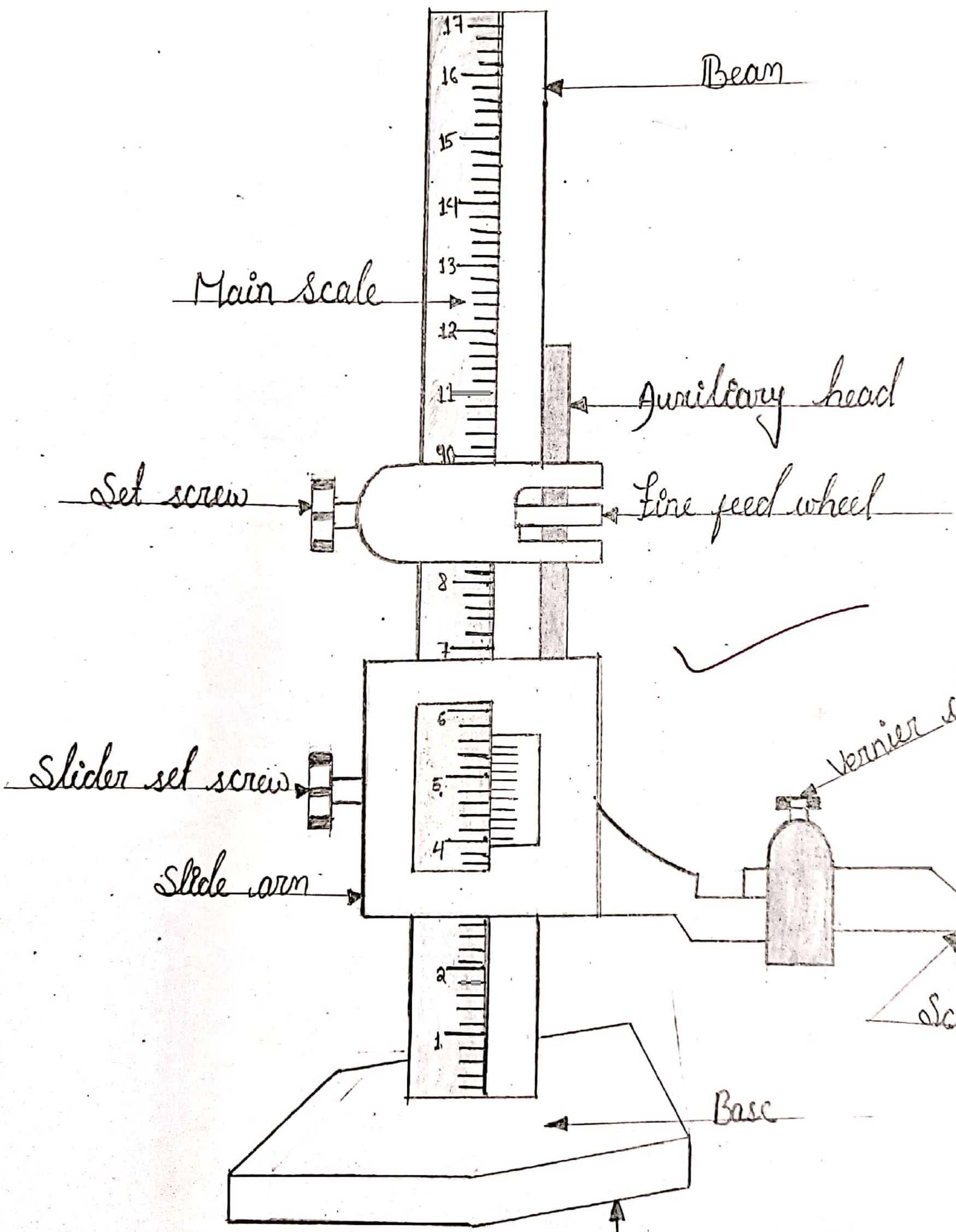
Dot Punch :-

This is used to lightly ident along the lay-out lines to locate center of holes and to provide a small center mark for divider point etc. For this purpose, the punch is ground to a conical point having 60° include angle.

Vernier Height Gauge :-

The vernier height gauge, clamped with a scriber is shown in fig. It used for layout work. An off-set scriber is used when it is required to take measurments from the surface on which the gauge is standing the accuracy and working principle of this gauge are the same as those of the vernier caliper. It's size is specified by the maximum hight that can be measured by it made of nicket - chromium steel.

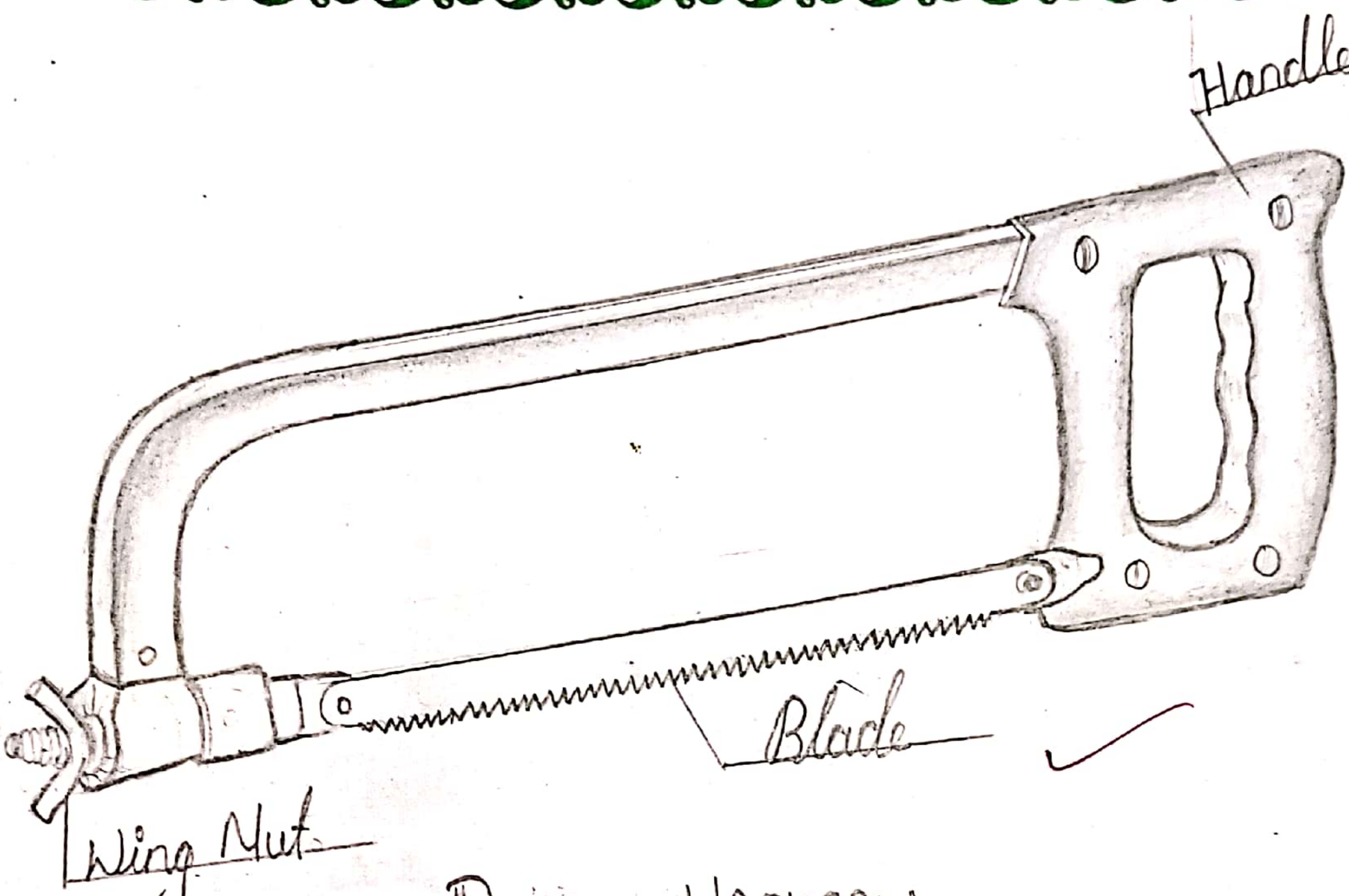
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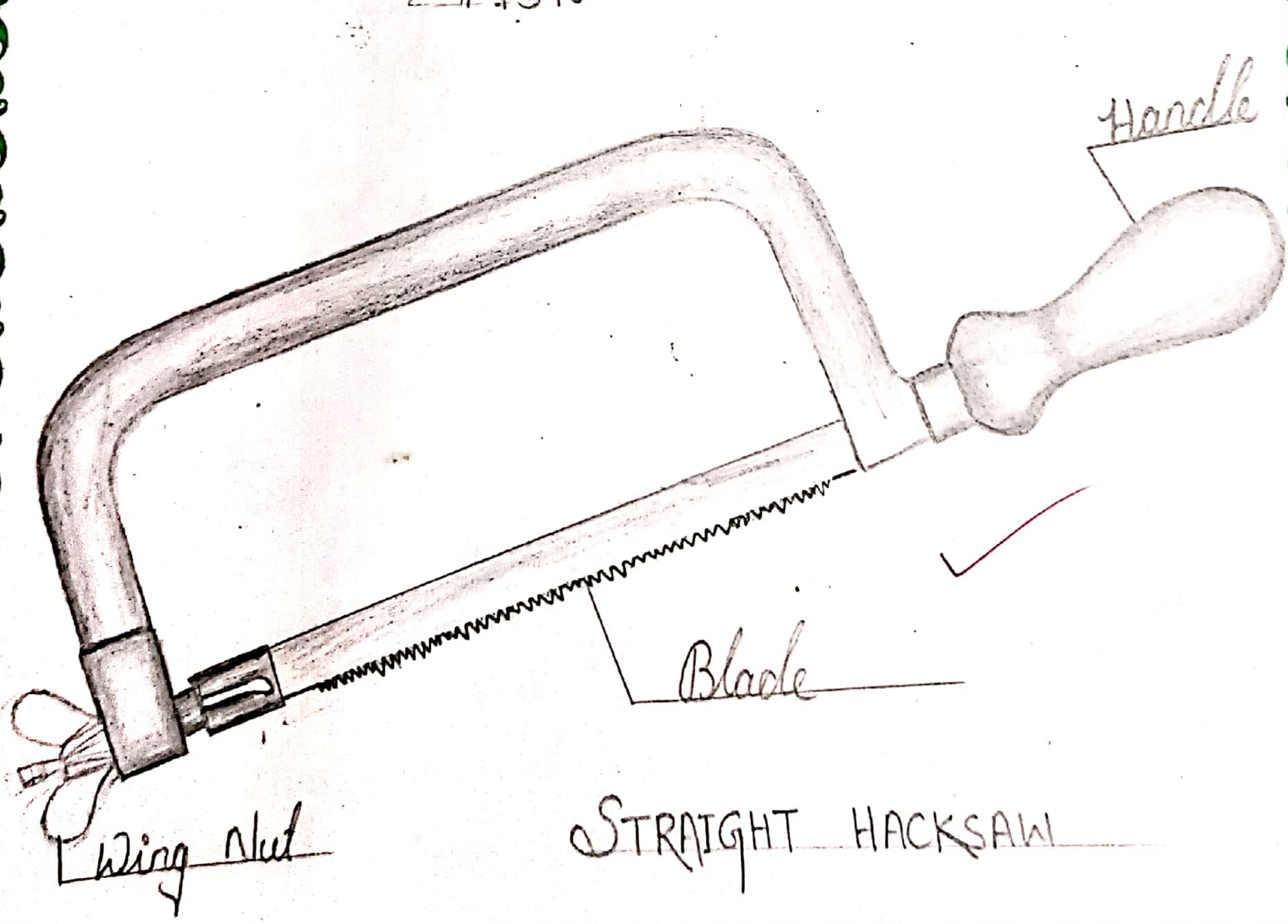
VERNIER HEIGHT GAUGE

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PISTOL HACKSAW



STRAIGHT HACKSAW

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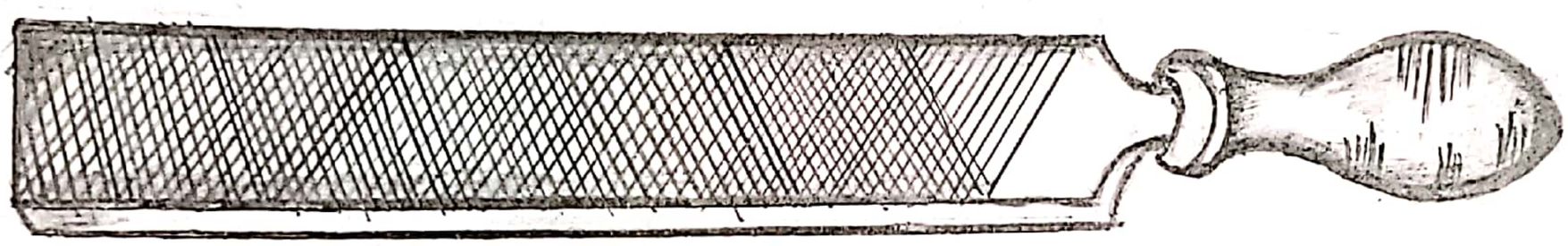
Cutting Tools :-

Hack saw :- The Hacksaw is used for cutting by hand. It consist of a frame which holdes a thin blade. firmly in position hacksaw blade is specified by the number of teeth ranging from 5 to 15 per centimeter (cm). Hacksaw blades are classified as (1) All hard (ii) flexiable type the all hard blades are made of H.S.S hardened and tempered throughout to retain their cutting edges longer. These are used to cut hard metals. These blades are hard and brittle and can break easily by twisting and forcing them in to the work. While sawing flexiable blades are made of H.S.S or low alloy steel but only the teeth are hardened and the rest of the blade is soft and the rest of the blade is soft and flexiable. These are suitable for use by on-skilled or seniskilled person.

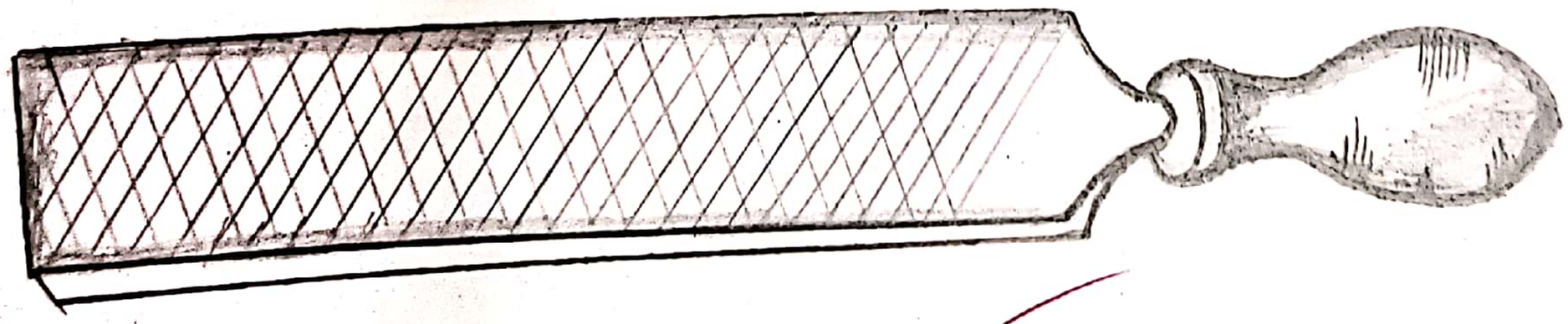
Finishing Tools :-

files :- files filling is one of the methode of removing small amounts of material from the surface of a metal part. A file is a hardened steel tool, having slant parallel raws of cutting edges or teeth on it's surface on the forces. the teeth are

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SMOOTH FILE



ROUGH FILE

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usually diagonal to the edge. One end of the file is shaped to fit in to a wooden handle. The hand file is parallel in width and tapering slightly in thickness, towards the tip. It is provided with double cut teeth on the faces single cut on one edge and no teeth on the other edge. Which is known as the safe edge.

Ball-Peen Hammer :-

Ball-peen hammers are named depending upon their shape and material and specified by their weight. A ball-peen hammer has a flat face. Which is used for general work and a ball end particularly useed for riveting.

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SAFETY POINTS

SAFETY FRECAUTIONS:

→ Learn safe way to doing the job before the work.
→ Think your safely and carefull any time.
→ follow the all safety rule & precaution that can protect you.

PARSONAL SAFETY RULES:

→ While in work shop decipline should be maintain.
→ Always proper safety apron, gloves, shoes.
→ Don't think about other things while working position, concentacate only that.

WORK SHOP SAFETY RULES:

→ Never used work shop floor the floor should dry and clear
→ If any electrical disput in the work shop don't be solved if immidiately report to the instructor.

HAND TOOL'S SAFETY RULES:

→ Don't used the tools which have no handle.
→ Tools & equipment should be used with proper care.
→ Don't like use pen like as scriber.

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MECHINE SAFETY RULES:

→ Machine should be in proper care and maintain.
→ While machine is in running condition tools should not be change.
→ While machine running don't change their gear syster.
→ While you go to start machine you have to know about that machine properly.

JOB SAFETY RULES:

→ Job should be in proper care & maintaince
→ Job should be proper cover also.

6. CONCLUSION - from the above job we get to know about the various operation like cutting filling etc and its sayety precaution.

NAME OF THE STUDENT Etishree Padhan

BRANCH Mechanical

SEMESTAR 3rd

REGD NO F231100040 19

GROUP

1/10/24

SIGNATURE OFTHE (WORKSHOP) LECTURER/ ASST. LECTURER

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Page No.....

SECTION : Welding

JOB NO. 02

DATE OF STARTING 4-10-24

DATE OF FINISHING : 12-11-24

DATE OF DIPOSIT : 12-11-24

GRADE AWARD OF _____

1. NAME OF THE JOB :

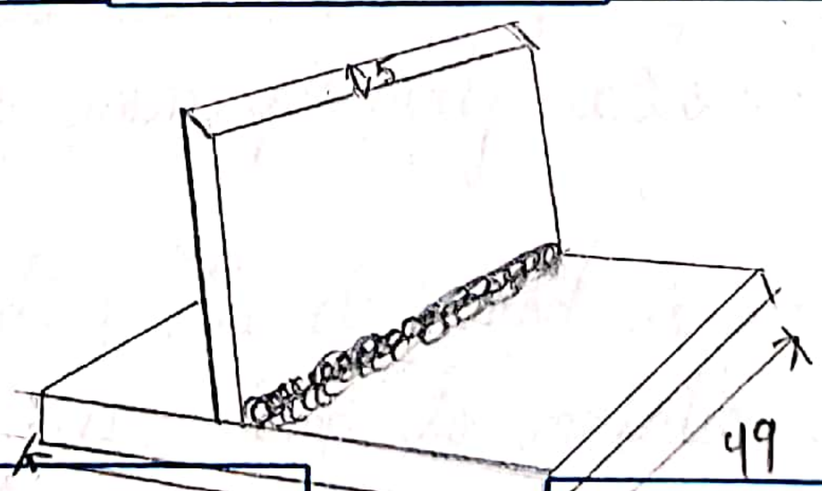
Preparation of 'T' joint through arc welding

2. RAW MATERIAL RQUIRED :

49 x 49 x 5 mm (2 piece) of mild steel.

3. JOB PERFORMANCE :

JOB SKETCH



ALL DIMENSION ARE IN MM

TOLERANCE : +

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TOOL'S AND EQUIPMENT REQUIRED

Steelrule	Safety Helmet
Hacksaw frame	Leathergloves
Bench vice	Scriber
File (smooth & Rough)	Flat Tongue
Try squere	Chiping hammer
Vernier Calliper	Wire brush
Arc Welding m/c	
Electrorod	

4. SEQUENCE OF OPERATION

Marking → Cutting → filling → Surface finishing → Welding → Chipping → Punching

4. PROCEDURE

1- First of all take the raw material of M/s plate of and make of needed dimension by filling operation.

2. Then the workpiece were properly cleaned by wire baush.

3. Then take for welding the electrorod is hold in holder and earth clamp is clamp to natalic work table and then supply the power.

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Page No.....

Introduction

Welding is the process of joining similar metals by the application of heat, with or with out application of pressure or filler metal, in such way that the joint is emivalent in composition and characterstics of the metal joined.

ARC WELDING

In arc welding, the heat reqired for joining the metals is obtained from an electric arc. Transformers or motor generator sets are used as arc welding machines.

Electrode :

Filler rod used in arc welding are called electrodes. These are rode of metallic wire called core wire, having approximately the same composition as the metal to be welded. These are coated uniformly with a protective coating called flux. The electrode holder is about 2mm length!



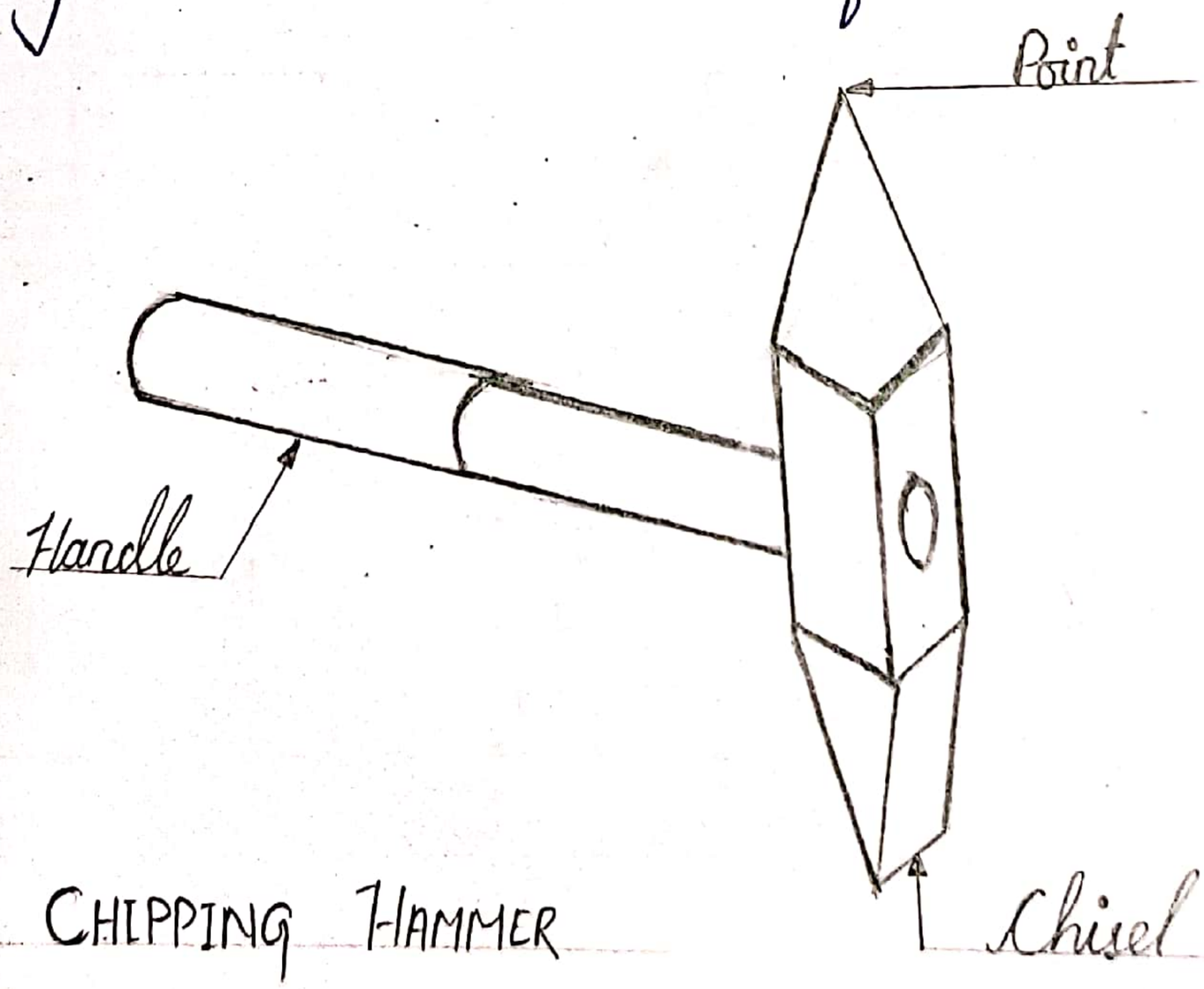
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Wire Brush and Chipping Hammer :-

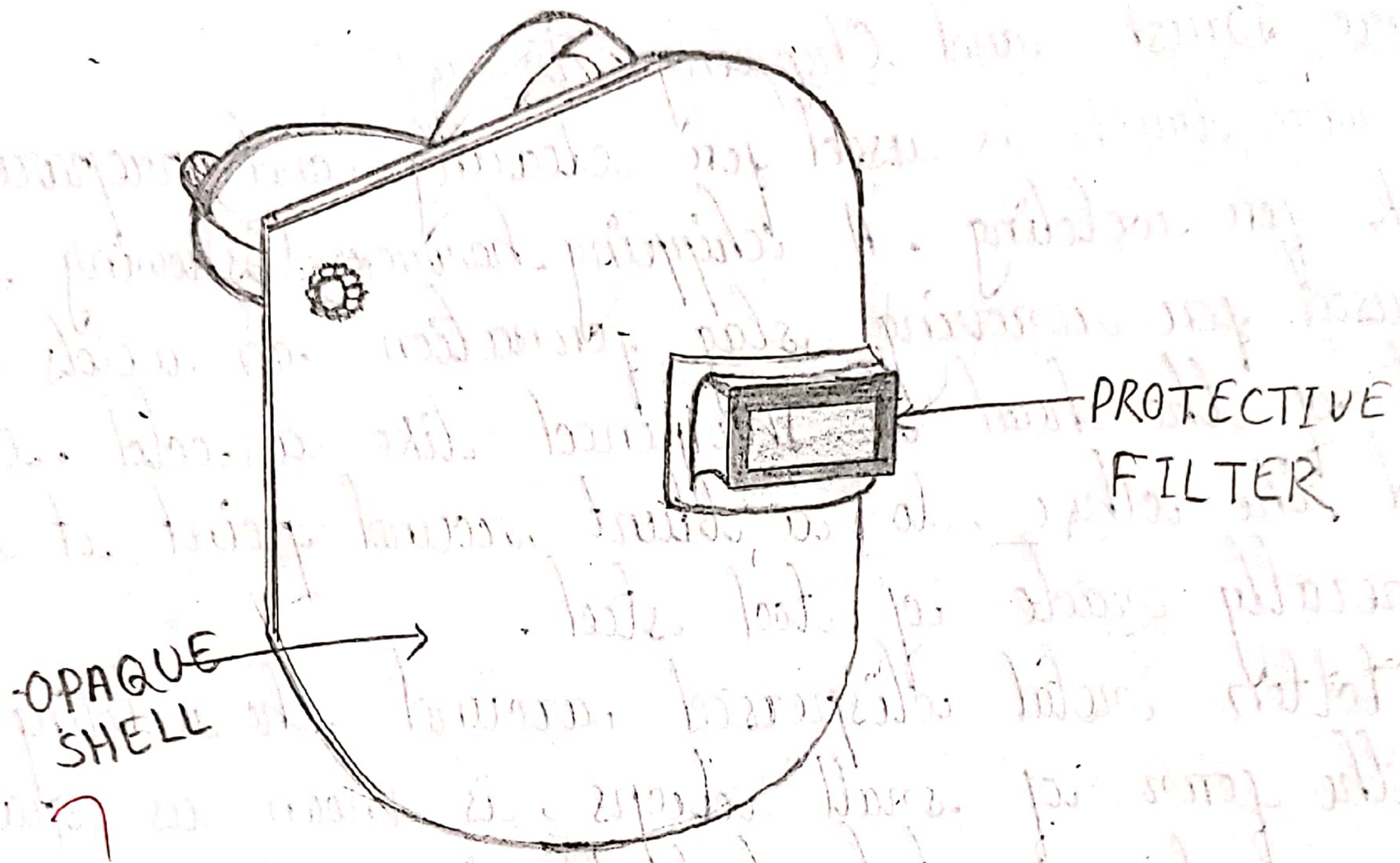
A wire brush is used for clearing and preparing the work for welding. A chipping hammer (showing in fig!) is used for removing slag formation on welds. one end of the head is sharpened like a cold chisel and the other, to a blunt, round point it is generally made of tool steel.

Molten metal dispersed around the welding beads in the form of small drops, is known as spatter. when a flux coated electrode is used in welding process, then a layer of flux material is formed over the welding bead which contains the impurities of weld material. This layer is known as slag. Removing the welding beads on the metal surface is known as chipping

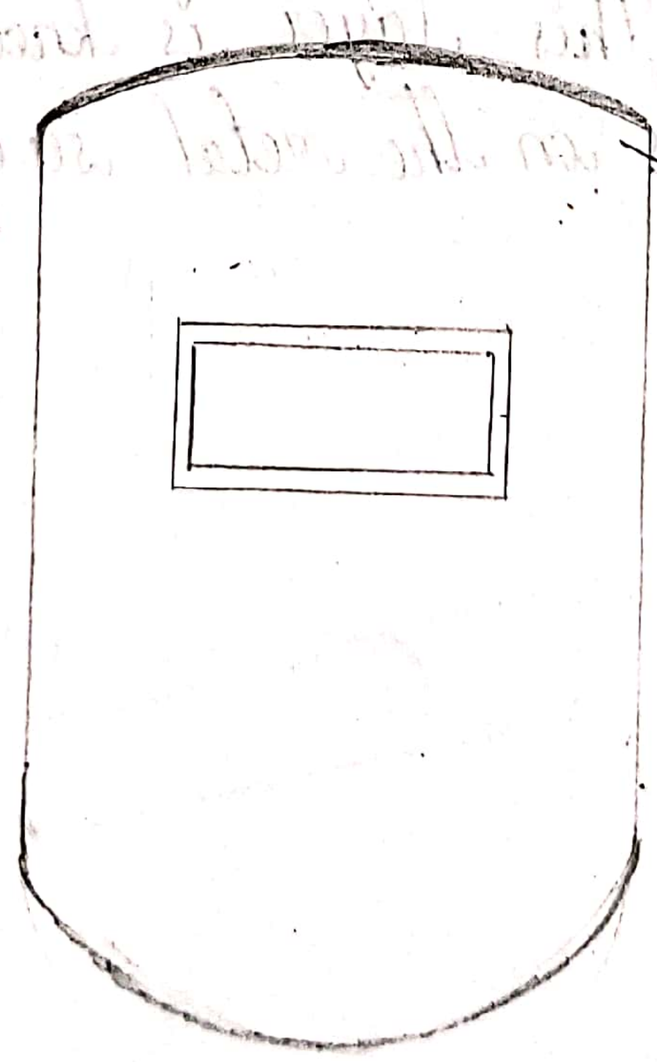


CHIPPING HAMMER

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WELDERS HELMET



HAND SHIELD

Page No.....

Face Shield :-

A face shield is used to protect the eyes and face from the rays of the arc and from spatter or flying particles of hot melt. It is available either (in hact on helmet type the hand type is convenient to use where ever the work can be done with one hand. the helmet type though not comfortable to wear, leaves both hands free for the work.

Hand Gloves :-

These are used to protect the hands from electrical shock and hot spatter.



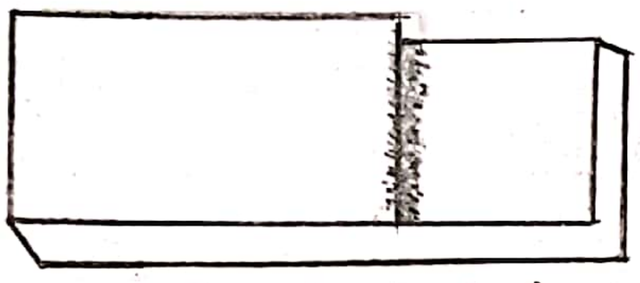
HAND GLOVES

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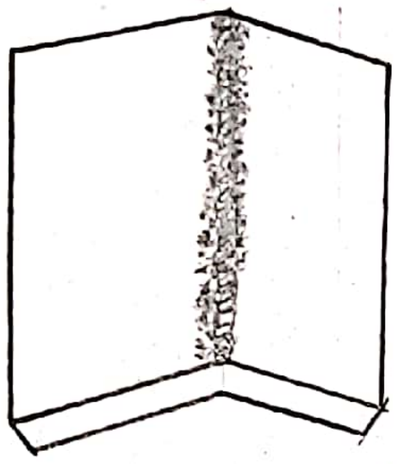
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Technique of Welding :-

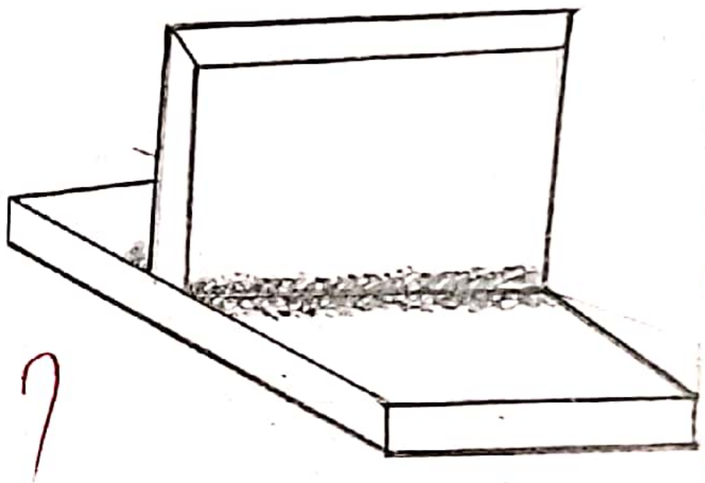
Preparation of work before welding, the work pieces must be thoroughly cleaned of rust, scale and other foreign.



Butt joint



corner joint



Tee joint

Advantages of Arc Welding :-

1. Welding process is simple.
2. Equipment is portable and the cost is fairly low
3. All the engineering metal can be welded because of the availability of a wide variety of electrodes.

Disadvantages of Arc Welding :-

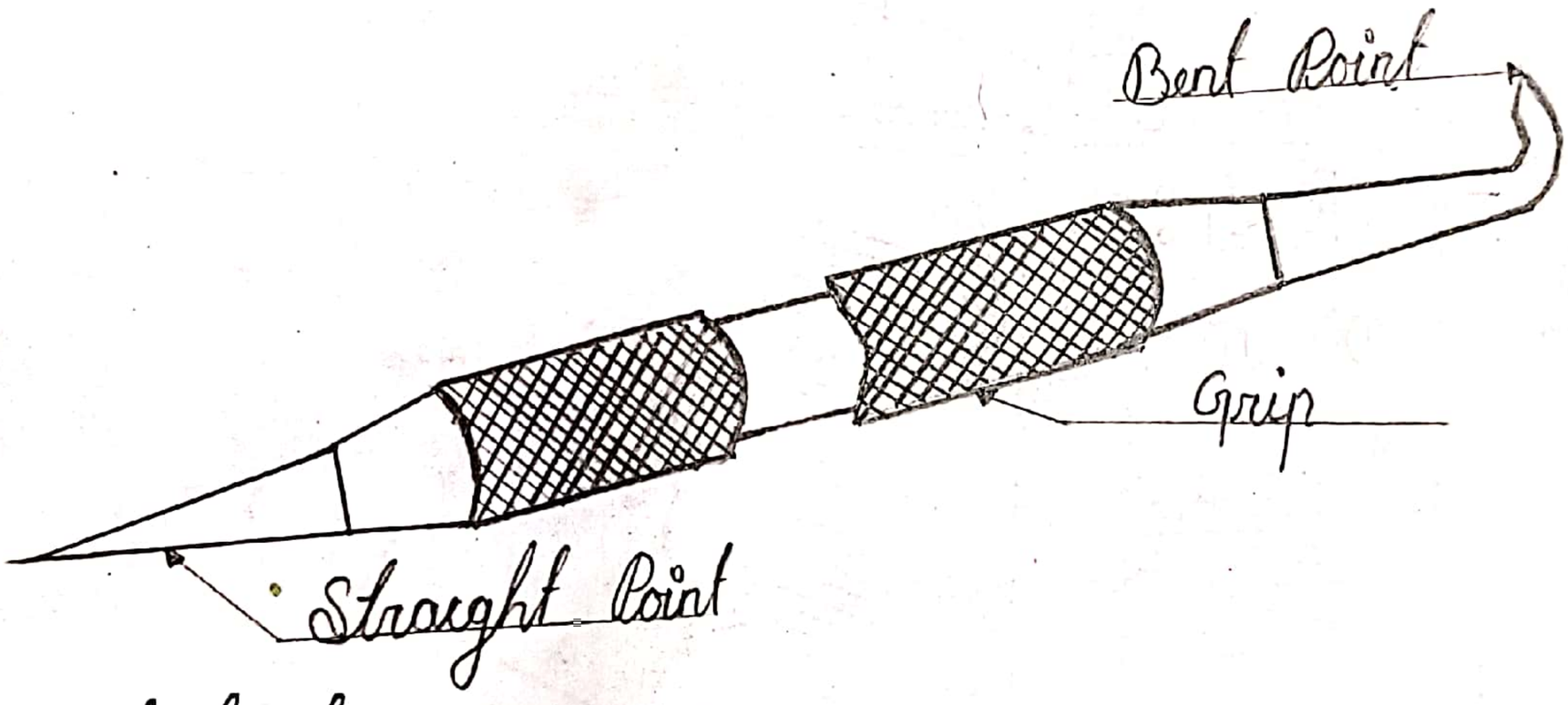
1. Mechanized welding not possible because of limited length of each electrode.
2. Number of electrodes may have to be used while welding long joints unless proper care is taken, a defect (slang inclusion or insufficient penetration)

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- may occur at the place where welding is restarted with a fresh electrode.

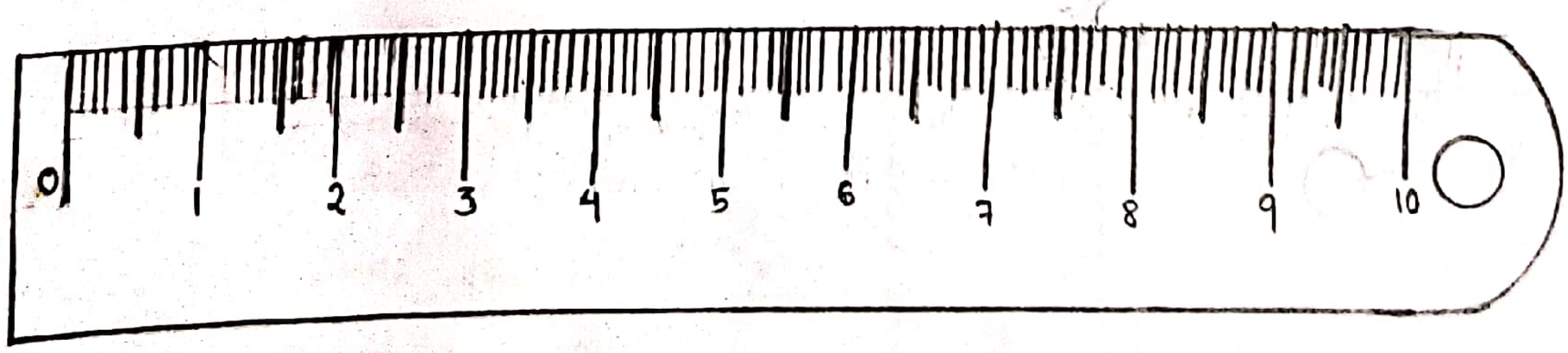
Scriber :-

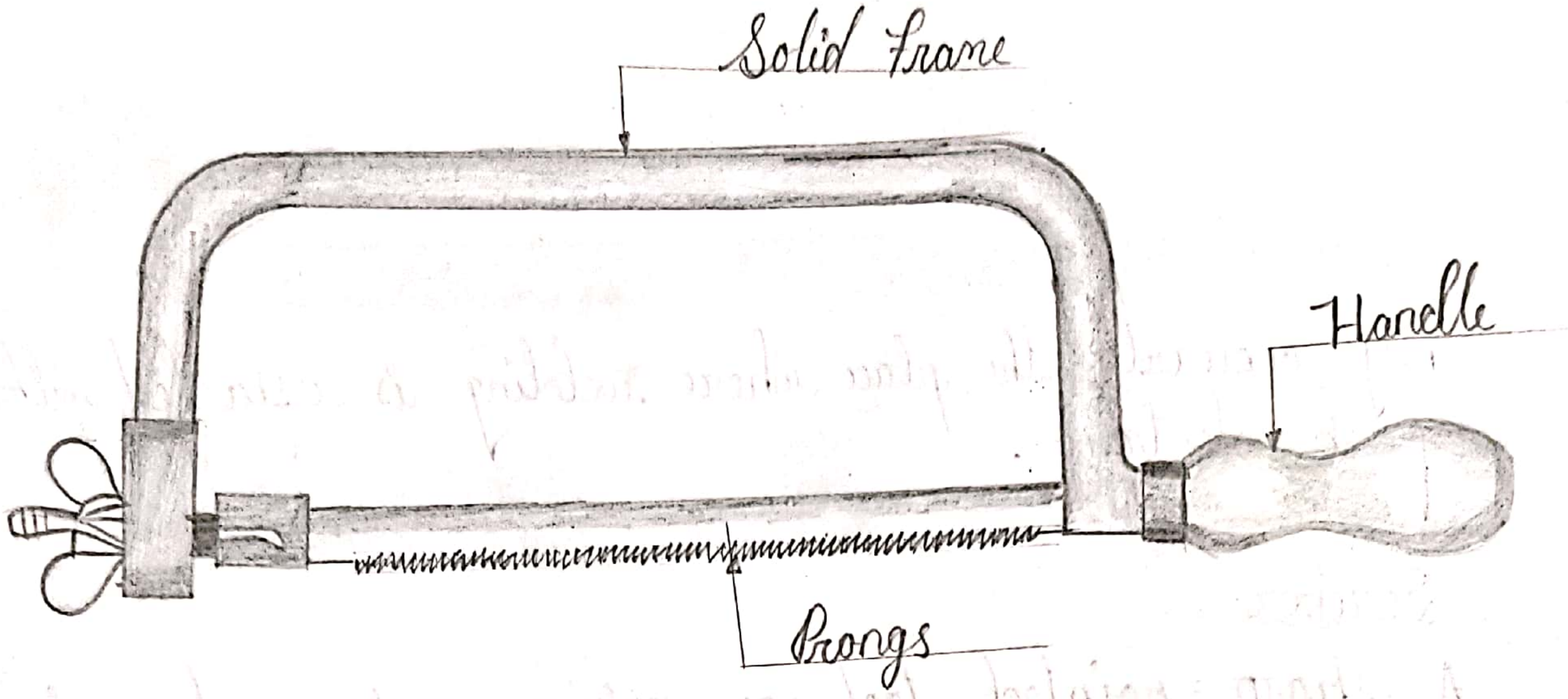
A sharp-pointed tool for making marks and especially for making off material to be cut.

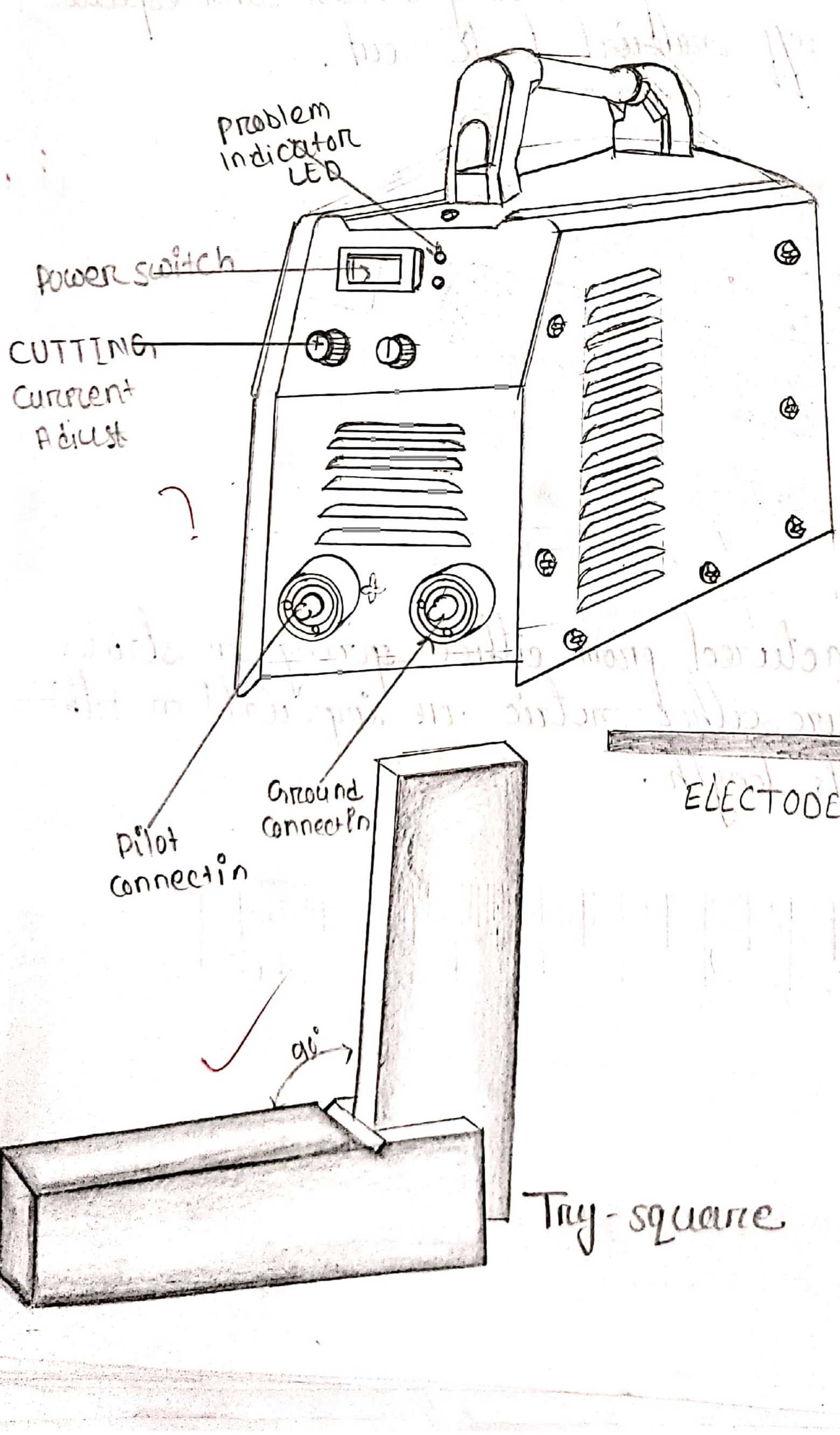


Steelrule :-

A rule manufactured from either spring or stainless steel that feature either metric or imperial (or both) scale along its length.









ELECTODE ROD

Tay - square

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Page No.....

Hacksaw frame :-
Hacksaw is used for cutting the material the hacksaw blade runs accross the open end.

Bench vice :-
Bench vice is a mechanical apparatus used to secure an object that is to be worked on.

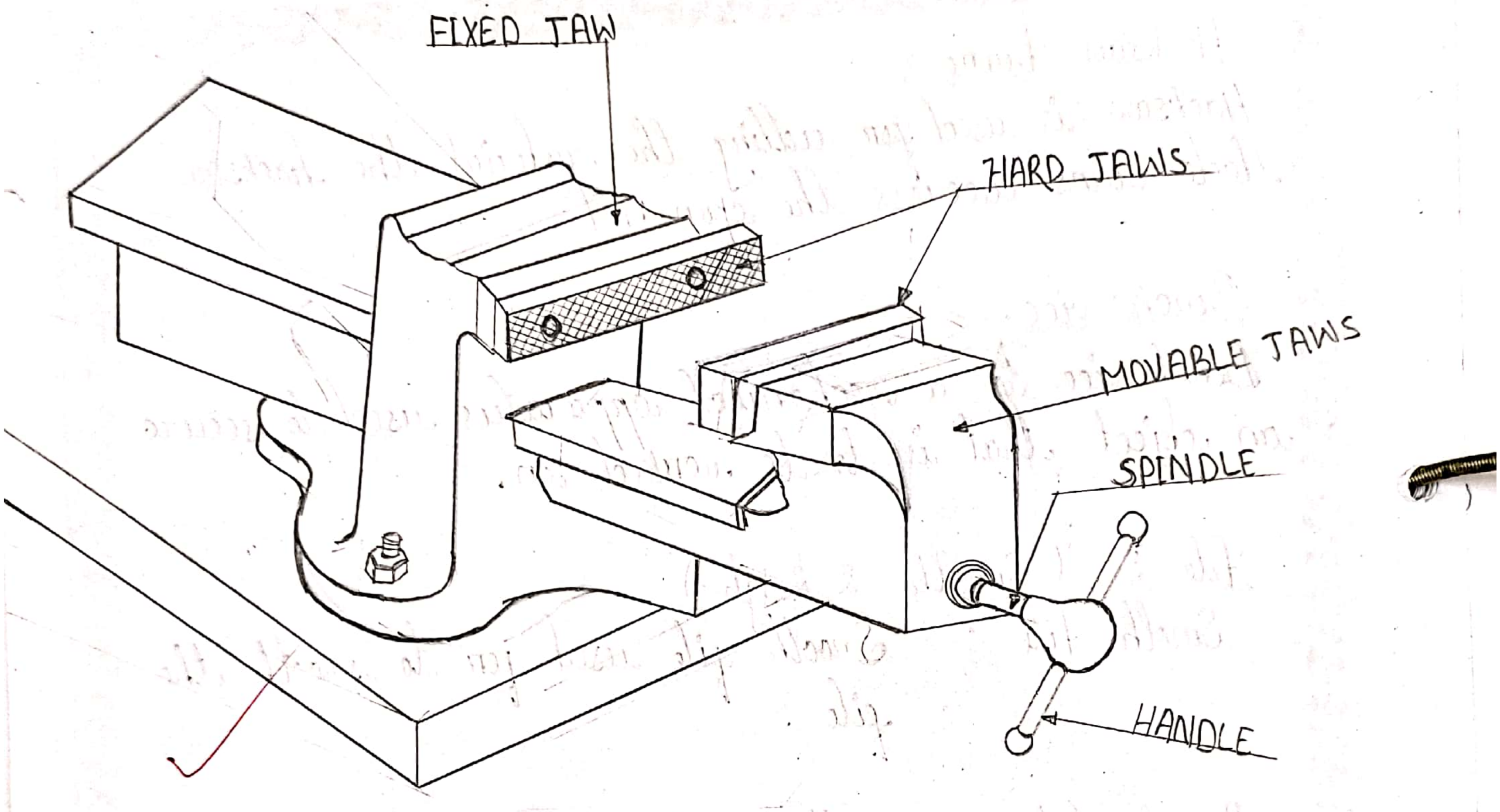
File :- (Smooth & Rough)
Smoth file :- Smooth file used for to smooth the file.

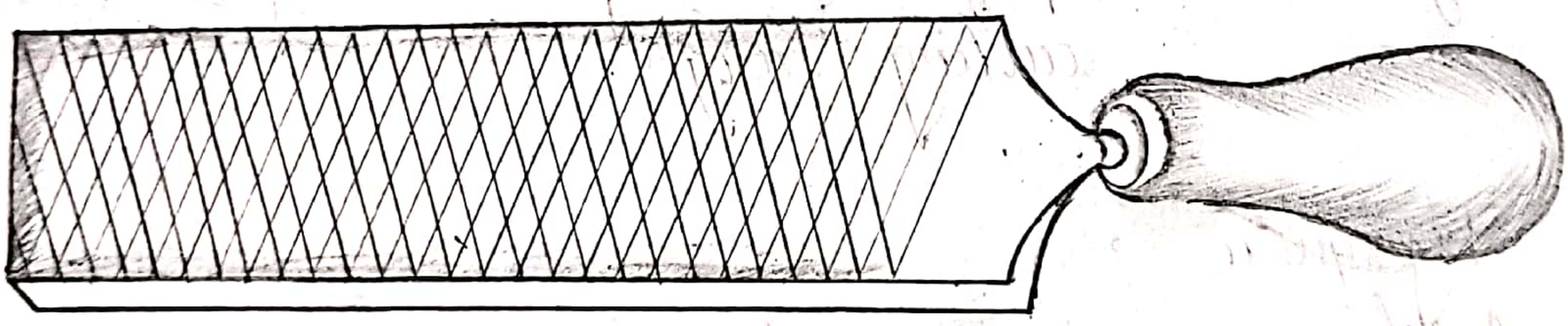
Rough file :- A file of the grade having the coarest cutting ridges.

Try squere :-
A trysquere is a working tool used for making and checking 90° angle on working material.

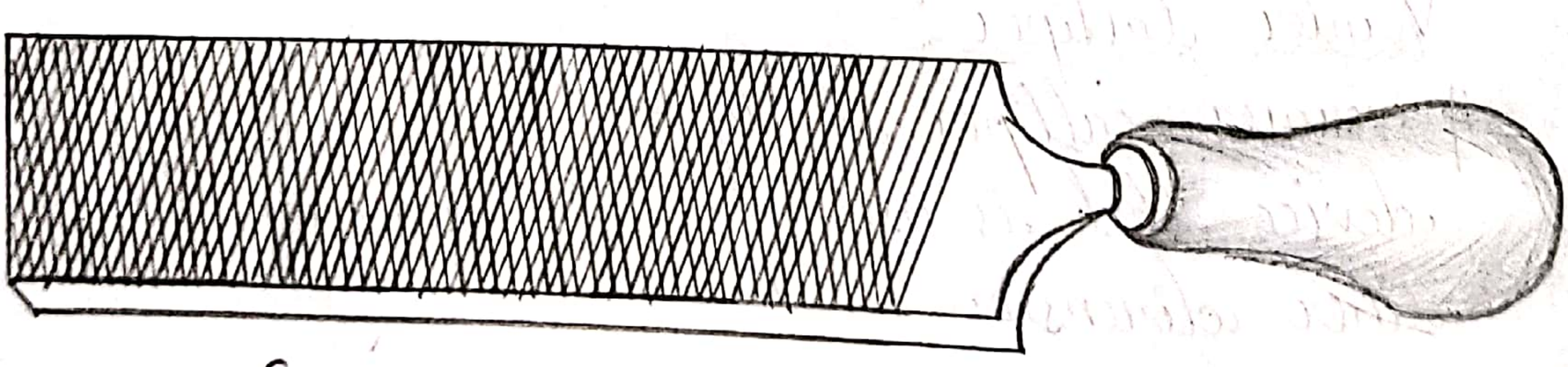
Vernier Calliper :-
A vernier calliper is defined as a measuring device that is used for the measurement of liner dimension.

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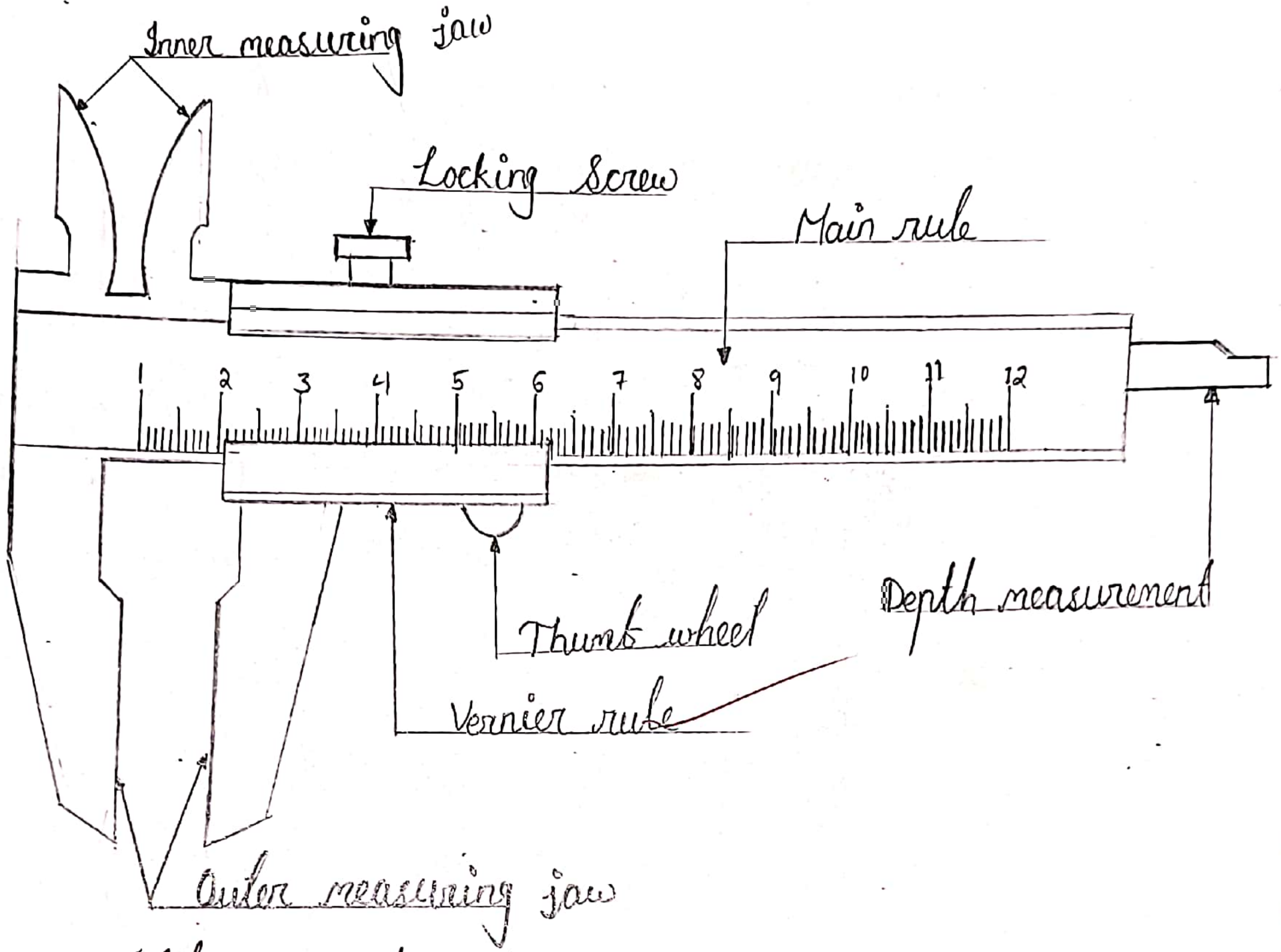


ROUGH FILE



SMOOTH FILE

Page No.....



Arc Welding M/c :-

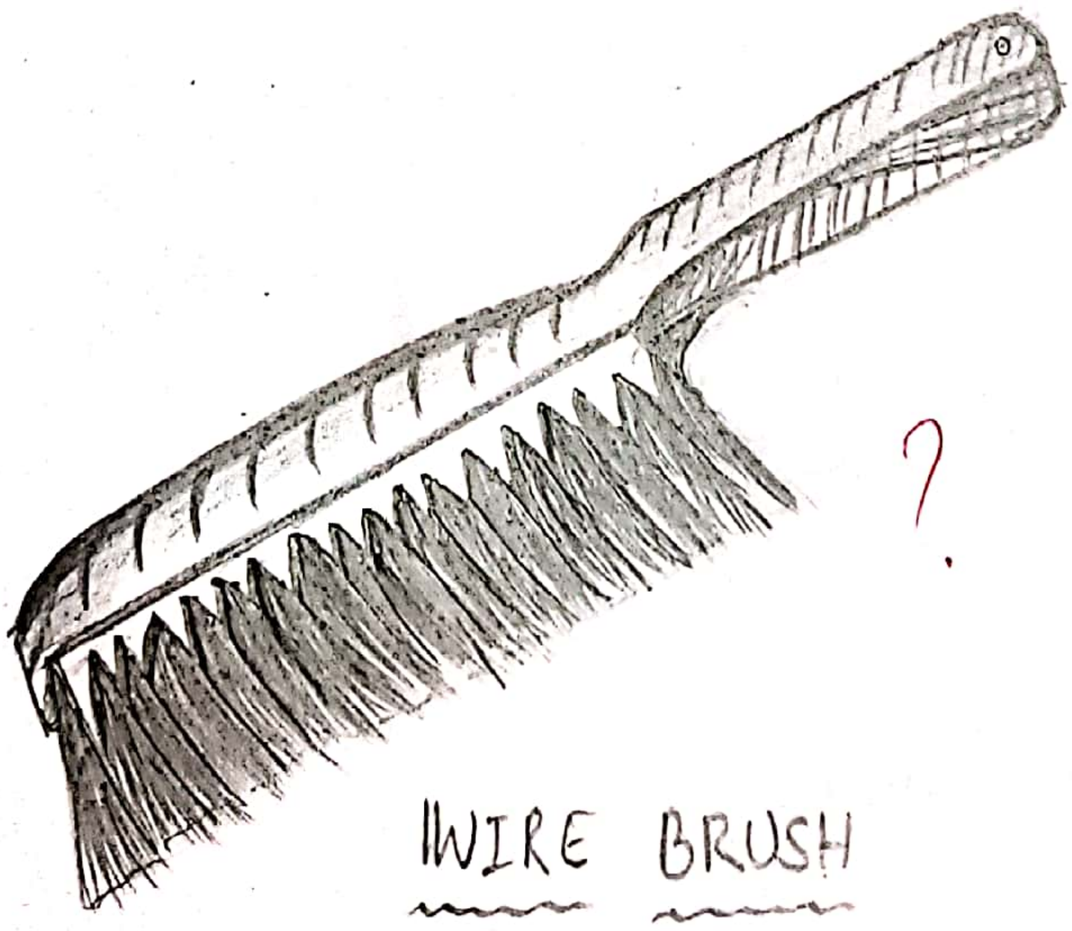
Arc welding machine is connect with electri board in arc welding machine positive and negative both current is avilable the positive current wair connect with electriholder and hold the electrode and the negative current wair connect with clamp and that is clamping with table than the welding is start.

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The metal to be forged be held securely, while it is being shaped. Tong are generaly used in to hold the hot material.

Wire Brush:-

A wire brush is a tool cosisting of a brush whose bristles are made of wire, most of ten steel wire.



WIRE BRUSH

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SAFETY POINTS

SAFETY FRECAUTIONS :

To prevent insury to personal, electrode caution should be exercibed when ussing gas welding.

PARSONAL SAFETY RULES :

While you going to make welding must be used personal safety equipment like glooes safety hebret, apron, shoes.

WORK SHOP SAFETY RULES :

1- In welding shop the house keeping should be properly done.
2- Welding tabbe and working place should not be in ust dily and grees with proper ventilation

HAND TOOL'S SAFETY RULES :

→ Hand tools like hammer, longne, wire brush should be properly handled & maitaineed.
→ These tools are used only for specific work on performance.

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MECHINE SAFETY RULES :

→ While start the machine it should be checked properly.
→ When you go to shoeld a mechine you have the proper knowledge about that mechine.
→ While machine running conditional tools should not bechange → Mechine should be checked in regular interval

JOB SAFETY RULES :

→ In welding job water should not be use to cooling the job. It keeps in atmospheric temperature.
→ Talk care of the job.
→ Give a proper cover to the job.

6. CONCLUSION

From the above operation we get to know about the various operation like cutting, filling, welding, working procedure and safety precaution

NAME OF THE STUDENT Etishree Padhan

BRANCH Mechanical

SEMESTAR 3rd

REGD. NO. F231100044019

GROUP

8/11/24

SIGNATURE OF THE (WORKSHOP) LECTURER / ASST. LECTURER

GOVERNMENT POLYTECHNIC, BALANGIR

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SECTION : Carpentry

JOB NO. 03

DATE OF STARTING 19-11-24

DATE OF FINISHING : 16-12-24

DATE OF DIPOSIT : 16-12-24

GRADE AWARD OF _____

1. NAME OF THE JOB :

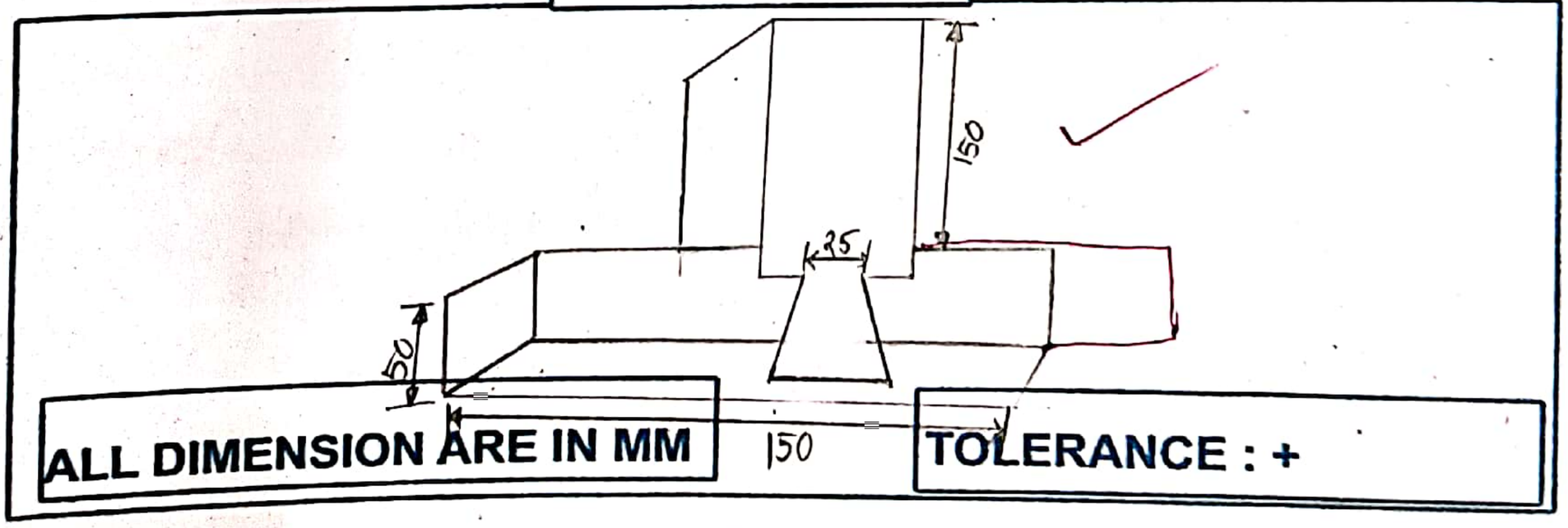
To make a 'T' joint of the required dimension from the given work piece.

2. RAW MATERIAL RQUIRED :

150 mm X 150 mm

3. JOB PERFORMANCE :

JOB SKETCH



ALL DIMENSION ARE IN MM

TOLERANCE : +

TOOL'S AND EQUIPMENT REQUIRED

1- Vernier Caliper	8- Jackplane (Iron / wood)
2- Double cut basterd file	9- chisel
3- Smooth file	10- Divider
4- Drill Bit Ø 10mm	
5- Vernier Hide Gauge	
6- Hack saw	
7- Try Square	

4. SEQUENCE OF OPERATION

Mesurement → Cutting → Filing → Drilling, fitting finishing.

4. PROCEDURE

→ Study the drawing properly
→ Collect the required tools
→ Collect the raw materials
→ Do the fiting operation and maintain length of.

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THEORY

Introduction :-

Carpentry may be defined as the process of making wooden components, it stands from a markelable form of wood and ends with a finished product, it deals with the building work.

Marking and Measuring Tools :-

Steel rule :- It is an important tool for linear measurement. It can also be used a making tool.

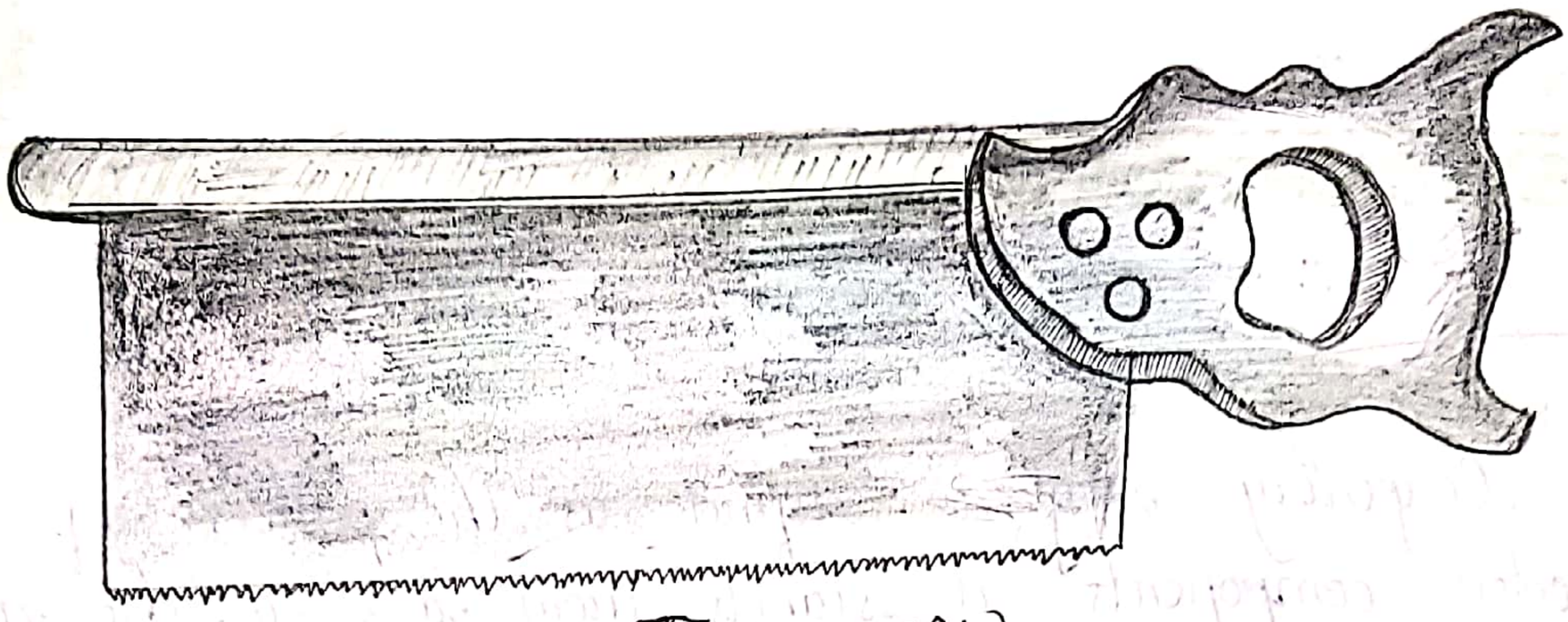
Steel tap :- It is used for large measurement, such as marking on boards and checking the overall dimension of the work.

⇒ Compass and divider are used for marking area and circles on the planed surface of the wood.

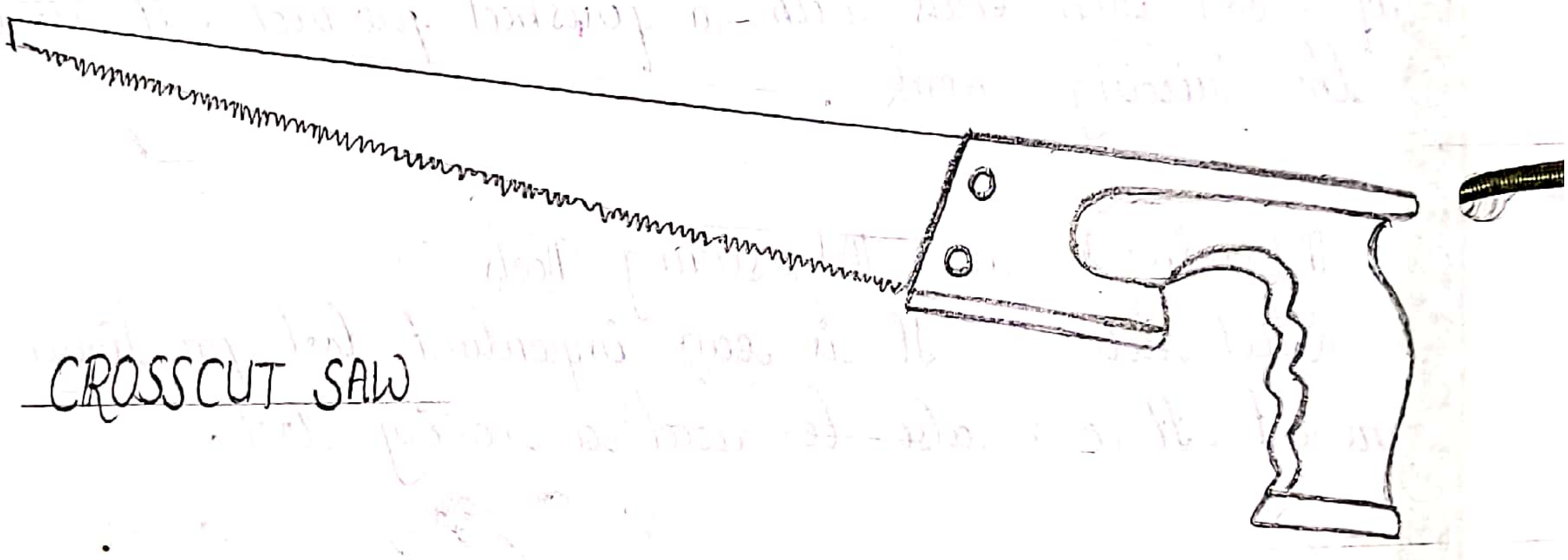
Scriber or Marking Knife :-

It is used for marking timber, it is made of steel having one end pointed and the other end formed in to a sharp cutting edge.

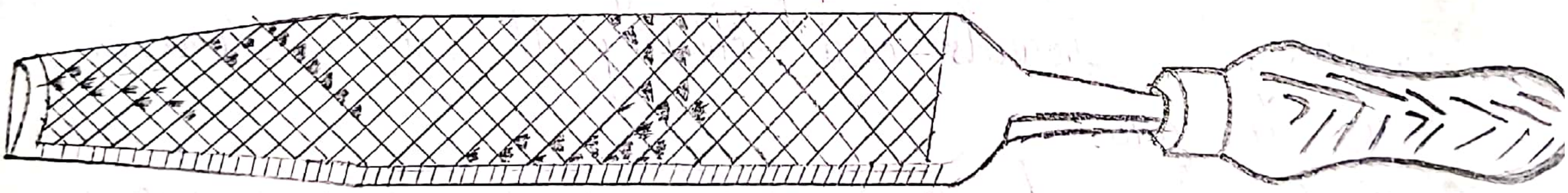
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TENON SAW



CROSSCUT SAW



WOODRASP FILE



CLAW HAMMER

CUTTING TOOLS :-

Saw :-

A saw is used to cut wood in to pices. There care different type of saw. designed to suit different purpose. A saw is specified by the length of its toothed edge.

Cross cut or Hedd saw :-

It is used to cut cross the grains of the stuck.

Rip saw :-

It is used for cutting the stack along the grains.

Tenon saw :-

It is used for cutting stack either along or across the grains.

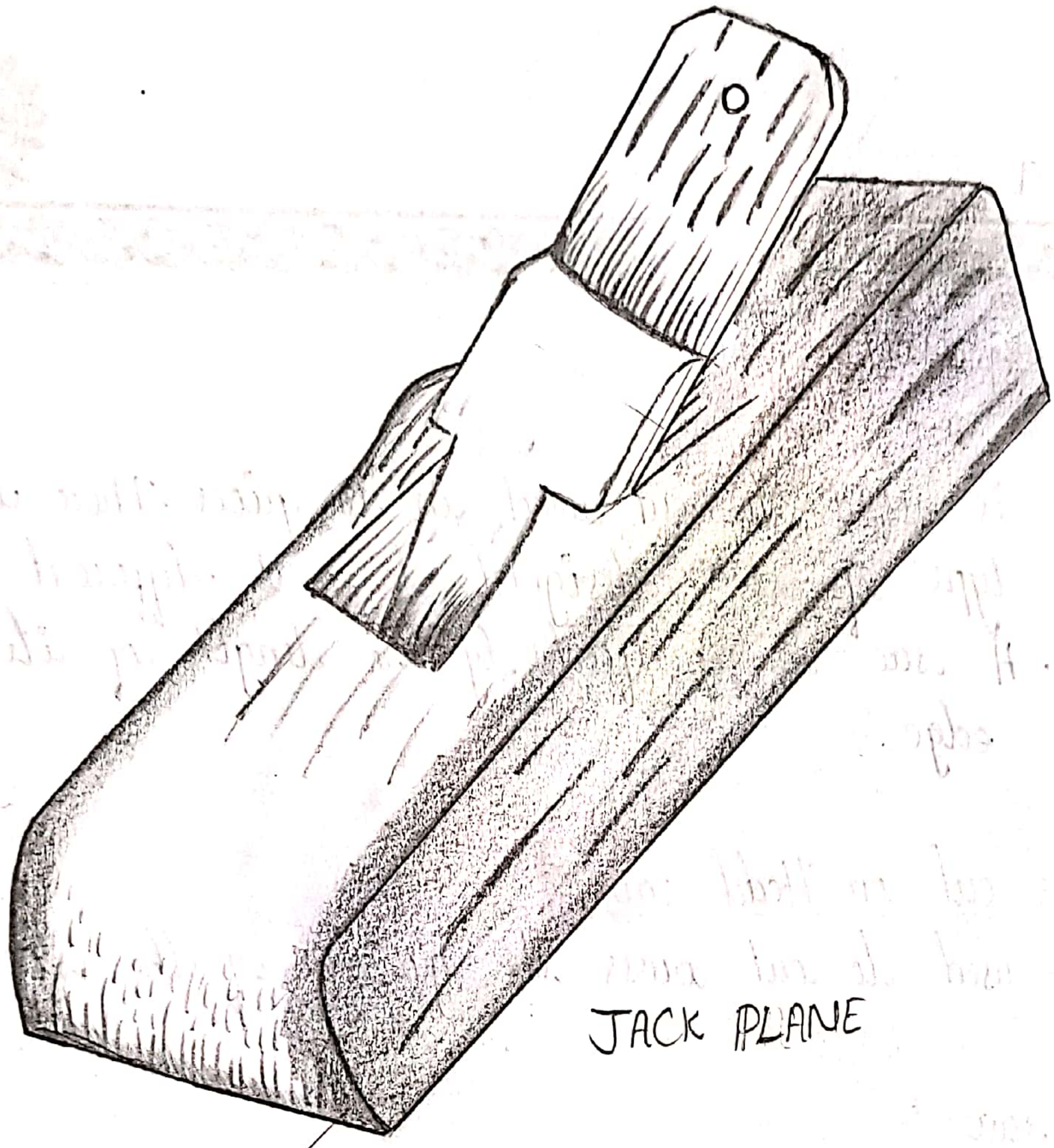
Compass saw :-

It has a narrow longer and stronger tapering blade. which is used for heavy works.

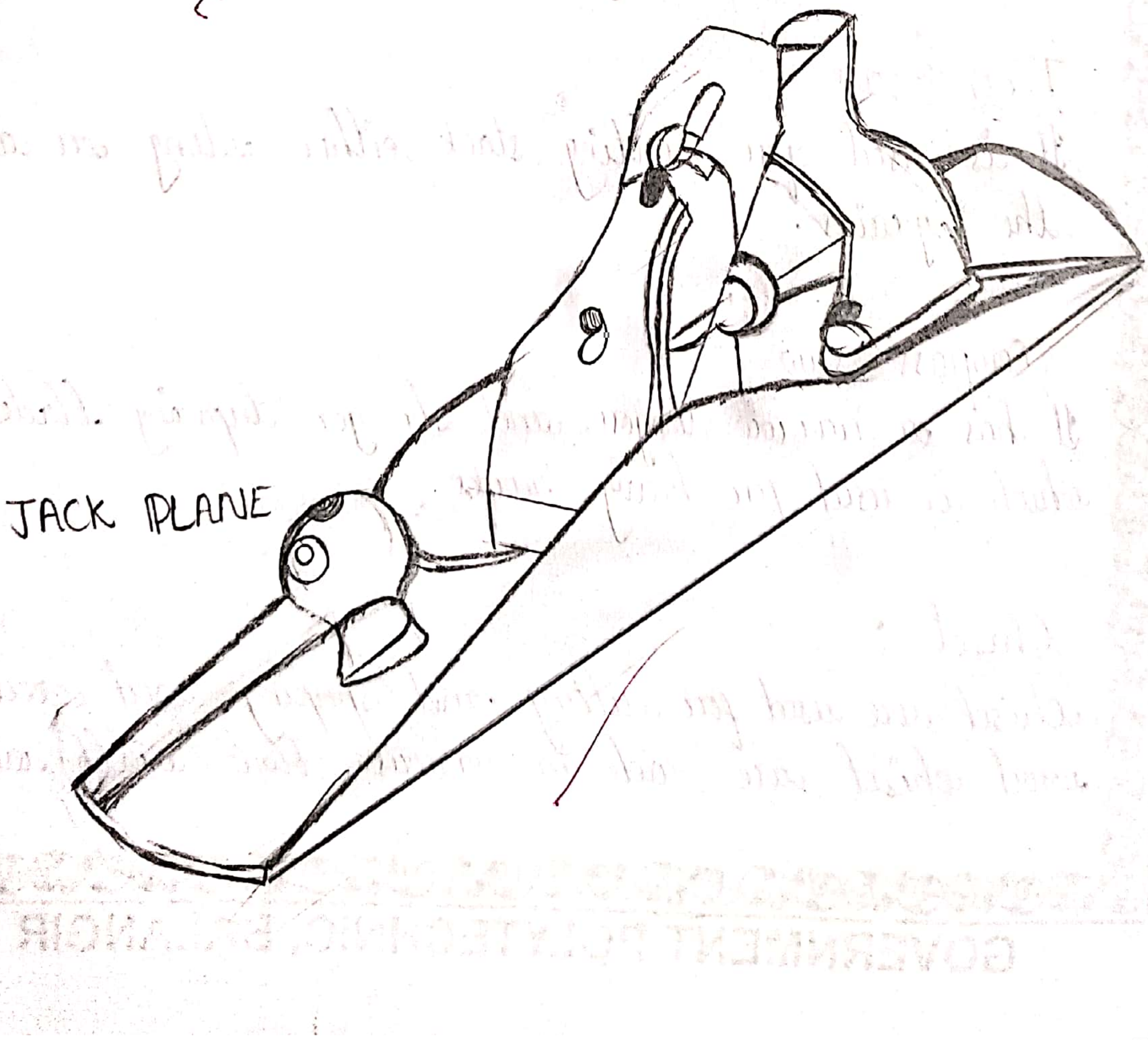
Chisel :-

Chisel are used for cutting and shaping wood accurately wood chisel are made in various blade width ranging.

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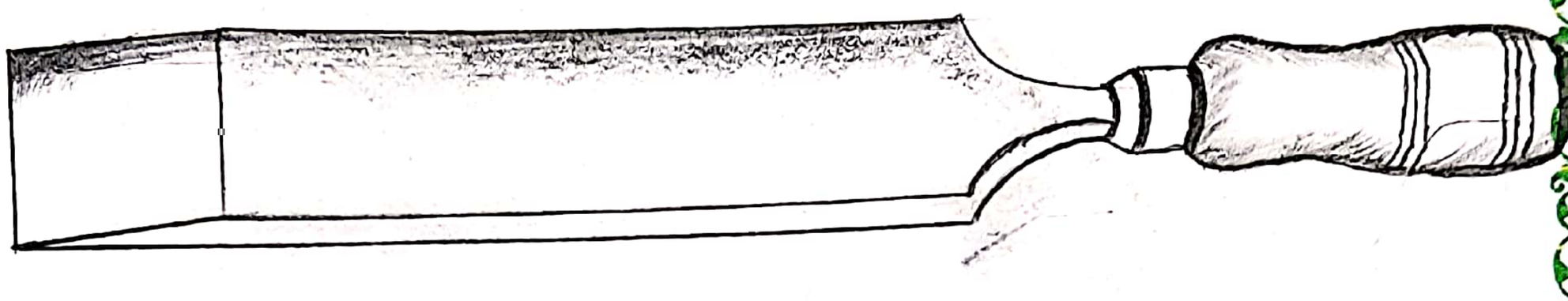


JACK PLANE

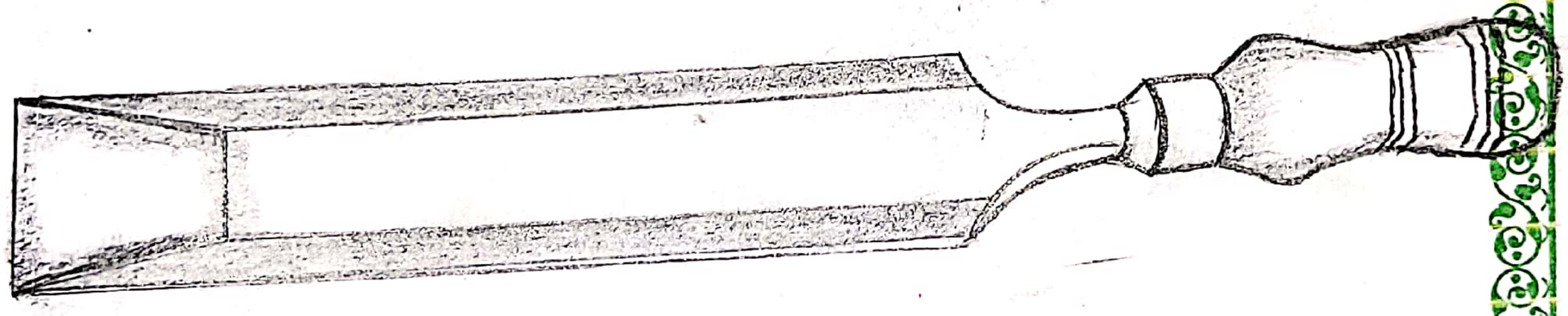


JACK PLANE

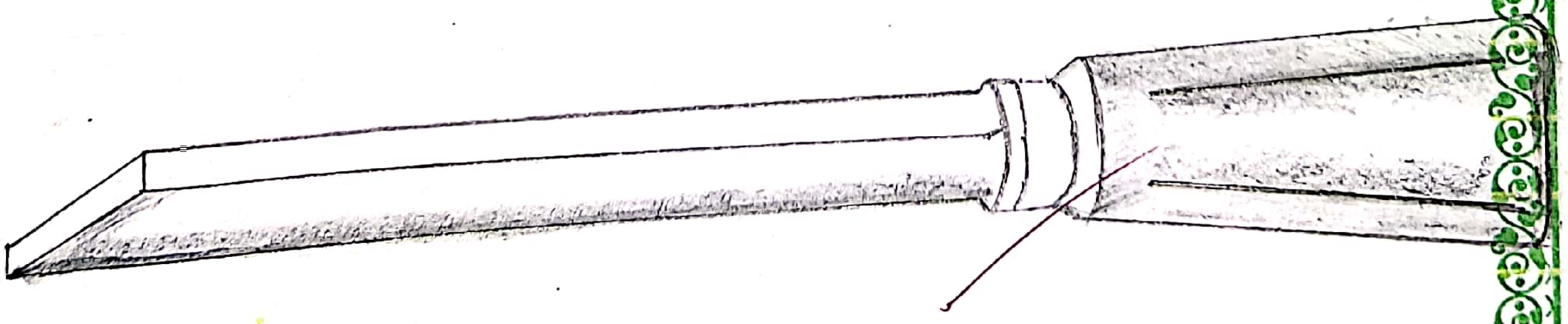
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DOVETAIL CHISEL



FIRMER CHISEL



MORTISE CHISEL

GOVERNMENT POLYTECHNIC, BALANGIR

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Finner Chisel :-

The word finer means "stronger and hence finner chisel is stronger than other chisel.

Dovetail chisel :-

It has a blade with a beveled back, as shown in fig due to which it can enter sharp corners for finishing as in dovetail joints.

Mortise chisel :-

It is used for cutting mortises and chipping in side holes.

Planning tools :-

Planning is the operation used to produce flat surface on wood. Aplane is a hand tool used for the purpose.

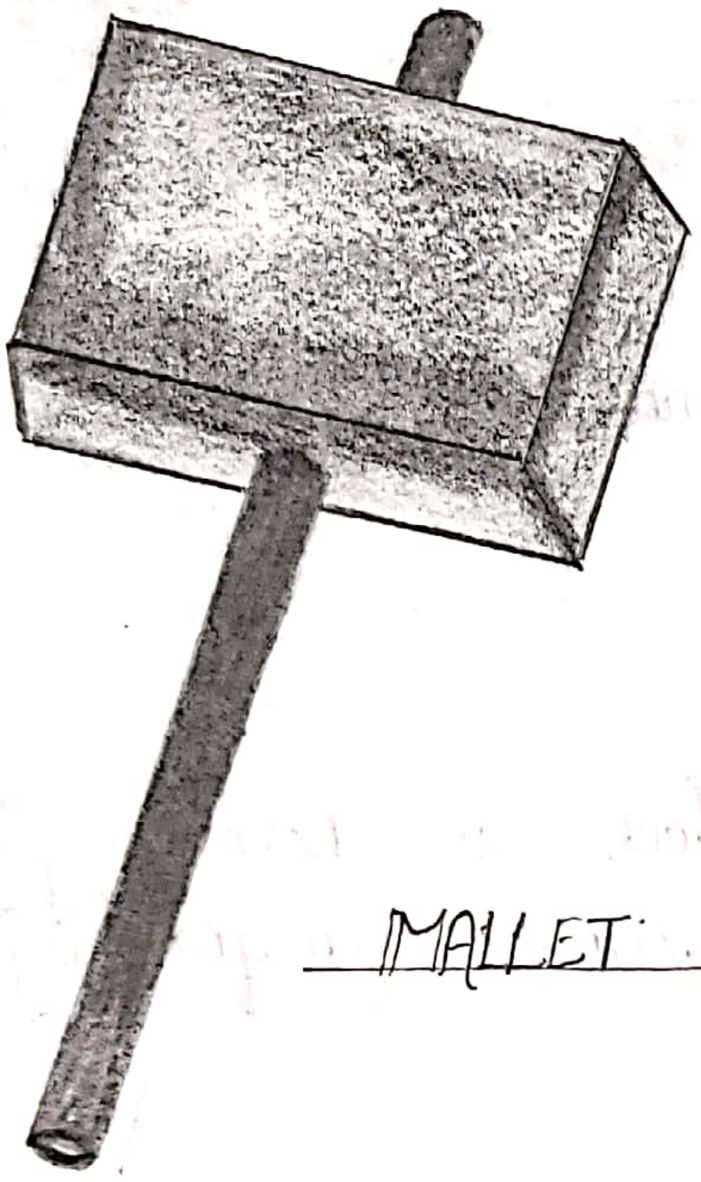
Jackplane :-

It is the most commonly used general purpose plane. It is about 35 cm long.

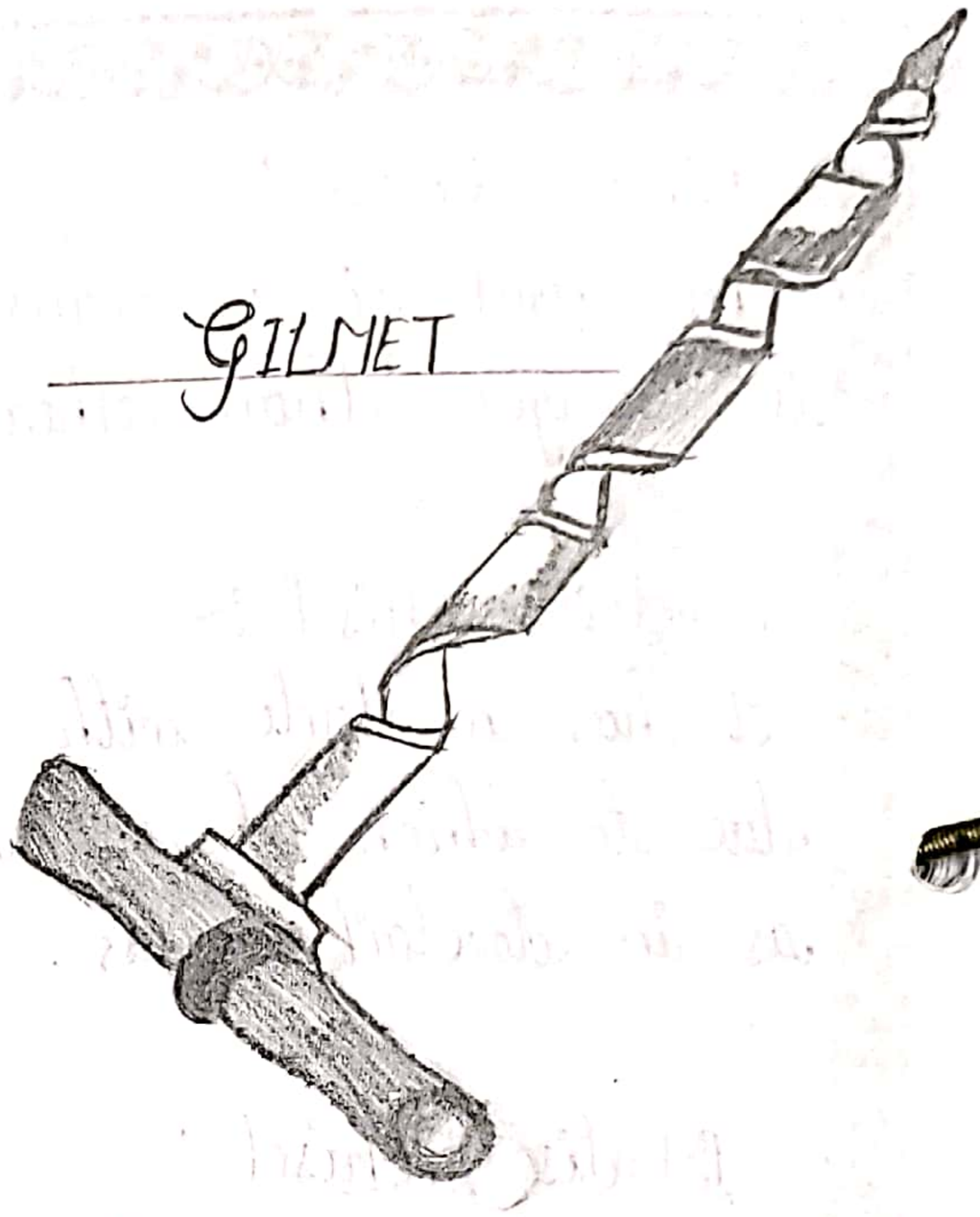
Smoothing plane :-

It is used for finishing work and hence, the blade should have a straight cutting edge.

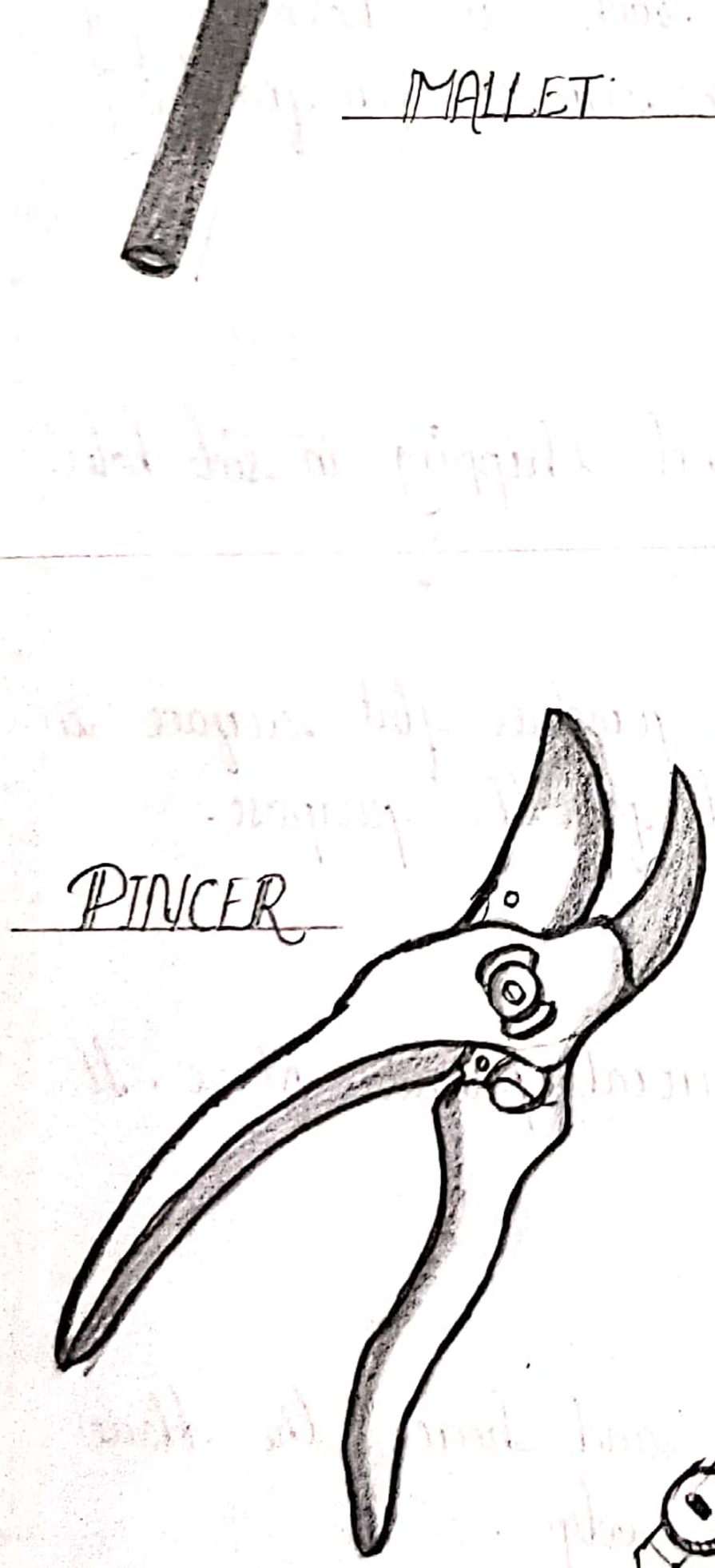
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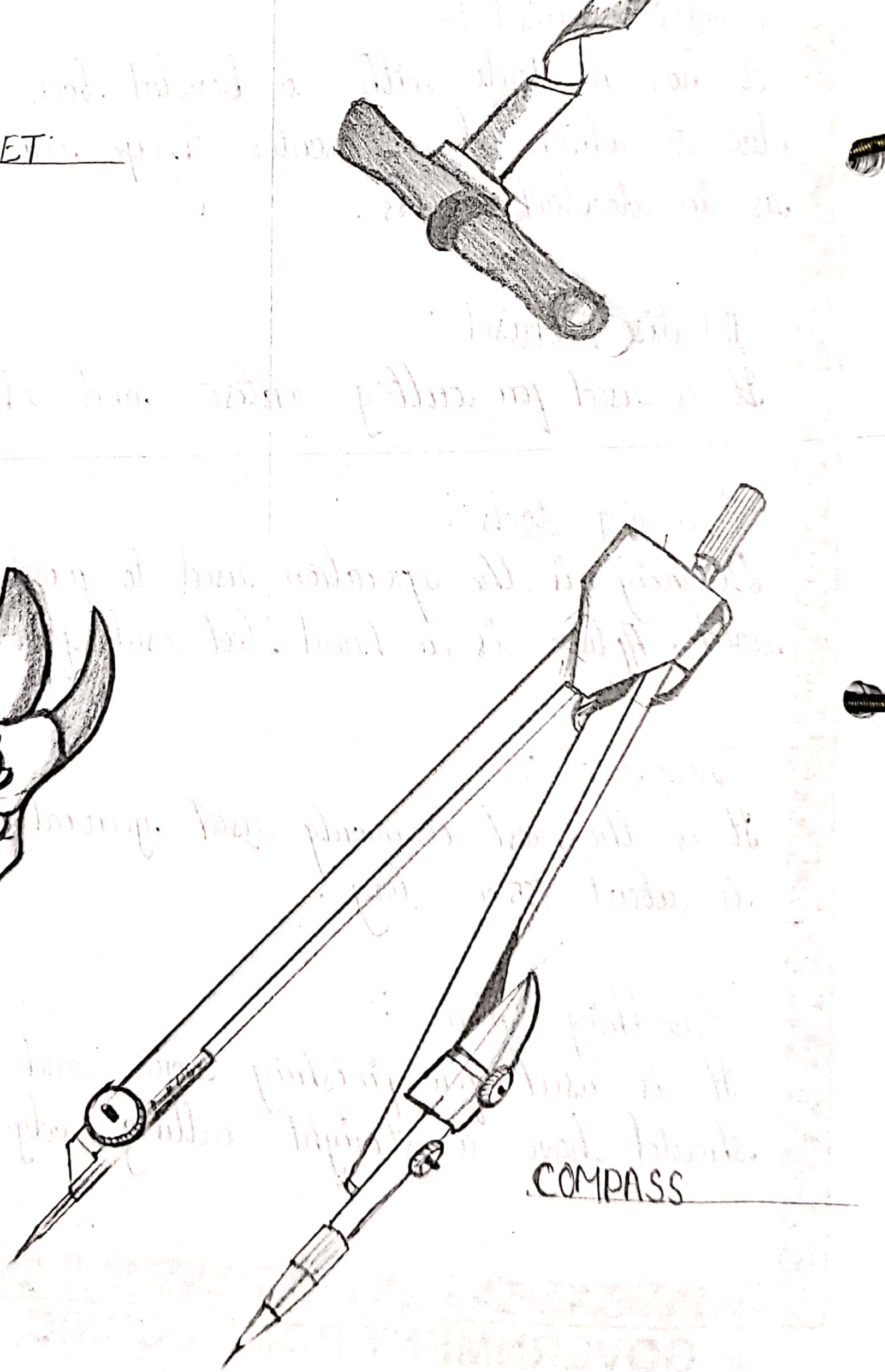
MALLET



GILMET



PINCER



COMPASS

Rebate plane :-

It is used for making a rebate. A rebate is a recess along the edge of a piece of wood, which is generally used for positioning glass in frames and doors.

Gimlet :-

It has cutting edge like a twist drill. It used for drilling large diameter holes with the hand pressure.

MISELLANIEOUS TOOLS :-

Mallet :- It is used to drive the chisel, when considerable force is to be applied. Which may be the case in making deep rough cuts.

Pincer :-

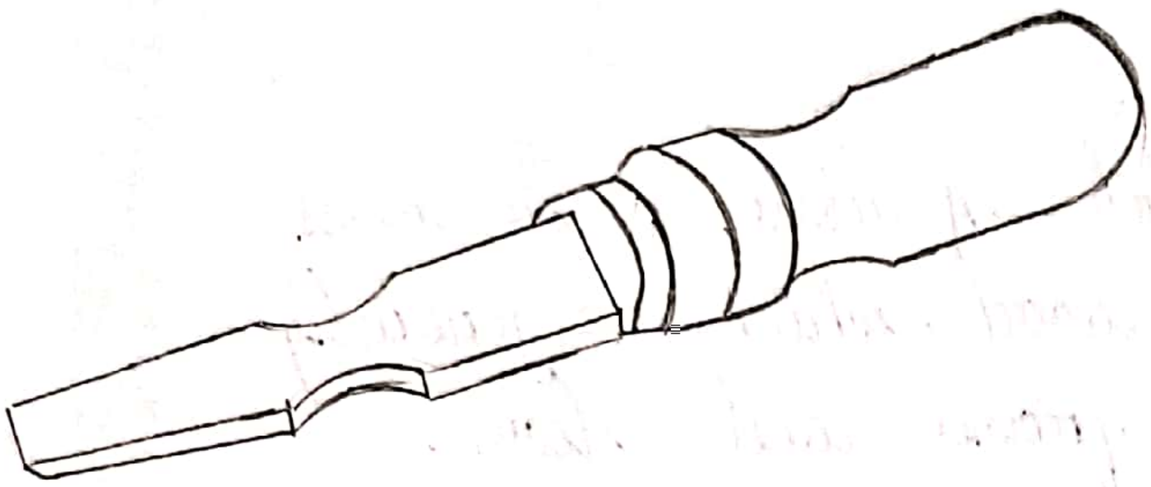
It is made of two forged steel arms with a hinged joint and is used for pulling - out small nails from wood.

Wood rasp file :-

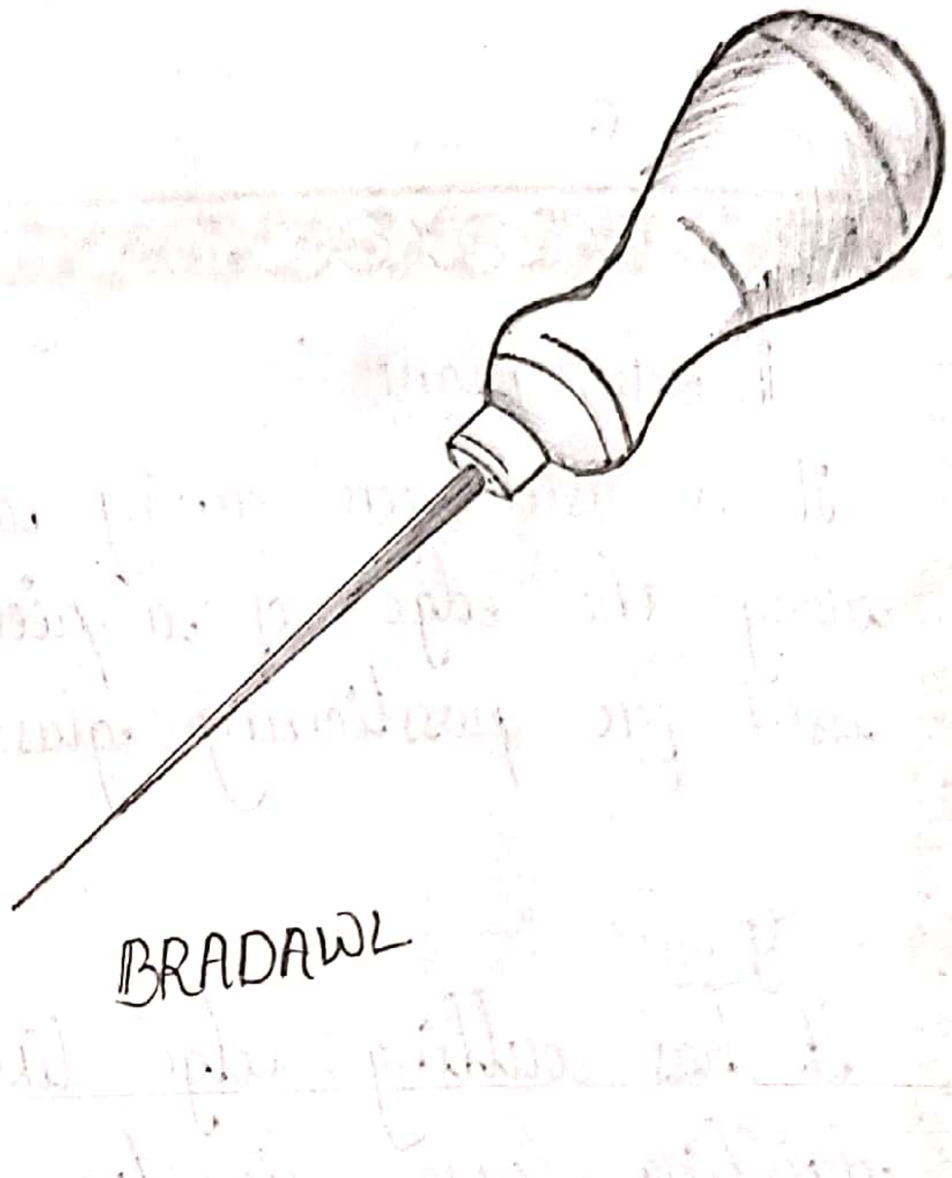
It is a finishing tool used to make the wood surface smooth, remove sharp edges, finish file and other intercon surfaces.

Bradwl :- It is a hand operated tool, used to bore small holes for starting a screw on large nail.

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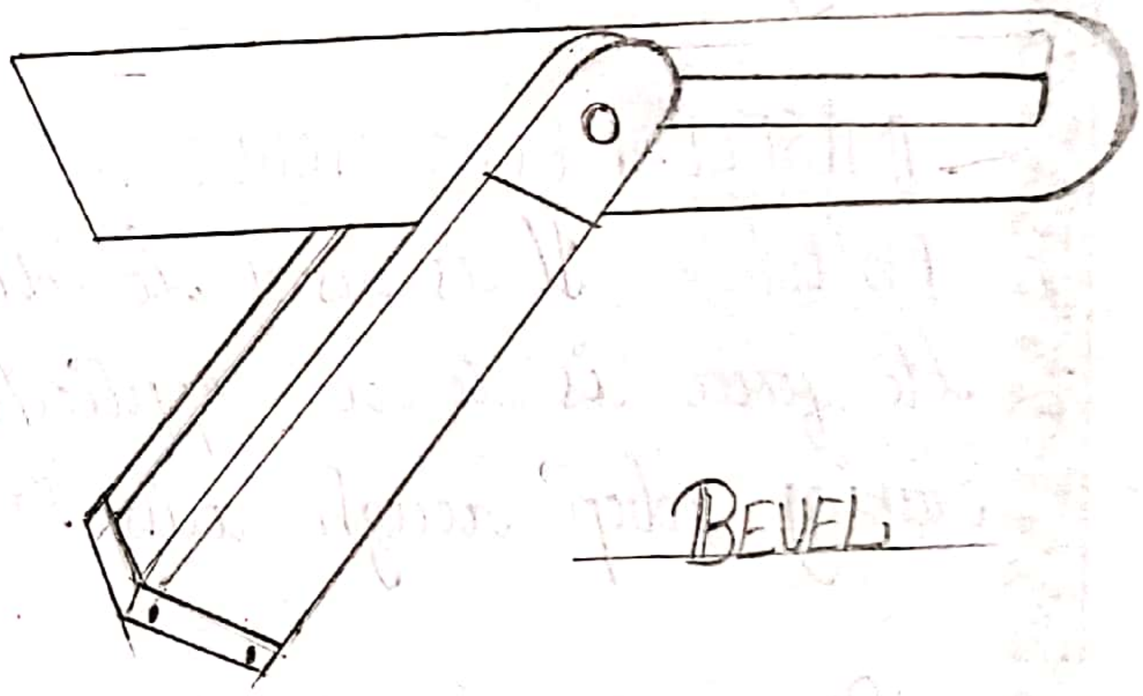
SCREW DRIVER



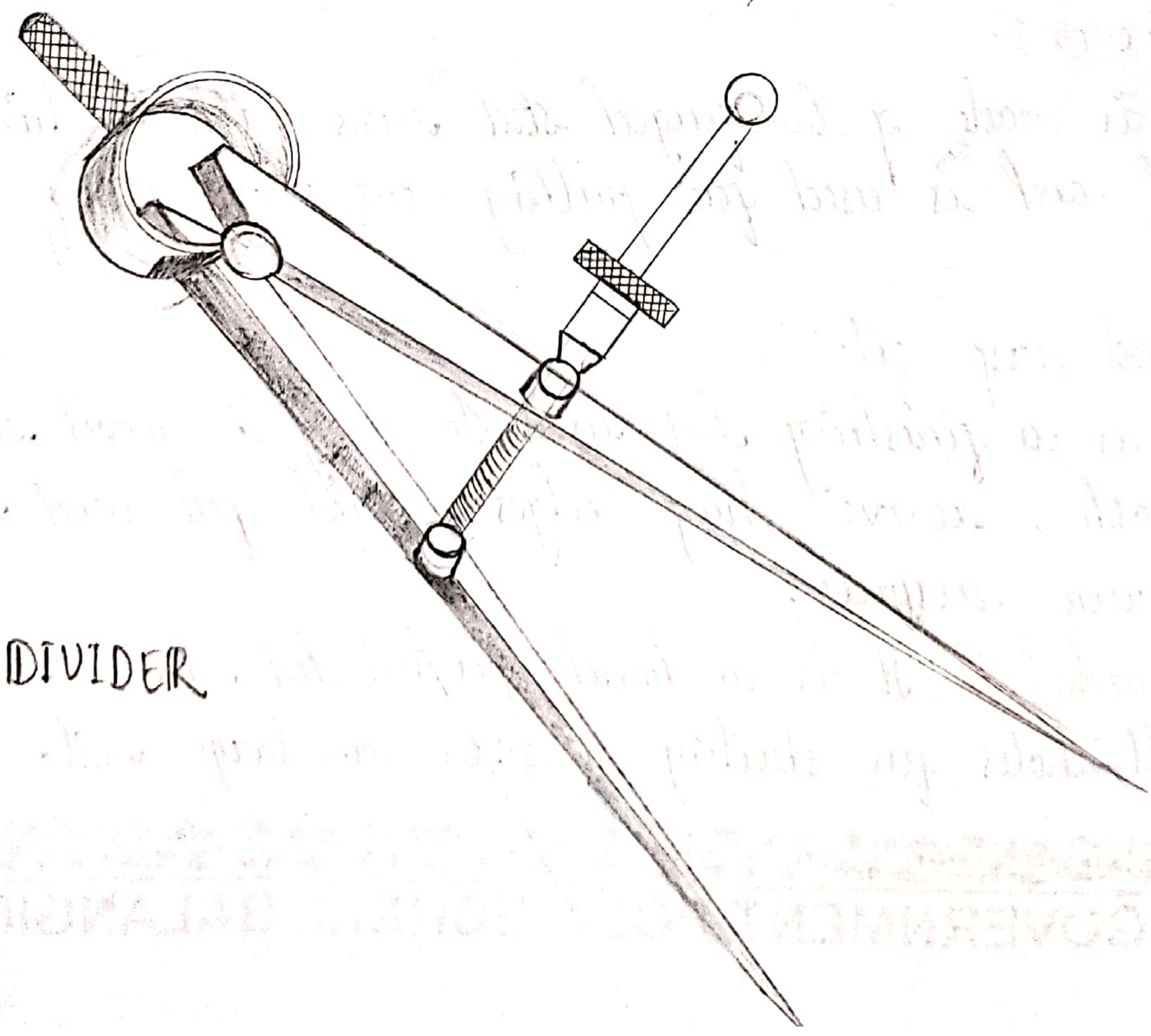
BRADAWL



SCRIBER or MARKING KNIFE



BEVEL



DIVIDER

SAFETY POINTS

SAFETY FRECAUTIONS :

→ Learn safe way of doing the job before you actually start.
→ Think of safety & safety all call time.
→ follow all the safety rules and regulation they are meant to protect.

PARSONAL SAFETY RULES :

→ While in workshop decipline sholed maindain.
→ Always wear proper cgaurd.
→ Don't think any unnessary think while in working position.

WORK SHOP SAFETY RULES :

→ Never workshop floor being oily. It should dry and clean.
→ If any electrical dispute in the workshop don't to be solved it imidieatly, report the electrician.

HAND TOOL'S SAFETY RULES :

→ Never workough any tools equipments.
→ Don't use broken tools, just like with out handle file on lowsely handle of hammer.
→ Tools equipments should be separtly other precision equipment should be placed with special wire.

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 # MECHINE SAFETY RULES :

→ Don't start any machine with out having proper knowledge
→ Before going to start machine should be checking.
→ Before starting the machine oil, lubricant should again.

 # JOB SAFETY RULES :

→ Job should be proper pure.
→ After finishing the job it should be oiling because corrosion will not invoed thier end.

6. CONCLUSION

From the above job we know making an asamble of

NAME OF THE STUDENT Elishree Padhan

BRANCH Mechanical

SEMESTAR 3rd

REGD. NO. F23110004019

GROUP

10/12/24

SIGNATURE OF THE (WORKSHOP) LECTURER /ASST. LECTURER

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