

Engineering Practice

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COURSE CONTENT:

UNIT- I

- Introduction
- Fitting shop

UNIT- II

- Carpentry shop
- Foundry Shop

UNIT- III

- Machining Shop

UNIT- IV

- Welding, soldering and Brazing

Introduction

It **provides the basic working knowledge of the production and properties of different materials used in the industry.** It also explains the **use of different tools, equipments, machinery and techniques of manufacturing**, which ultimately facilitate shaping of these materials **into various usable forms.**

Ores (raw material for industry)

↓

To suitable reducing or refining processes convert the metal into molten form

↓

This molten metal poured into mould to give commercial castings called ingots.

↓

From suitable process- to obtain usable metal products of different shapes and sizes

Processes:

1. Primary shaping processes
2. Machining processes
3. Joining processes
4. Surface finishing processes
5. Processes effecting change in properties.

Workshop safety

The safety in Workshops has been written not only to provide appropriate safety procedures but also to assist trained workshop personnel with the provision of a reference document outlining the general principles of safe working practices relevant to the mechanical engineering aspects. It relates to specific areas where definite safety measures are required for workshop operations

Causes of accidents

The 98% accidents could be easily avoided provided due precautions are taken well in time. A very familiar slogan goes on to say that accidents do not just happen but are caused due to the failure of one element or the other, and the most unfortunate factor is that the human element is the most pronounced of all which fail.

The common causes which lead to accidents are the following:

1. Unsafe working position.
2. Improper or defective tools or their improper use.
3. Improper acts- which result in violation of safety rules and non-observance of safety precautions.

Common sources of accidents

1. Projecting fasteners on revolving parts.

2. Revolving cutting tools, circular saw blades.

3. Revolving drums, crushers, spiked cylinder and armed mixers, etc.

4. Revolving shafts, spindles, bars and tools like drills, reamers, boring bars and chucks, etc.

5. Projecting sharp edges or nips of belt and chain drives viz., belt, pulleys, chains, sprockets and belt fasteners.

6. Reciprocating tools and dies of power presses, drop hammers, and revolving presses, etc.

1. General Instructions and Safety

1. Every student should obtain a copy of Engineering Practice Laboratory Manual.
2. Dress Code: Students must come to the laboratory wearing (i) Trousers, (ii) Leather shoes.

Note: Half pants, loosely hanging garments and slippers are not allowed.





General Instructions and Safety

3. To avoid injury, the student must take the permission of the laboratory staff before handling any machine.



4. Students must ensure that their work areas are clean and dry to avoid slipping.



5. At the end of each experiment, students must clear off all tools and materials from the work area.



General Instructions and Safety

6. Laboratory report must be submitted in standard report sheet in the subsequent lab turn. Reports on ordinary sheet and computer papers will not be accepted.
7. Operate/observe machine in safe direction. Careless handling of machines may result in serious injury.

Safety Equipments while working in Workshop



Mask



Hand Glows



Helmet



Ear Muffs



Safety Goggles



Blue Apron

Fitting Shop: To make a fitting job

Aim:

To make a fitting job as per the given drawing.

Objectives:

1. To understand how to use various tools of fitting shop.
2. Make a job and assembly of given drawing from MS plate.

Tools Required:

Files



Centre Punch



Scriber

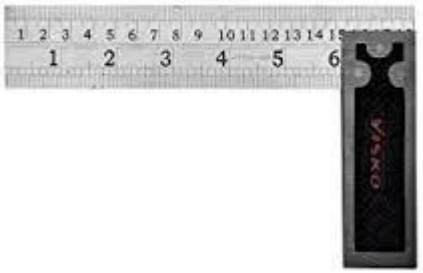


Fitting Shop: To make a fitting job

Bench Wise



Try Square



Odd leg Caliper



Hacksaw frame with Blade



Hammer



Fitting Shop: Fitting job Procedure

1. Taking Two Work Piece of Mild Steel Material with Dimensions 50mm X 50mm.
2. Making Right angle all the sides of work piece with the use of **Rough & Fine Files** and Measure **it with Tri Square**.





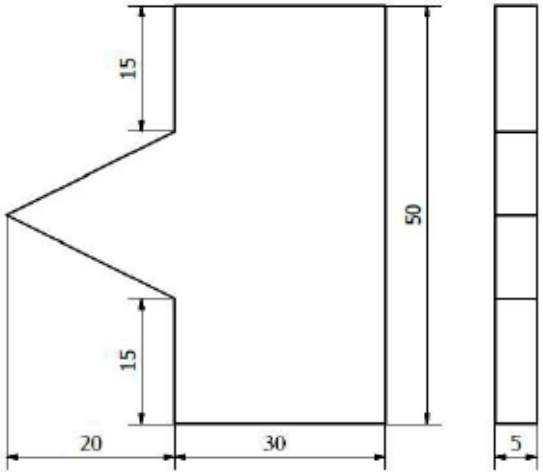
Fitting Shop: Fitting job Procedure

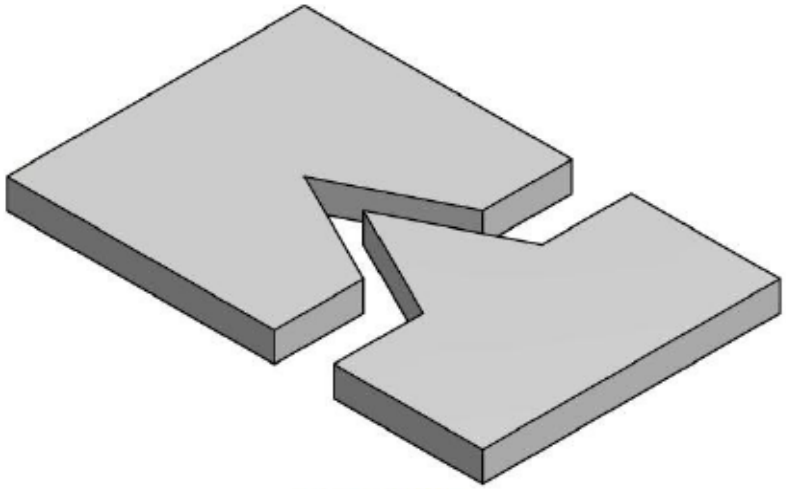
3. Marking Drawing on work piece and do punching on Drawing of work pieces.
4. Start Cutting as per punching with slowly and ensure that your cut goes through out the length of Marking.

1. Cut All the marked pieces.
2. File all the sides and do as it is in other work pieces. File it and match it.
3. Punch Roll No. on Works pieces and Submit to Faculty.

FITTING JOB

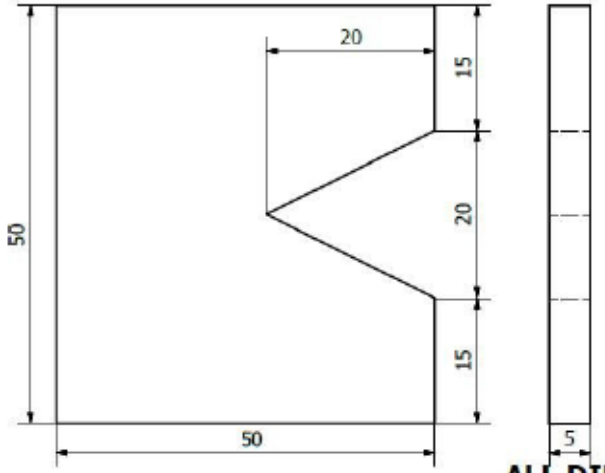
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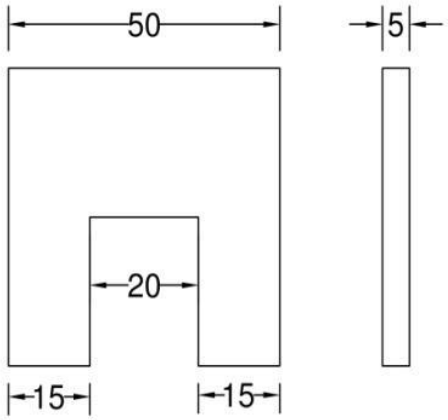
ISO. VIEW

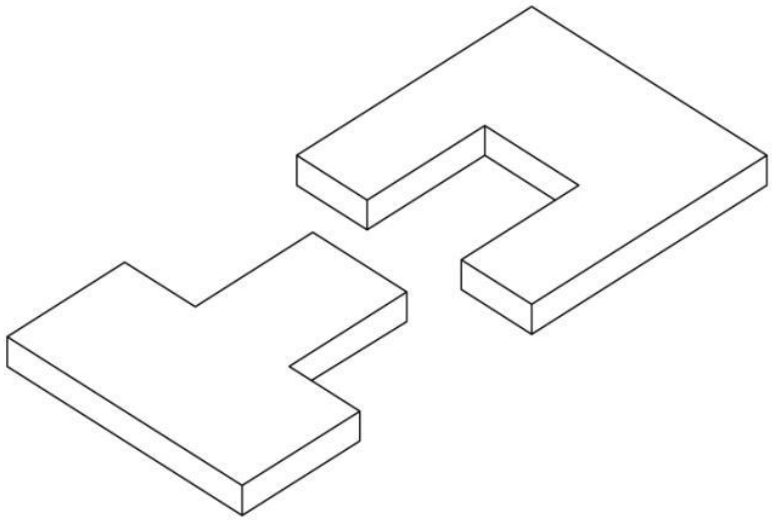
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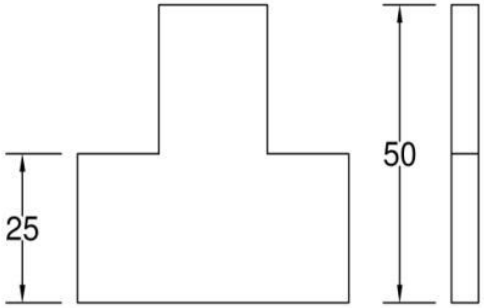
ALL DIMENSIONS ARE IN MM

COMPONENT NO 1

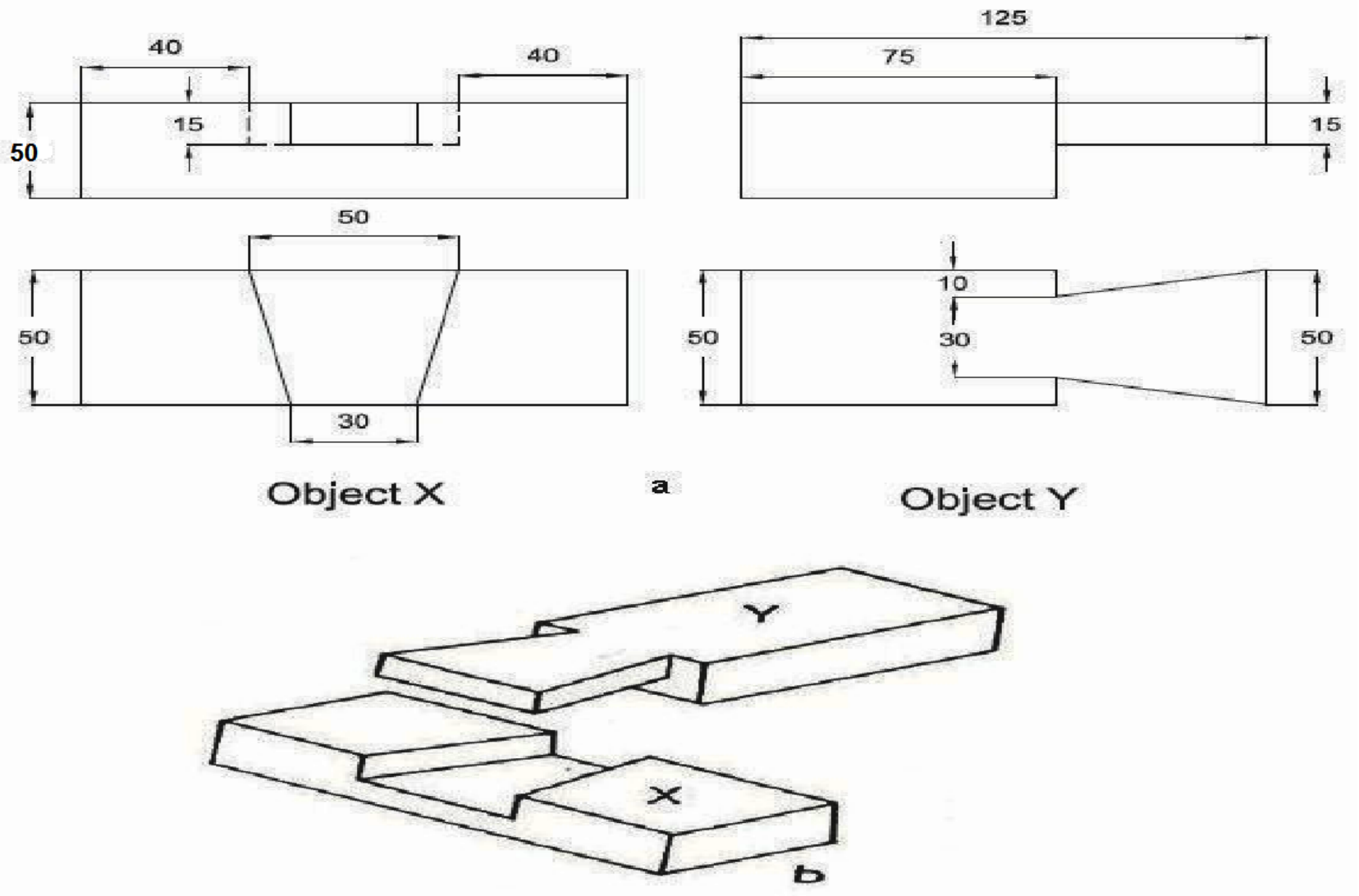


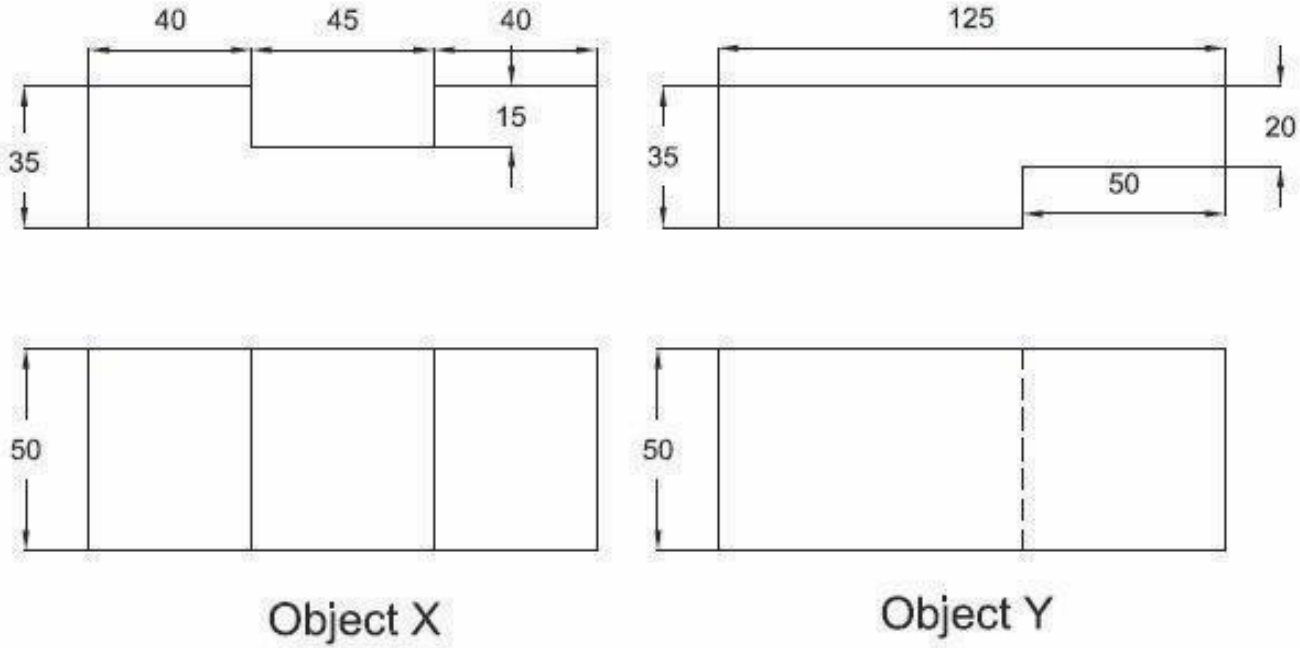


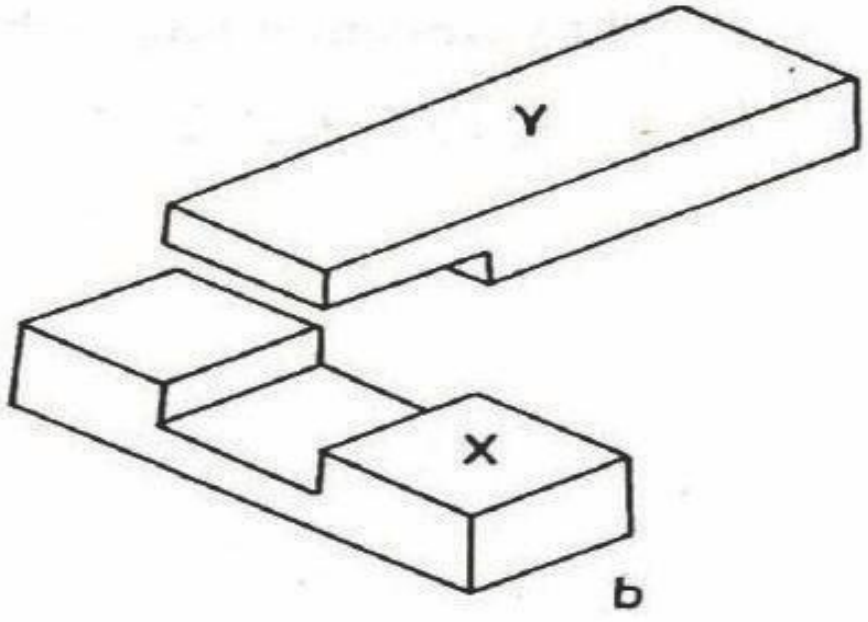
COMPONENT NO. 2



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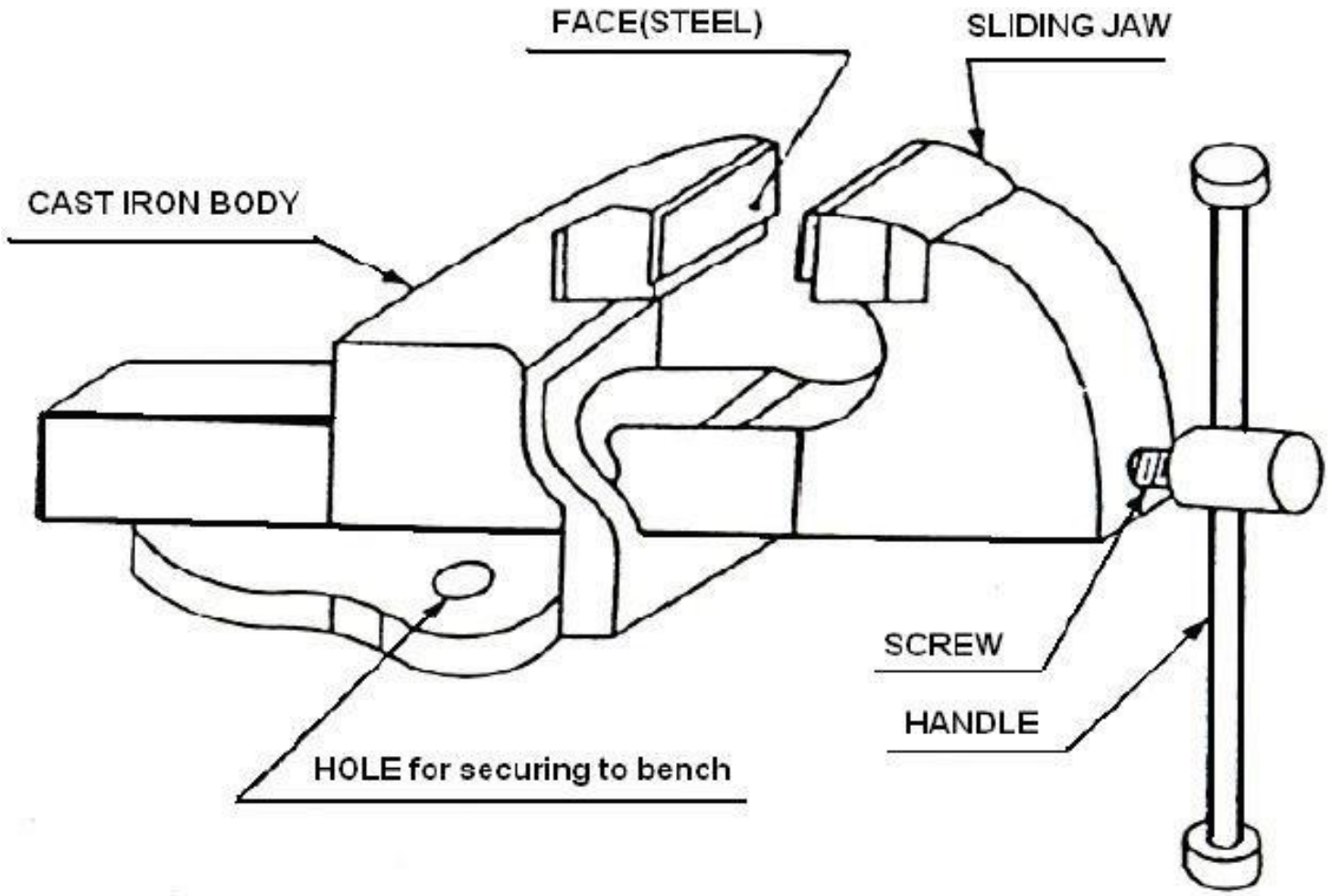

40
40
15
50
125
75
15
50
50
50
30
10
30
50
50
Object X
a
Object Y
Y
X
b


40
45
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15
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50
Object X
125
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35
50
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Object Y

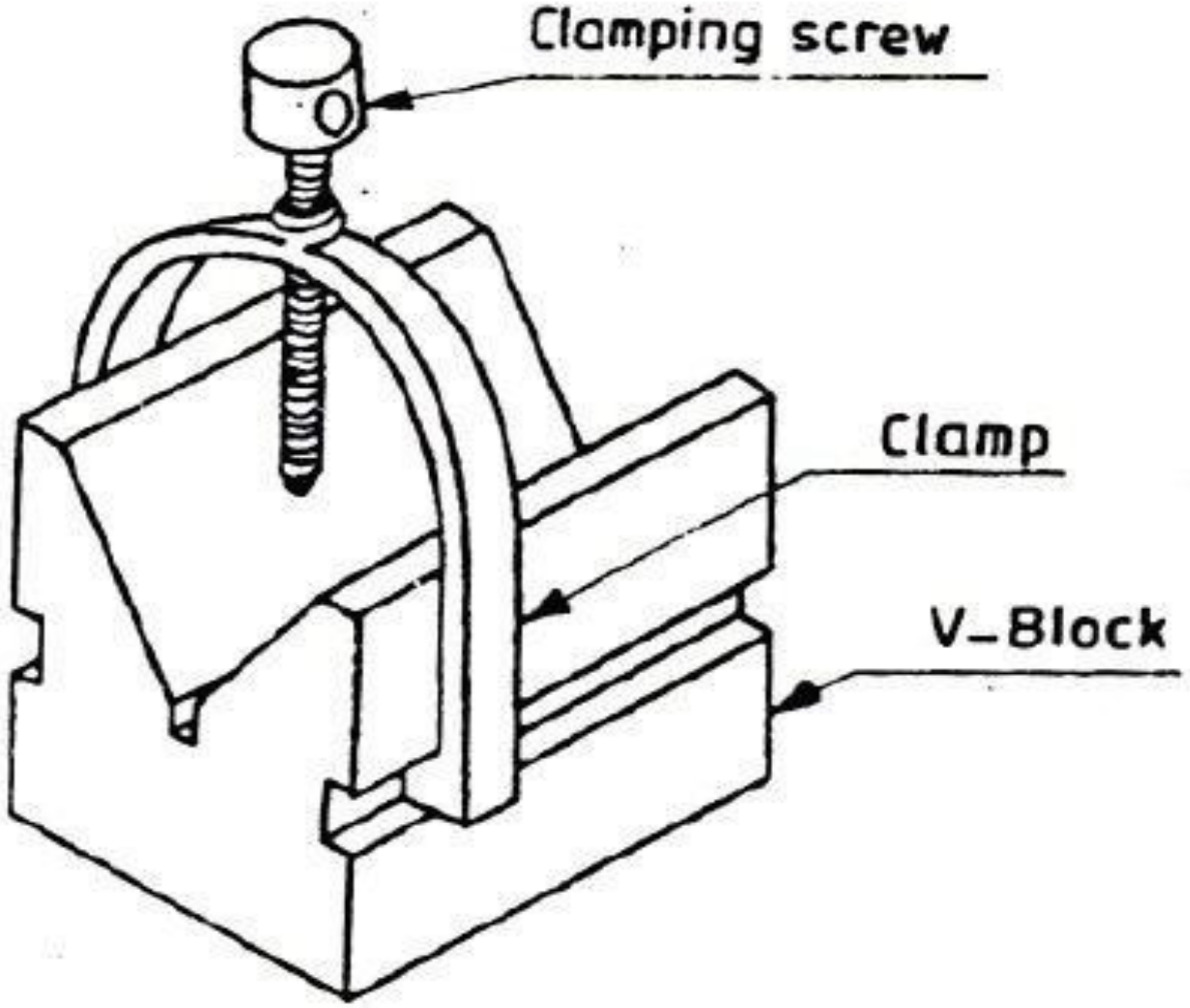

Y
X
b

Holding Tools

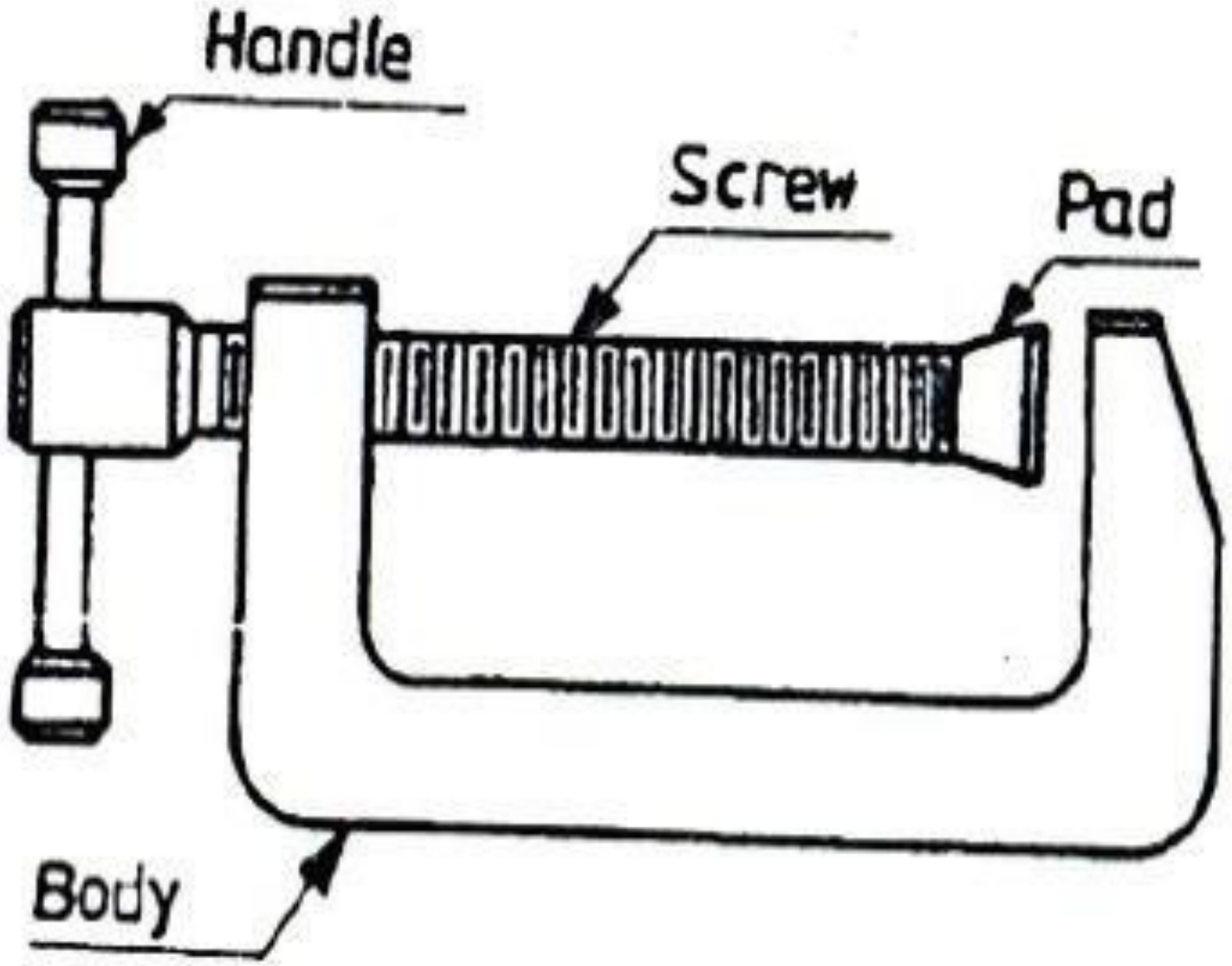
Bench vice



V-block

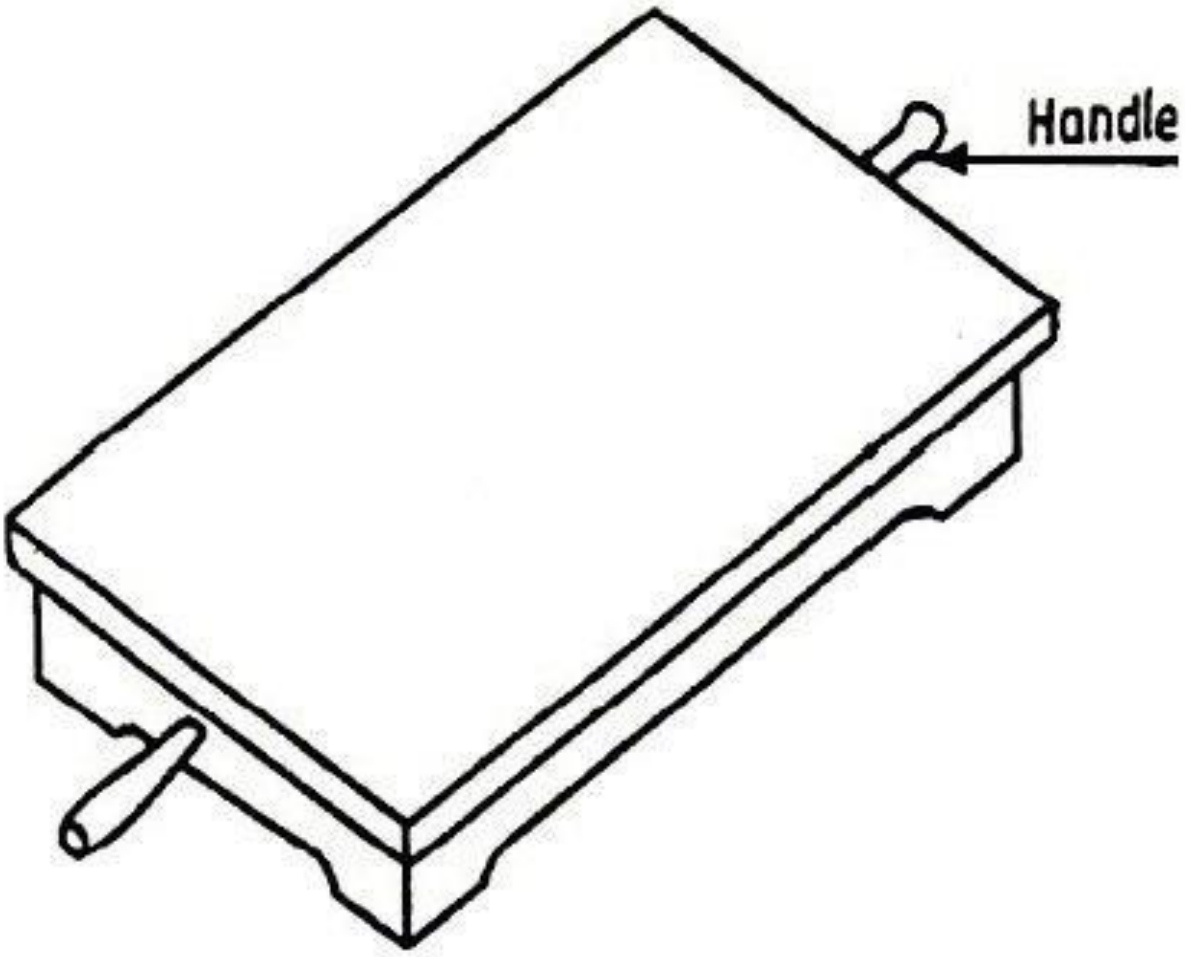


C-Clamp

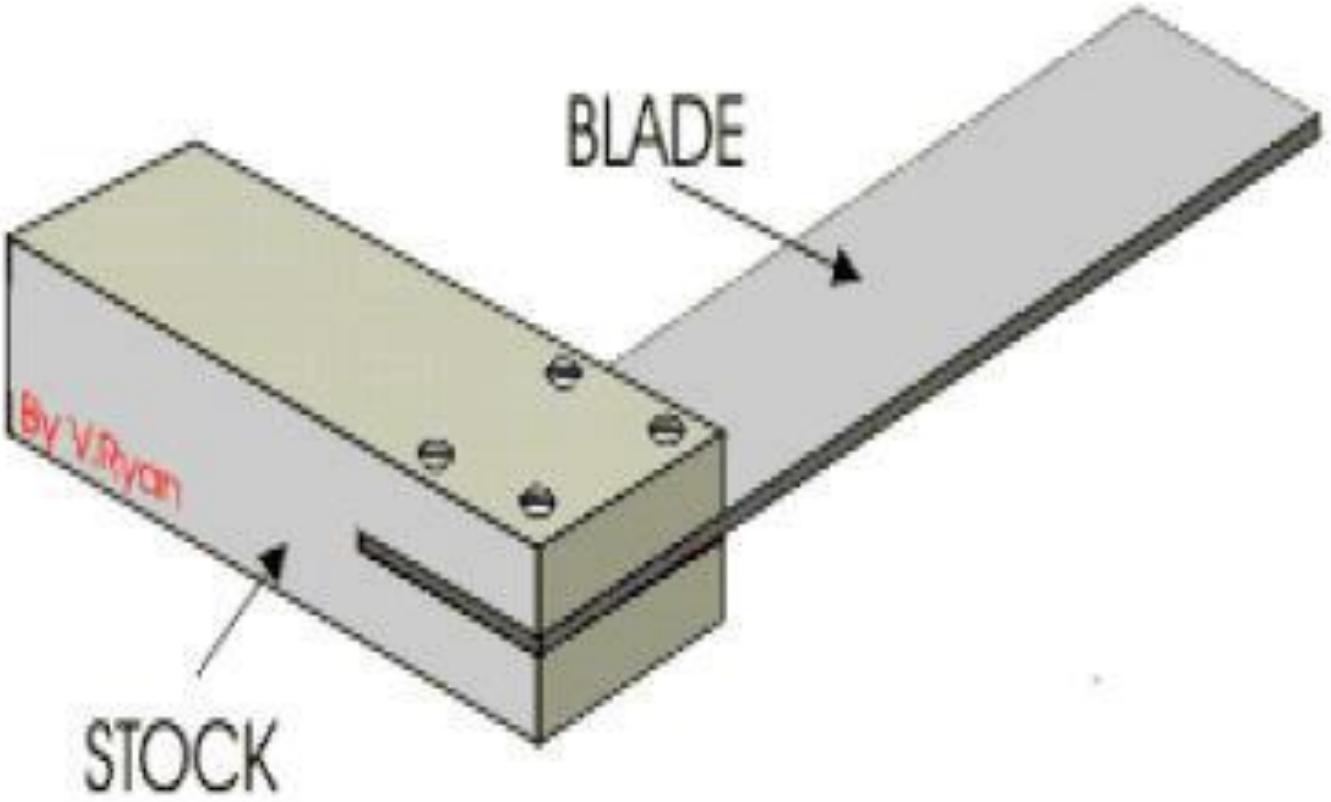


Marking and Measuring Tools

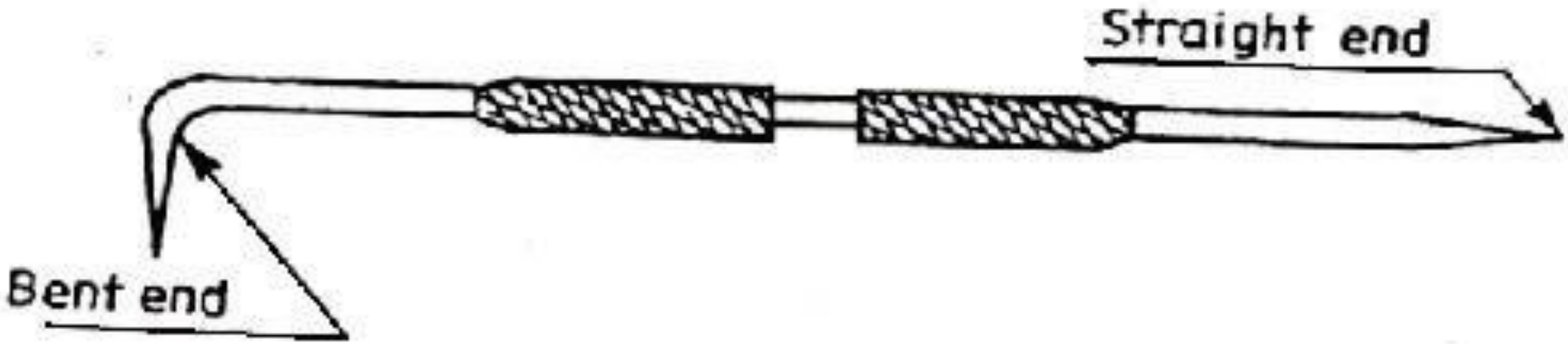
Surface plate



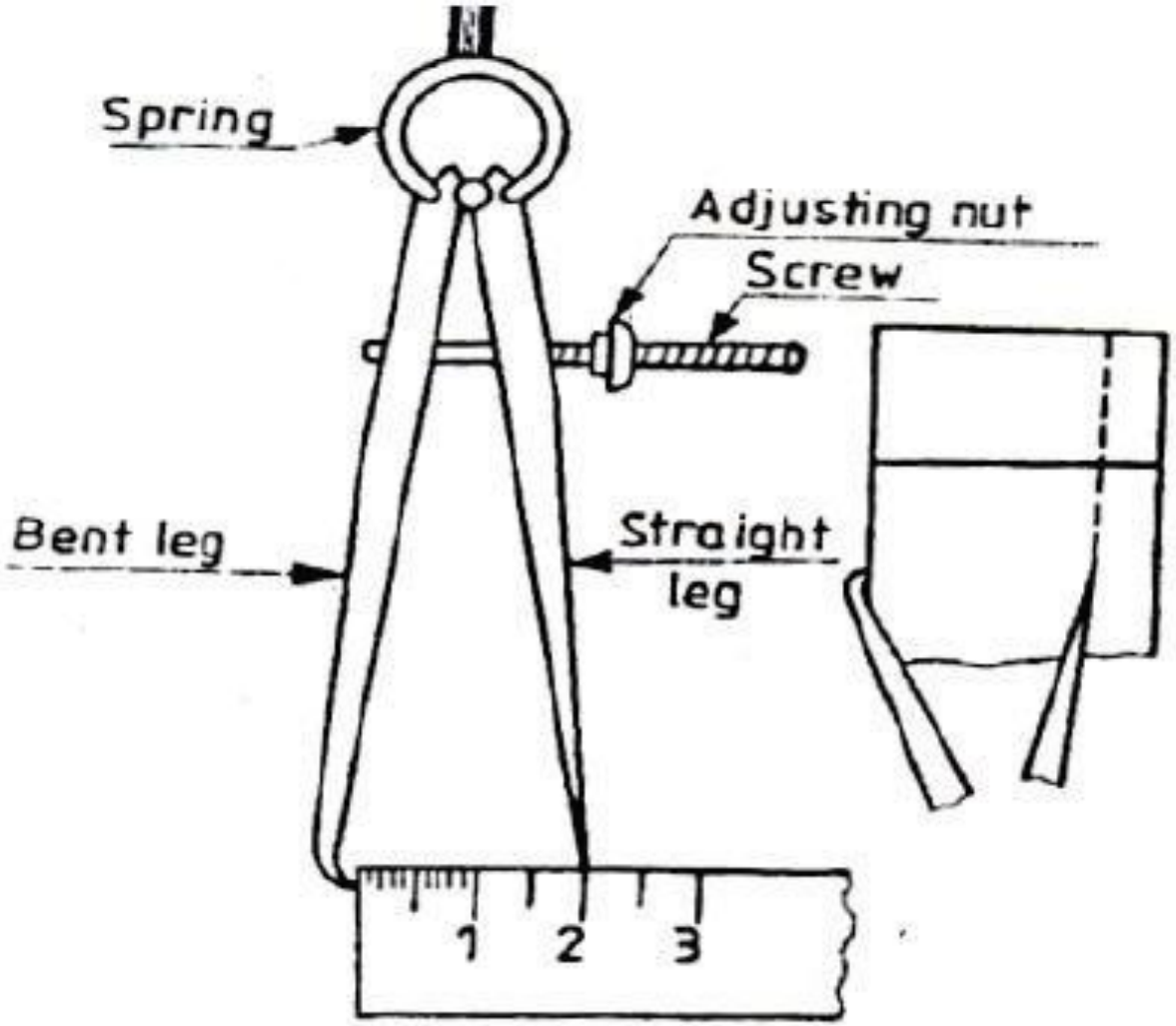
Try square



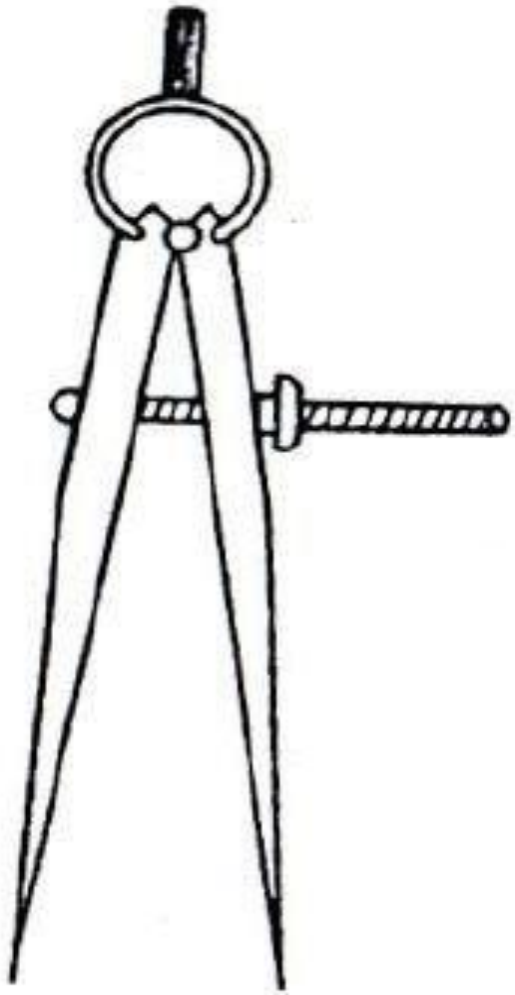
1.3.3 Scriber



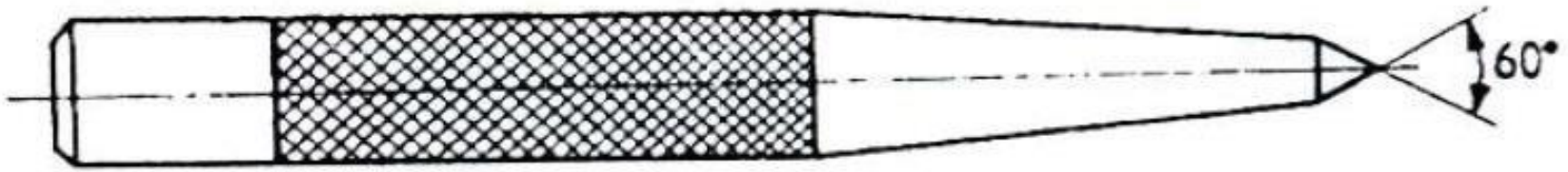
Odd leg Caliper



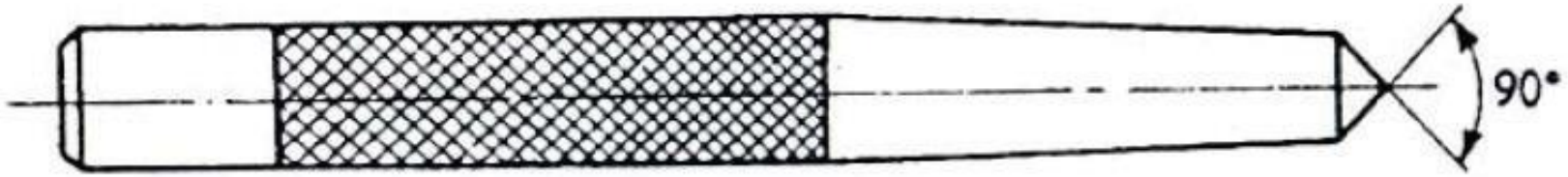
Divider



Punches

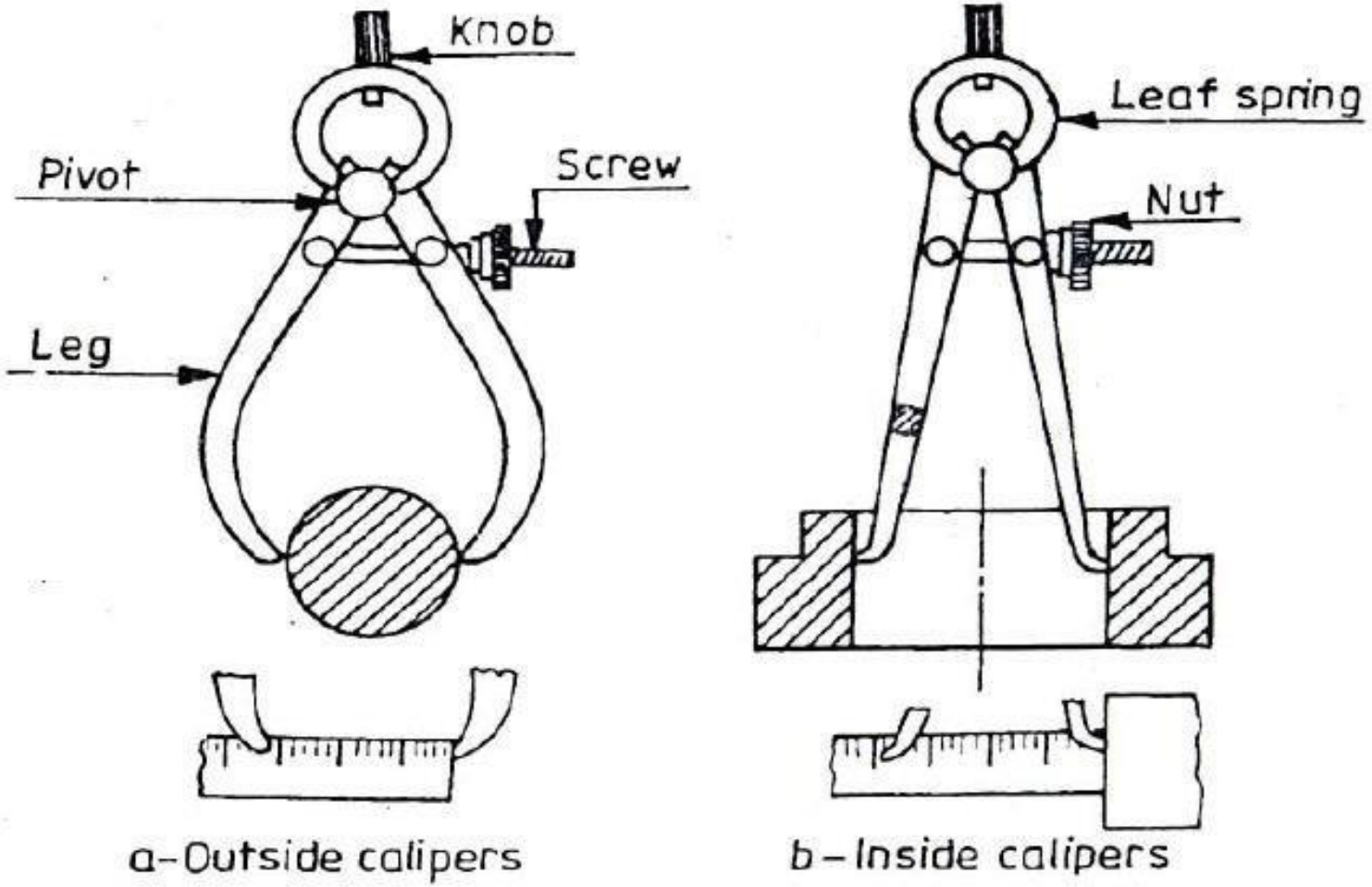


a – Dot punch

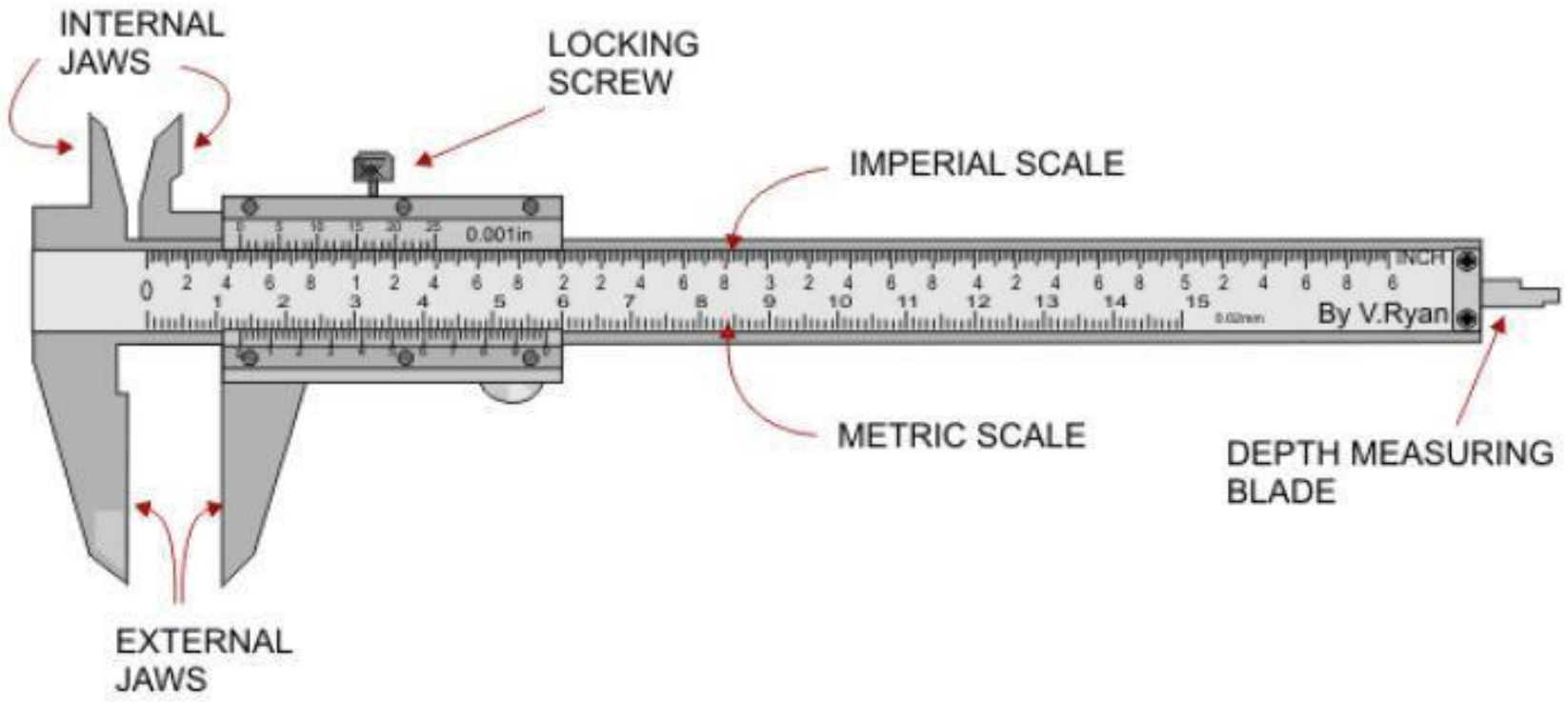


b – Centre punch

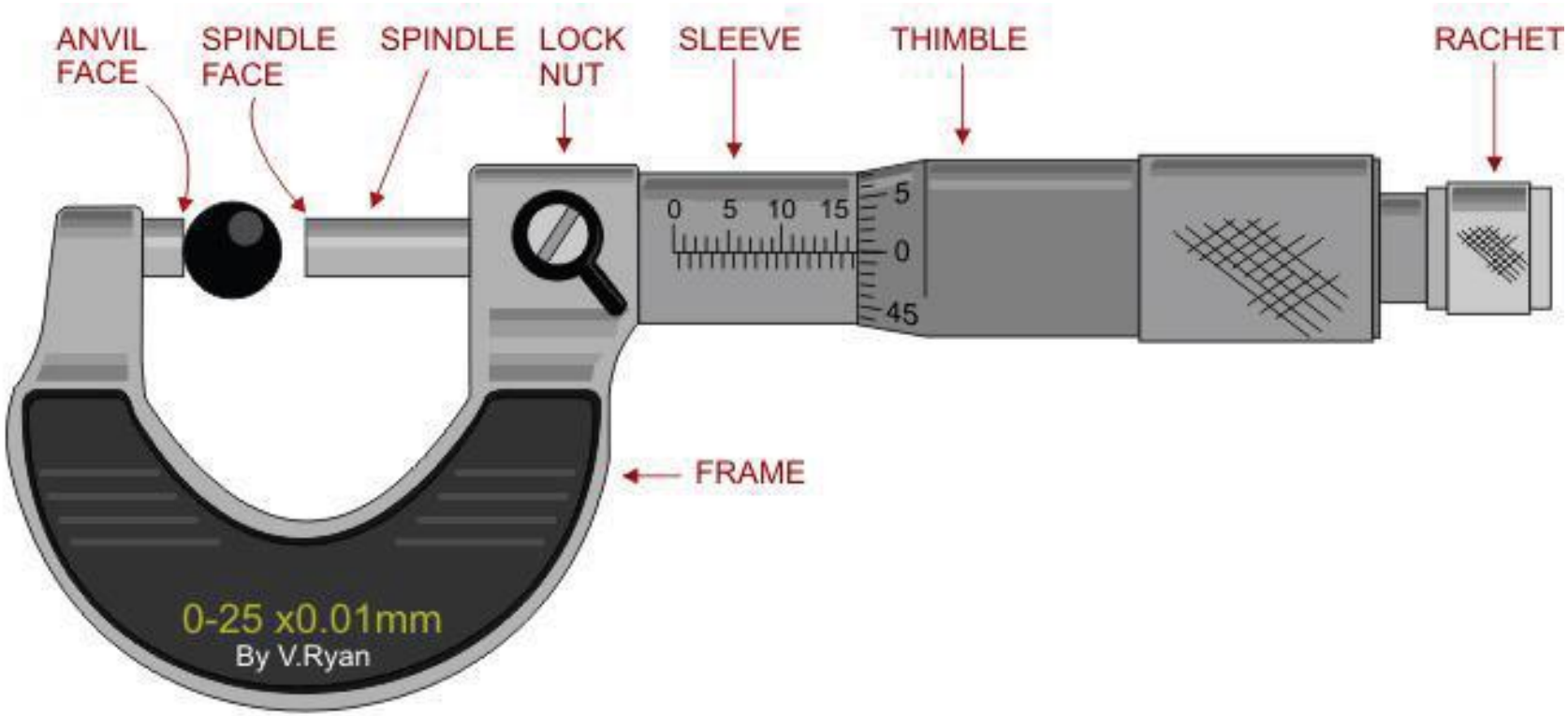
Calipers


Knob
Pivot
Screw
Leg
Leaf spring
Nut
a–Outside calipers
b–Inside calipers

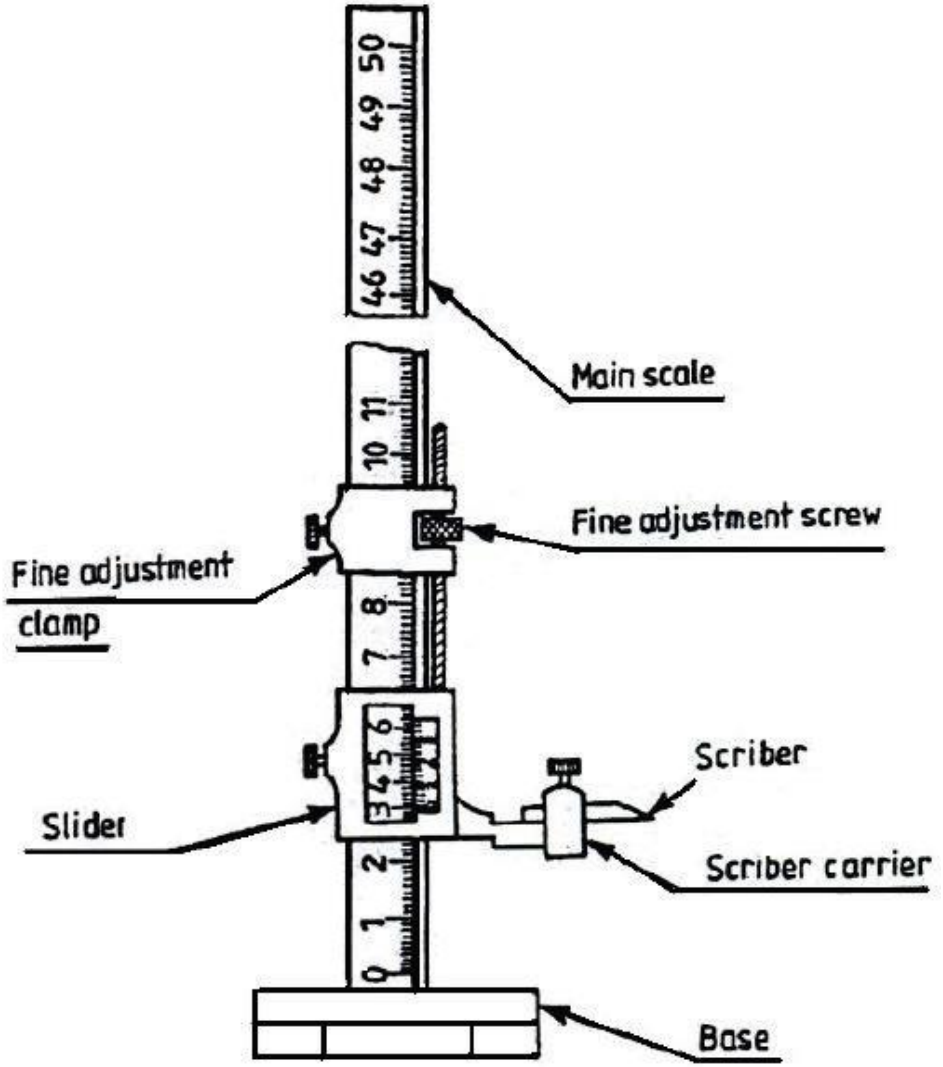
Vernier Calipers



The Micrometer (Screw gauge)

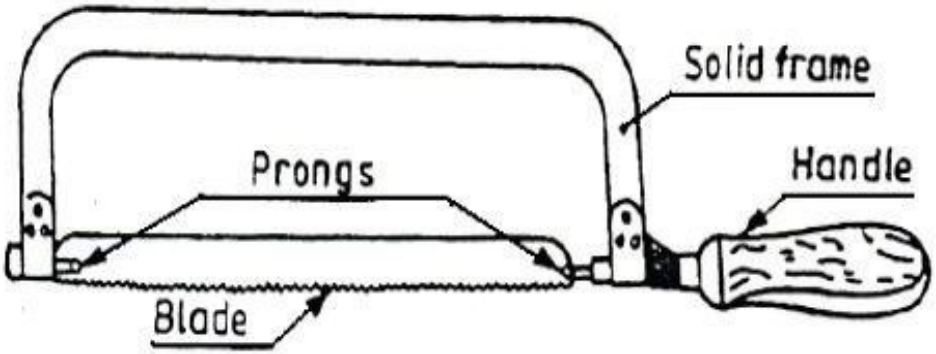


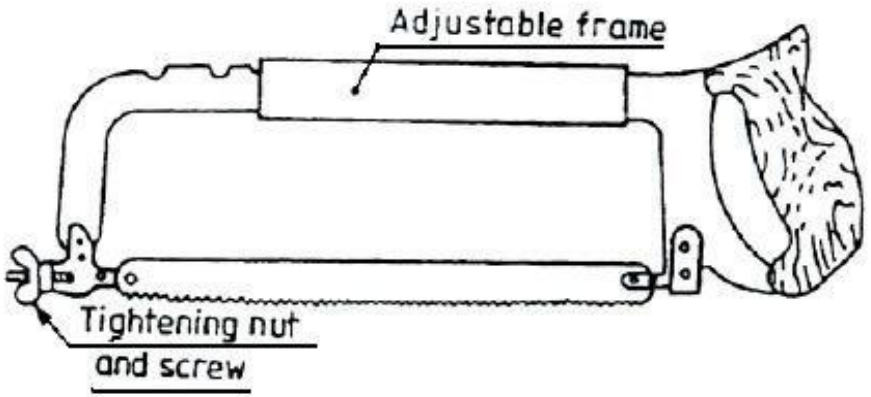
Vernier Height Gauge

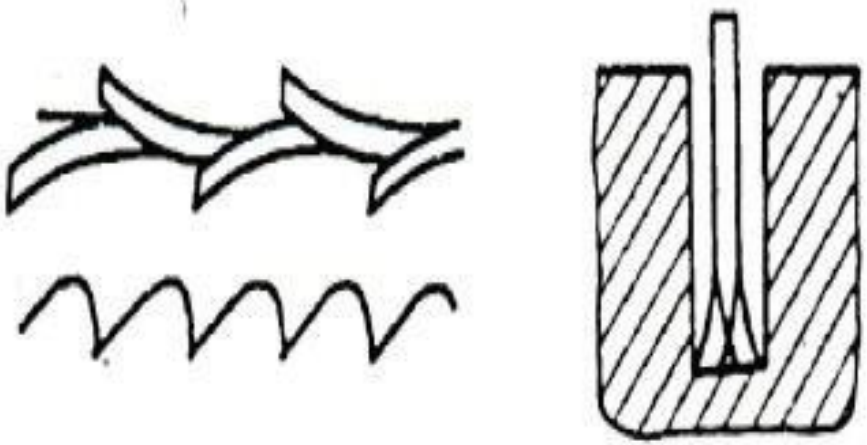


1.4 Cutting Tools

Hack Saw

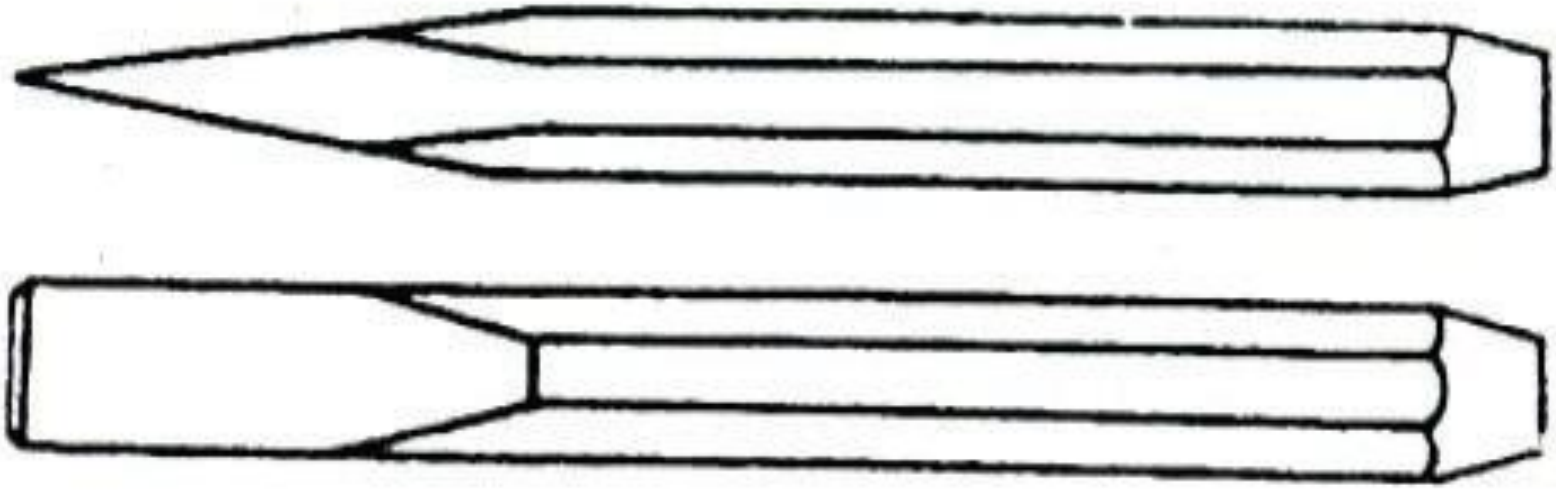




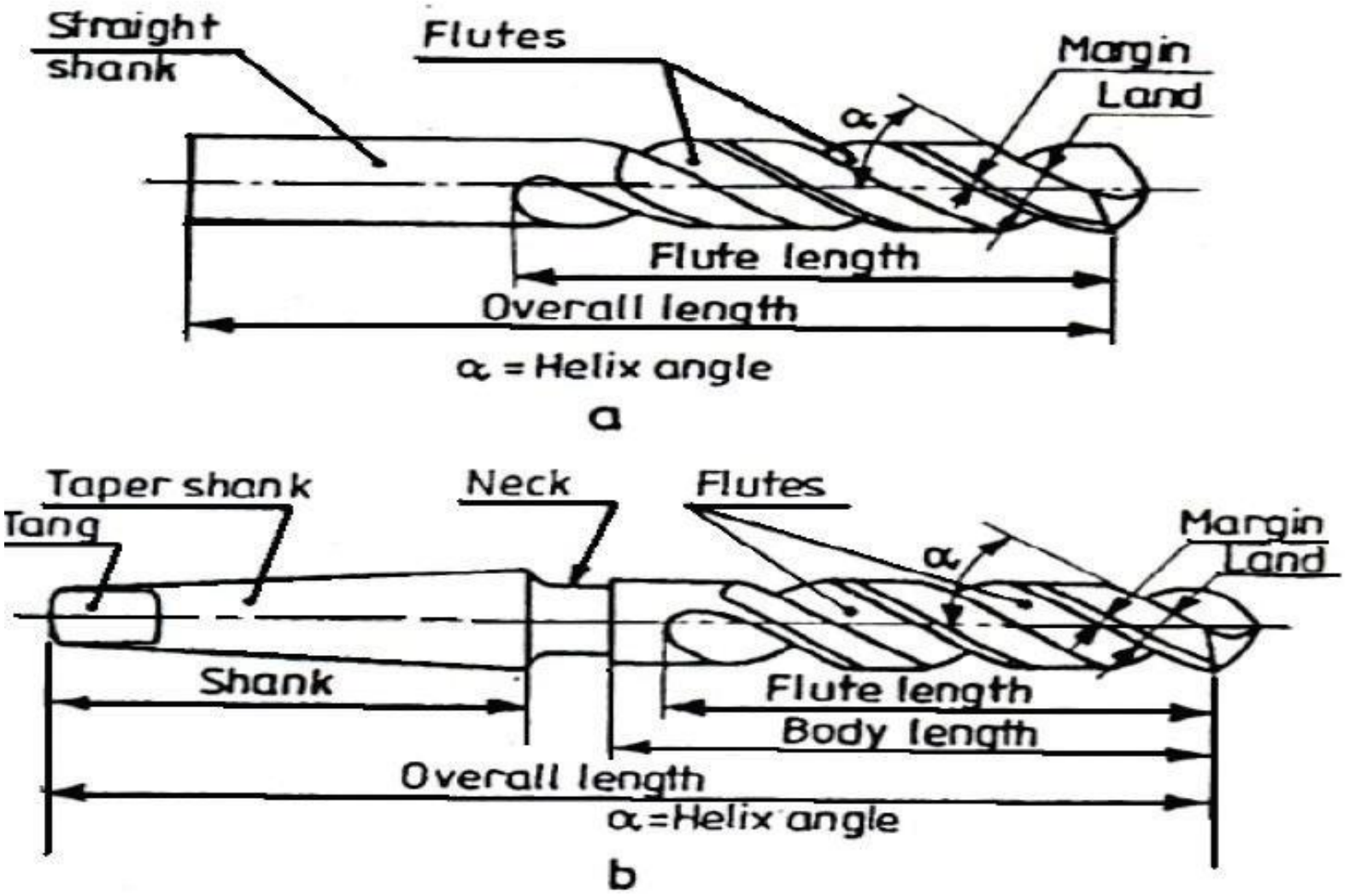


Set of teeth

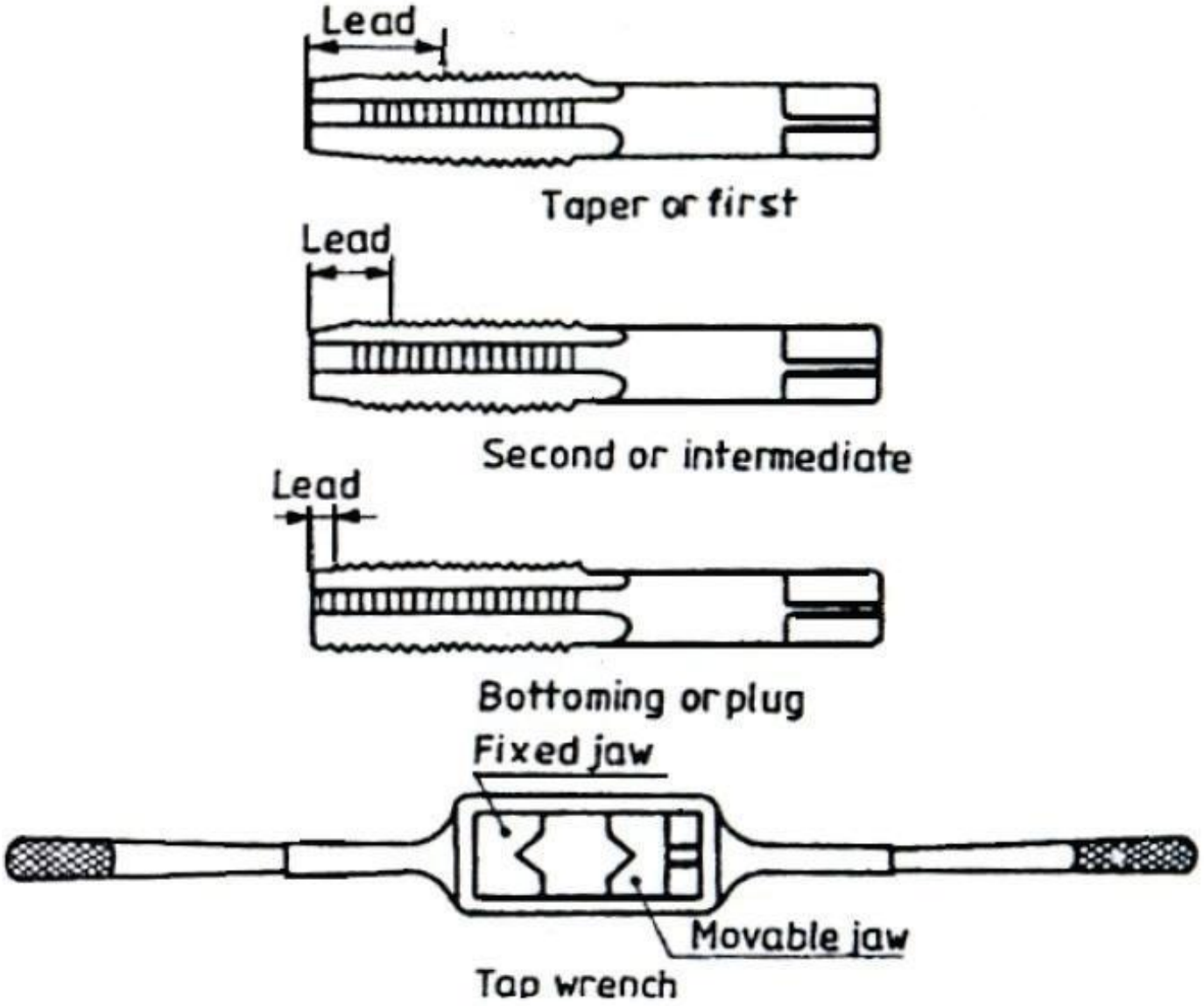
Chisels



Twist Drill

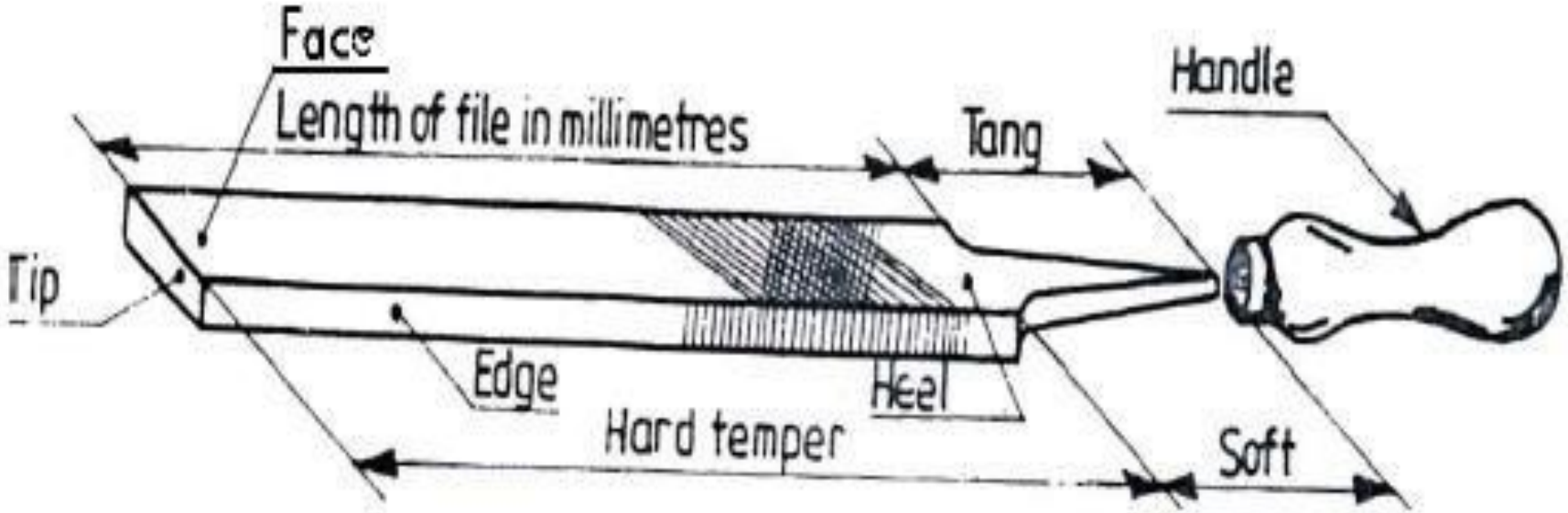

Straight shank
Flutes
Margin
Land
α
Flute length
Overall length
α = Helix angle
a
Taper shank
Tang
Neck
Flutes
Margin
Land
α
Shank
Flute length
Body length
Overall length
α = Helix angle
b

Taps and tap wrench

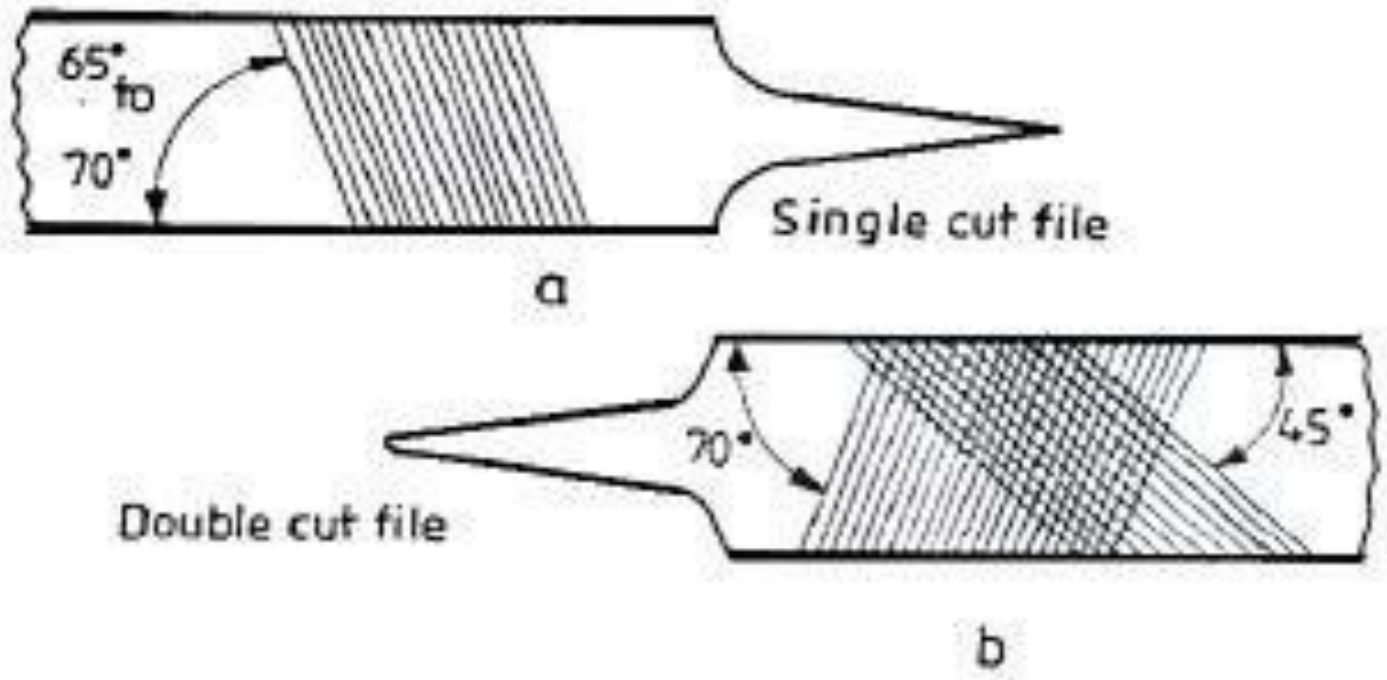


Finishing Tools

Files

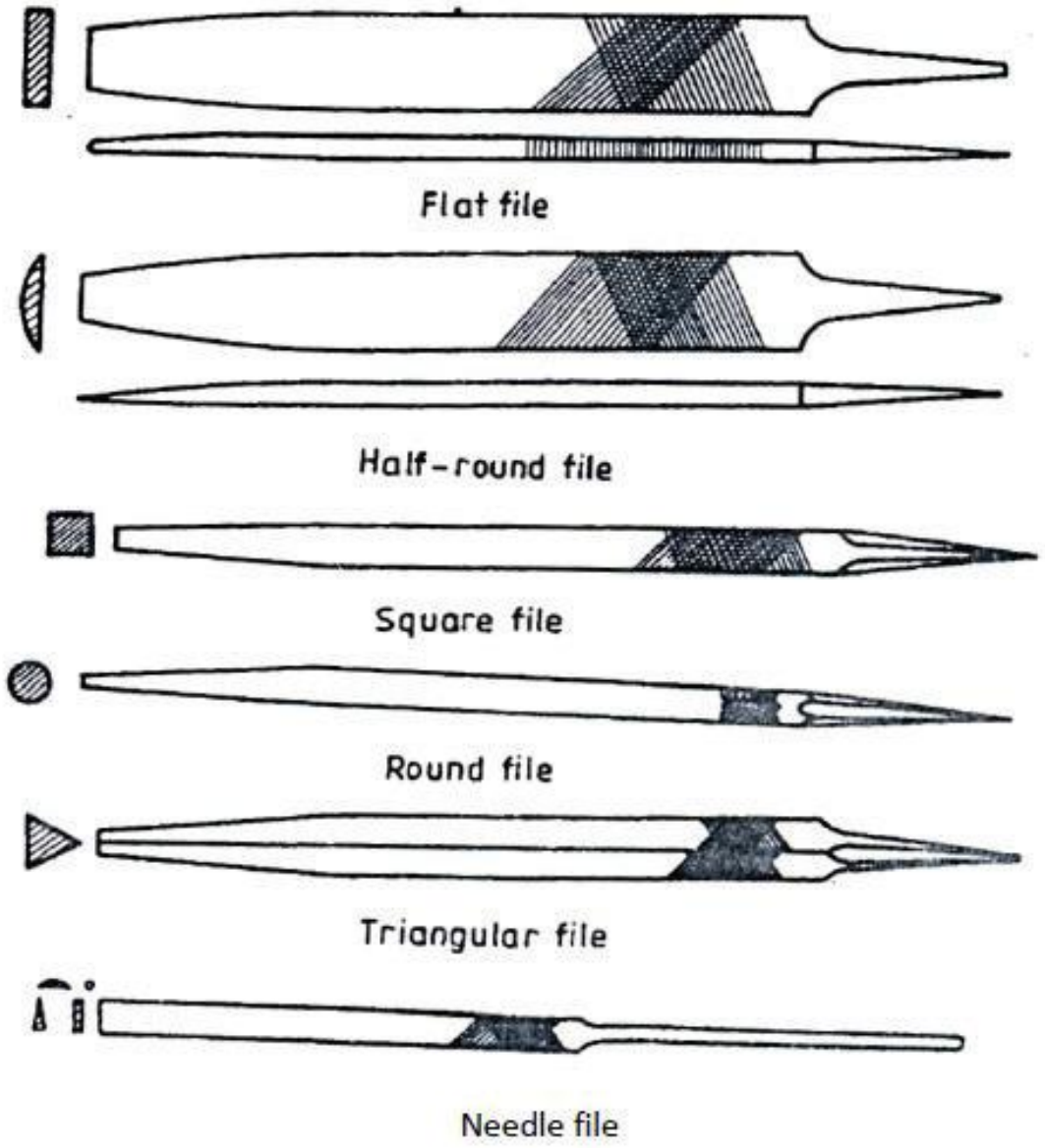


Parts of a hand file

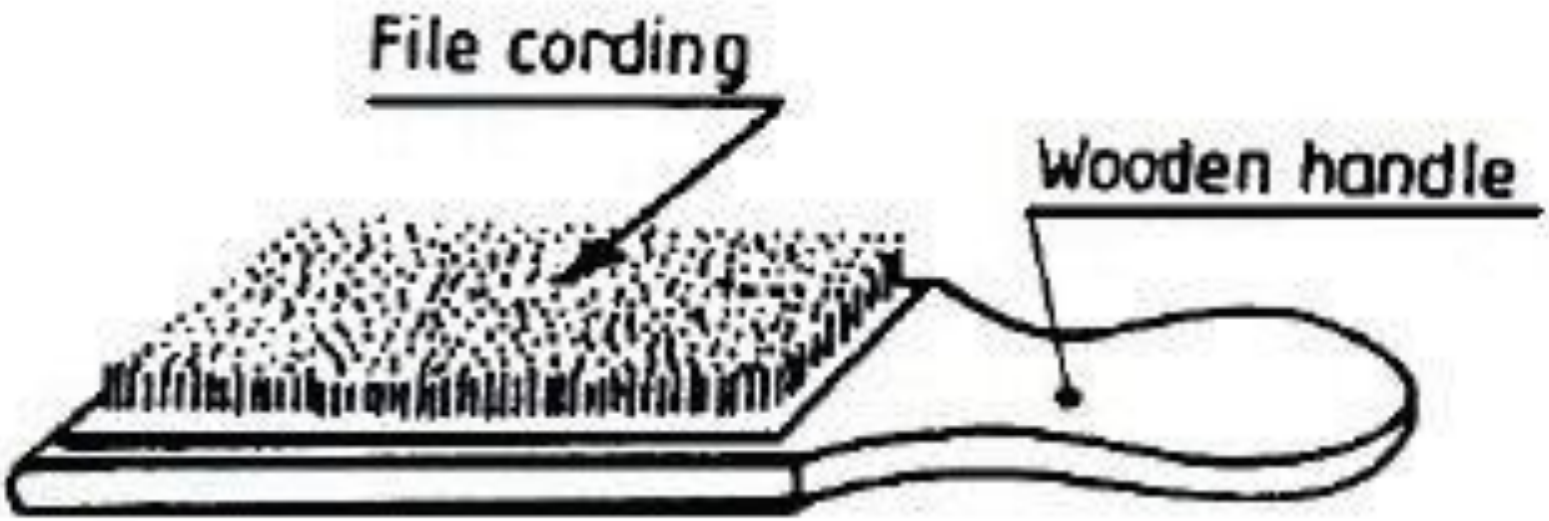


Single and double cut files

Types of files



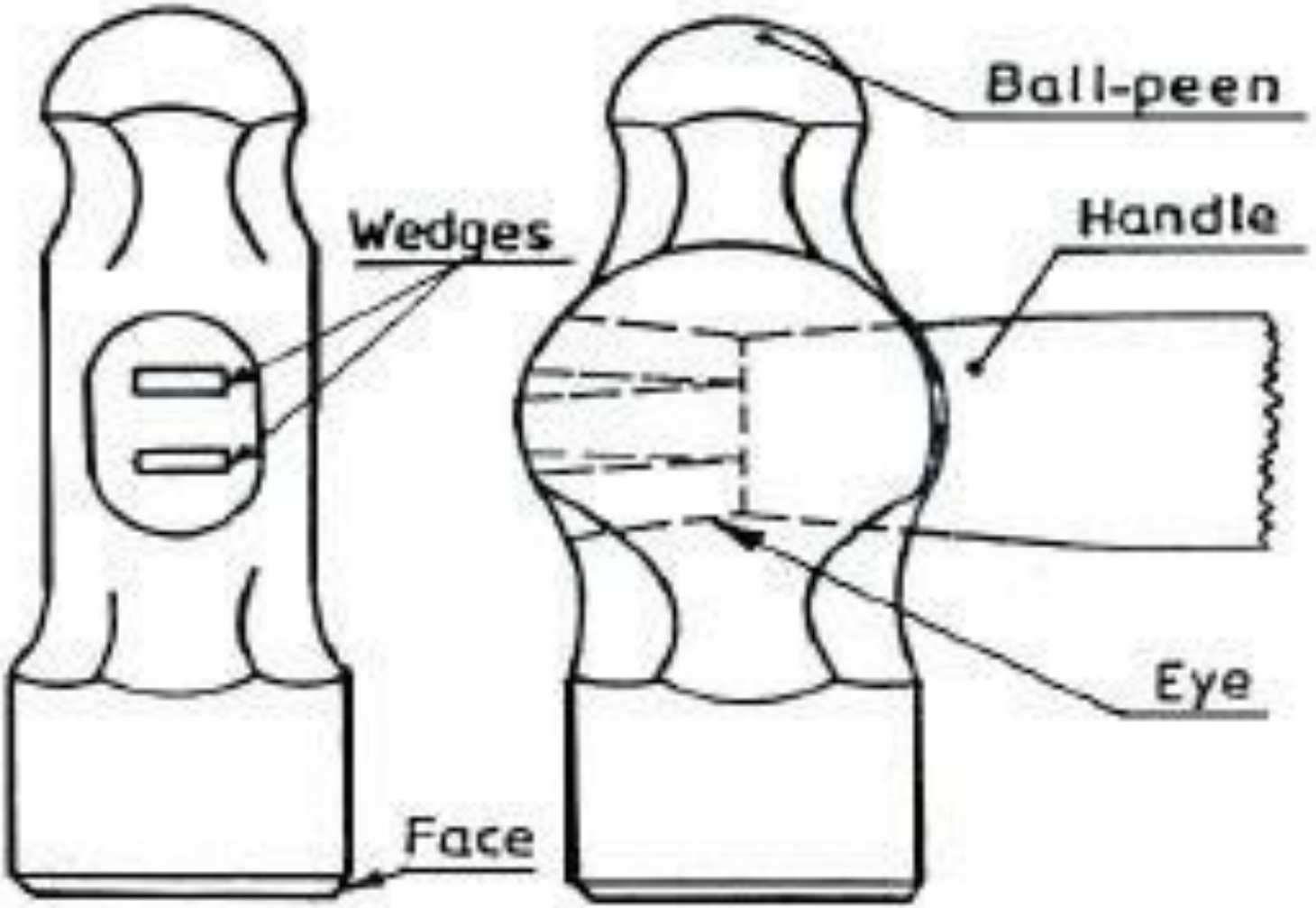
File card



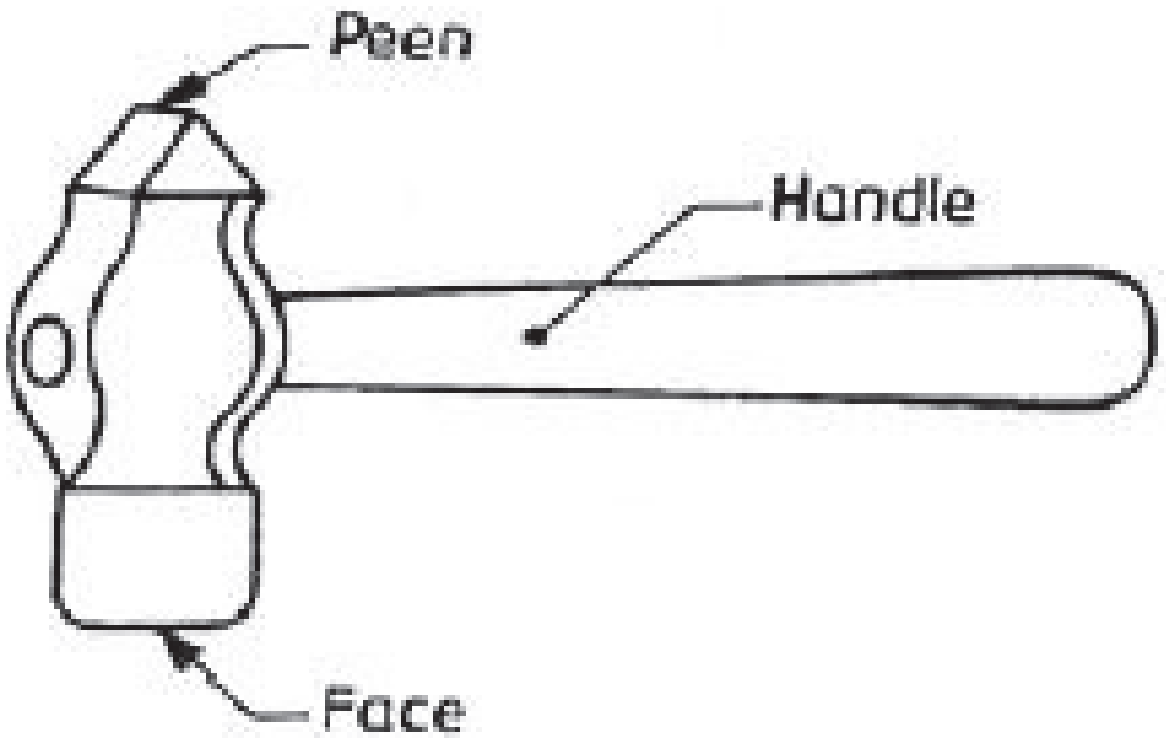
Spirit level



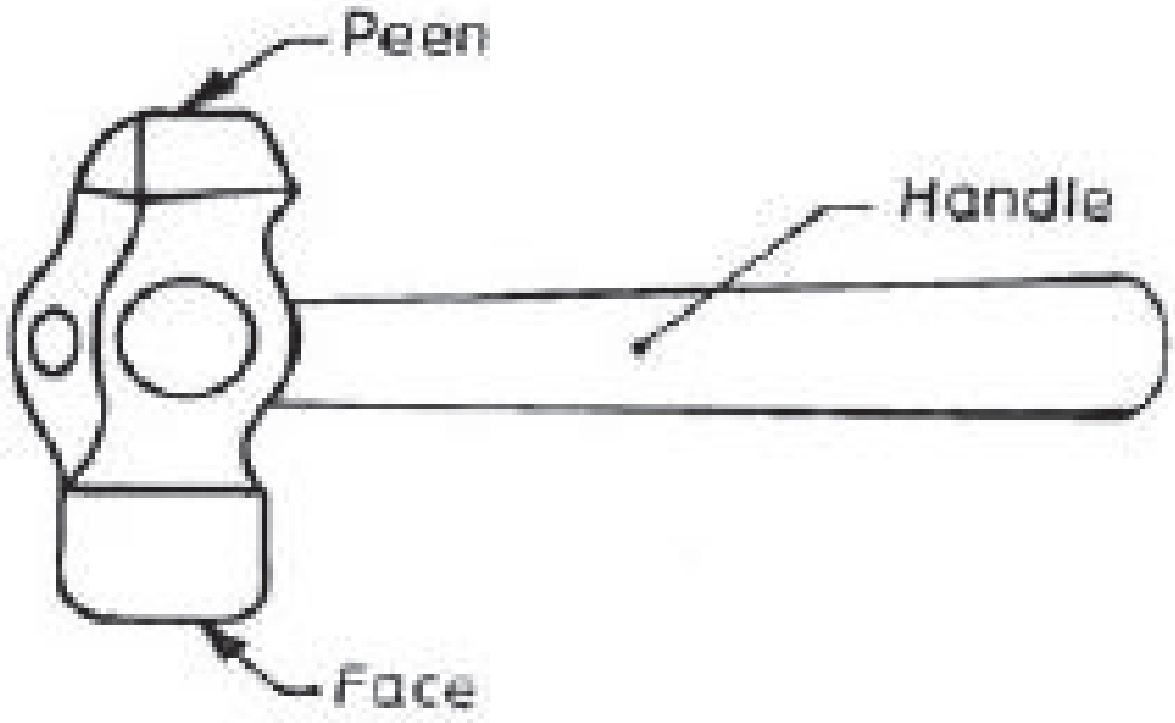
1.6.3 Ball-Peen Hammer



1.6.4 Cross-Peen Hammer

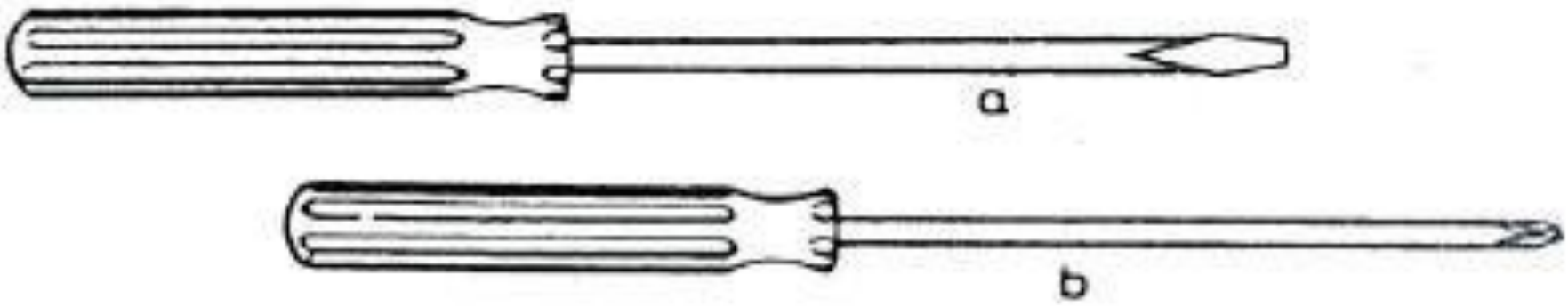


1.6.5 Straight-Peen Hammer



Straight peen hammer

Screw drivers



1.6.7 Spanners

